Gas Access Arrangement Review 2018-2022:

Access Arrangement Information

Submitted: 16 December 2016

About AusNet Services

AusNet Services is a major energy network business that owns and operates key regulated electricity transmission and electricity and gas distribution assets located in Victoria, Australia. These assets include:

- A 6,574 kilometre electricity transmission network that services all electricity consumers across Victoria;
- An electricity distribution network delivering electricity to approximately 680,000 customer connection points in an area of more than 80,000 square kilometres of eastern Victoria; and
- A gas distribution network delivering gas to approximately 665,000 customer supply points in an area of more than 60,000 square kilometres in central and western Victoria.

AusNet Services' purpose is 'to provide our customers with superior network and energy solutions.'

For more information visit: www.ausnetservices.com.au

Contact

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Glossary

section	Full Name
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMS	Asset Management System
ASIC	Australian Securities and Investments Commission
BAU	Business-as-usual
CBD	Central Business District
CAM	Cost Allocation Methodology
capex	Capital Expenditure
CCP	Consumer Challenge Panel
CESS	Capital Efficiency Sharing Scheme
DCF	Discounted Cash Flow
DNSP	Distribution Network Service Provider
EAM	Enterprise Asset and Works Management
EBSS	Efficiency Benefit Sharing Scheme
EGWWS	Electricity, Gas, Water and Waste Services
EMV	Emergency Management Victoria
EPA	Environment Protection Authority
ERP	Enterprise Resource Planning Platform
ESC	Essential Services Commission
ESMS	Electricity Safety Management Scheme
ESV	Energy Safe Victoria
EUAA	Energy Users Association of Australia
GDP	Gross Domestic Product
GFC	Global Financial Crisis

section	Full Name
GIS	Gas Insulated Switchgear
GST	Goods and Services Tax
IAP2	International Association of Public Participation
ICT	Information and Communication Technology
IT	Information Technology
KPIs	Key Performance Indicators
MTFP	Multilateral Total Factor Productivity
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
NPV	Net Present Value
NSP	Network Service Provider
OH&S	Occupational Health and Safety
Opex	Operating and Maintenance Expenditure
PCRs	Protection & Control Requirements
PPIs	Partial Performance Indicators
PTRM	Post Tax Revenue Model
PV	Present Value
RAB	Regulatory Asset Base
RIN	Regulatory Information Notice
RPP	Revenue and Pricing Principles
SCADA	Supervisory Control and Data Acquisition
SCO	Synchronous condenser
STPIS	Service Target Performance Incentive Scheme
WPI	Wage Price Index

Highlights

Delivering efficient services and lower prices

By embedding the operating and capital efficiencies achieved in the current period, the proposal allows for necessary efficient investment to meet customers' expectations. AusNet Services is proposing to deliver an **upfront 5% reduction** in gas distribution charges, resulting in lower prices for gas services on 1 January 2018.

Targeted and prudent investment continues

AusNet Services' gas network consists of 11,000 km of pipelines spanning 60,000 km^2. The network reflects more than 100 years of development with varying performance. Over 7% of AusNet Services' network consists of deteriorated low pressure mains which pose a safety risk to customers and the community. We will continue to remove these deteriorated and unsafe assets from the network, replacing all low pressure mains by 2025.

Listened to customer views

We have responded to feedback from our customers to develop our access arrangement proposal. The insights from this engagement influenced decisions taken in this proposal. Despite gas usage per customer falling, customers have told AusNet Services that they value the gas network and rely on our services. As such, there is a continued need for investment and maintenance on the network. AusNet Services will continue its commitment to maintain the safety on the network by completing the low pressure mains replacement program.

Recognised changing customer behaviour and consumption

Our customers are now consuming less gas than in the past. In response to this changing environment, our proposed gas marketing will support both lower average prices for customers and the sustainability of the network. Further, as gas services are exposed to greater competition we believe that the continuation of a price cap form of control will provide AusNet Services with incentives to provide sustainable services and improve efficiency.

Evident efficient outcomes

AusNet Services has continued to respond to operating efficiency incentives with independent benchmarking analysis concluding that AusNet Services is one of the most efficient gas distributors in Australia.

Strengthening incentive regulation

Incentives have worked. Therefore, broadening the scope of incentives that apply to gas networks to include a network innovation scheme and capital efficiency scheme will drive better performance and efficiency, and balance the existing incentives on opex. There is also support for this amongst stakeholders.

Customers will benefit from lower rate of return

AusNet Services is proposing a reasonable return on its assets from both a customer's and an investor's perspective. In particular, the large fall in interest rates is being passed back to customers. AusNet Services has adopted the AER's Guideline approach to estimating the cost of equity and debt including the AER's Guideline Transition approach to the cost of debt. The **proposed rate of return of 5.63%** is one of the lowest rates ever applied to a regulated electricity or gas distribution network.

Executive Summary

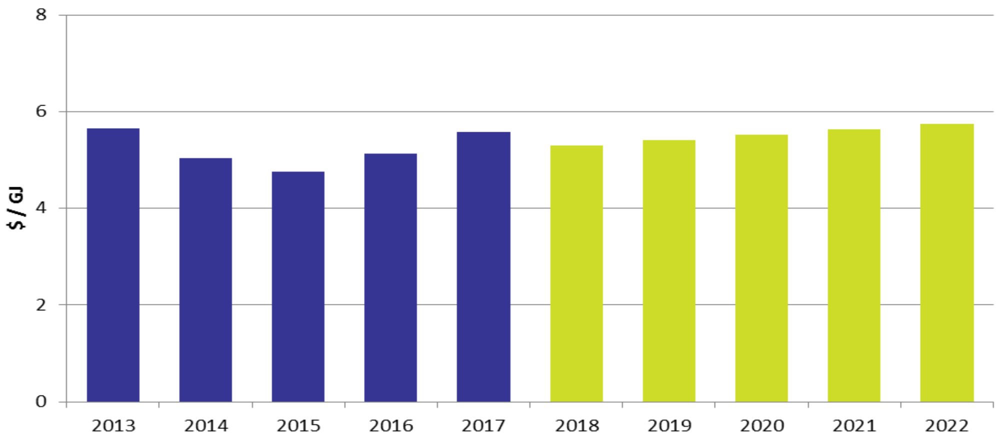
AusNet Services' gas network distributes natural gas from the principal gas transmission system to approximately 665,000 customers across the west of Victoria, including the outer northern and north-west metropolitan area of Melbourne.

This proposal sets out AusNet Services' plans for the gas distribution network for the next five years (from 1 January 2018) and the associated revenues required to deliver those plans.

AusNet Services will continue to deliver low cost gas services

AusNet Services is proposing to deliver an **initial 5% reduction** in gas distribution charges, resulting in lower prices for gas services on 1 January 2018. Following this immediate price reduction, prices for the following years will increase at 2% per annum. The proposed price path is set out in Figure 1.

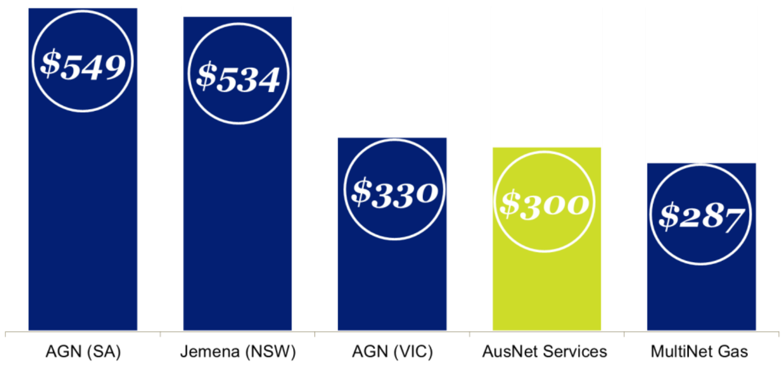
Figure 1: Proposed price path (real $2017)



Source: AusNet Services

The proposal enables AusNet Services to meet the needs of its customers while continuing to offer one of the lowest gas network charges in Australia (see Figure 2).

Figure 2: Estimated average gas network charges in 2018



Source: AusNet Services
Note: estimated 2018 network tariffs based on 2016 published tariffs[1]

1 Average customer assumptions: Annual usage of 46 GJ per in central zone split between peak/off peak rates and fixed component. Based on published 2016 gas tariffs.

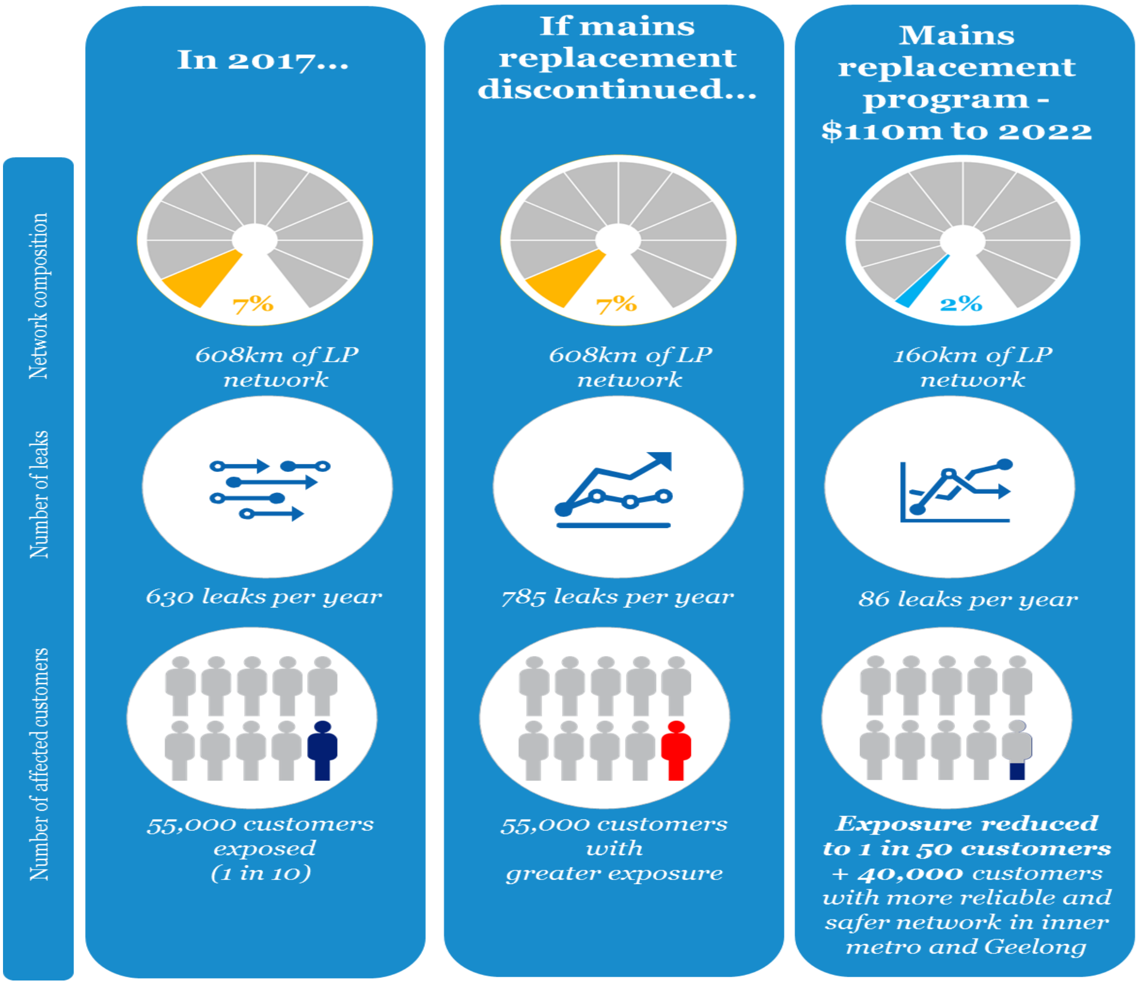
We manage our assets safely and prudently

The gas distribution network has been constructed over a period of more than 100 years, using a variety of pipeline materials with varying performance capabilities. The age profile of the network is varied. The low pressure mains of our network contain the old and most deteriorated assets.

The replacement of the low pressure mains network had its origins in the 2003-07 Access Arrangement review process. In this review process, the Essential Services Commission of Victoria (ESC) noted in its Final Decision that 'it is prudent for [AusNet Services] to implement a long-term program to progressively replace the cast iron parts of the network and thereby minimise the possibility of any major incidents'.[2] AusNet Services has proposed to continue investment over the next five years to remove the old and deteriorated assets from its network. This will remove over 410 kms of aged low pressure mains. In turn, this investment will maintain network reliability and the safety of the network.

As illustrated by Figure 3, without this investment, the annual number of leaks on the low pressure network will increase by 24% and 55,000 customers will continue to be exposed to a high level of gas leaks.

Figure 3: Benefits of low pressure mains replacement program



Source: AusNet Services

2 Essential Services Commission, *Final Decision on Gas Access Arrangement Review* 2003-07, p. 117.

AusNet Services' commitment to completing the mains replacement program by 2025 reflects the serious consequences that major gas leaks can have for public safety. AusNet Services is committed to:

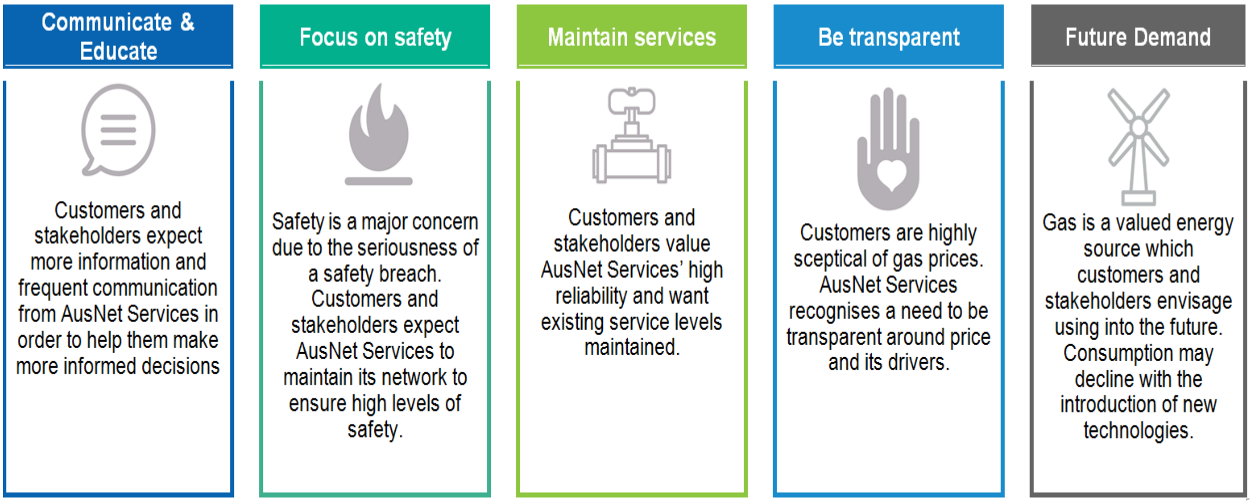
- delivering services safely and in line with good industry practice at the lowest sustainable cost;
- meeting AusNet Services' legislative and regulatory obligations (including State legislation) in a way which contributes to the achievement of the National Gas Objective; and
- delivering on our vision for the gas distribution network.

AusNet Services' focus on completing the mains replacement program by 2025 reflects the serious consequences that major gas leaks can have for public safety. Leakage rate analysis demonstrates that replacing 465 kms of mains (low and medium pressure) over the next five years will keep leakage rates within an appropriate safety level. The capacity and integrity of the network is being improved by replacing deteriorated mains with modern polyethylene pipes.

Listened to customer views

AusNet Services has undertaken a range of engagement activities aimed at understanding its customers' attitudes to network investment and trade-offs between reliability and safety outcomes and operating costs. Over 700 customers and stakeholders were participated in the program across a range of customer categories and insights from their input are summarised below.

Figure 4: Customer and stakeholder engagement insights



Source: AusNet Services

The operation of AusNet Services' network in a safe manner was considered the top priority for customers. Customers were very supportive of investment that improved network and community safety, even when presented with the additional costs of certain programs.

Customers expressed a strong preference for current reliability levels. This satisfaction was shared across different customer and stakeholder groups.

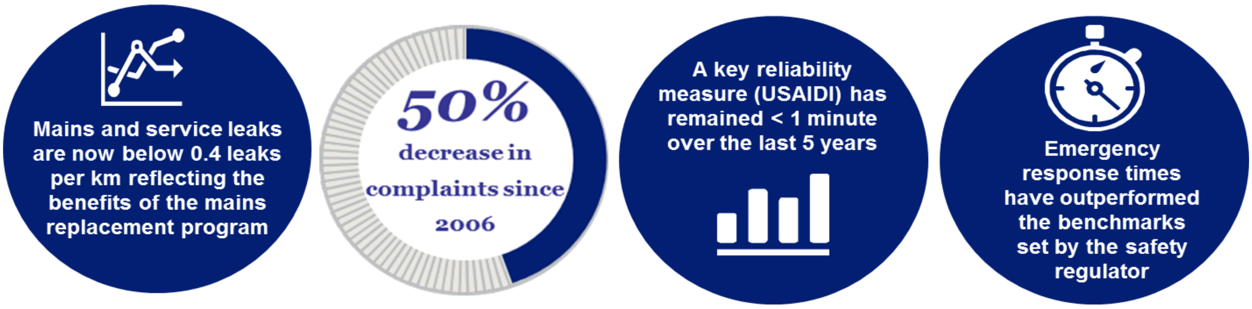
Finally, there was general support for investment in innovation, particularly where it resulted in lower long term costs or higher community benefits such as improved safety or reliability.

AusNet Services has taken care to ensure its access arrangement proposal details where, why and how customer feedback influenced or did not influence the proposals presented. At a high level, however, community consultation has led to a series of coordinated decisions (for example, on the volume of low pressure and medium mains replacement) that stabilises prices for AusNet Services' customers while still delivering the desired improvements in community safety.

Services performance has met or exceeded expectations

Over the last five years, AusNet Services has improved its service performance as summarised below.

Figure 5: Summary of AusNet Services' recent service performance



Source: AusNet Services

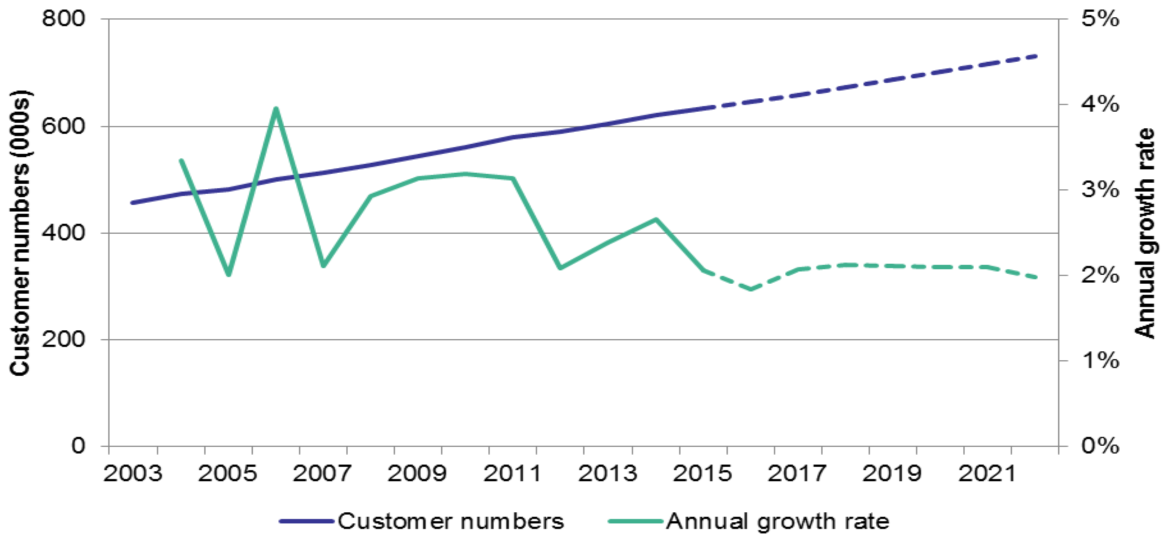
Changing energy behaviour

Increase in customers on the network…

At present, the network contains some of the fastest growing urban and regional locations in Victoria. Within the Melbourne metropolitan area, the number of occupied dwellings in Wyndham and Melton has grown at 30% and 23% respectively over the past five years and are forecast to continue grow over the next five years.

In regional Victoria, AusNet Services' gas distribution network covers major population centres such as Geelong, Ballarat and Bendigo. In addition, regional areas exhibiting strong growth such as Moorabool, Golden Plains, Macedon Ranges and Surf Coast are all located in AusNet Services' network. Over the period to 2022 customer numbers are expected to grow by approximately 2% per year. This is lower than the last five years, where customer growth has been 2.5% per year. Figure 6 shows the total number of actual and forecast customers since 2003 and the corresponding annual growth rate on the right hand axis.

Figure 6: Residential customer growth (LHS) and growth rate (RHS)

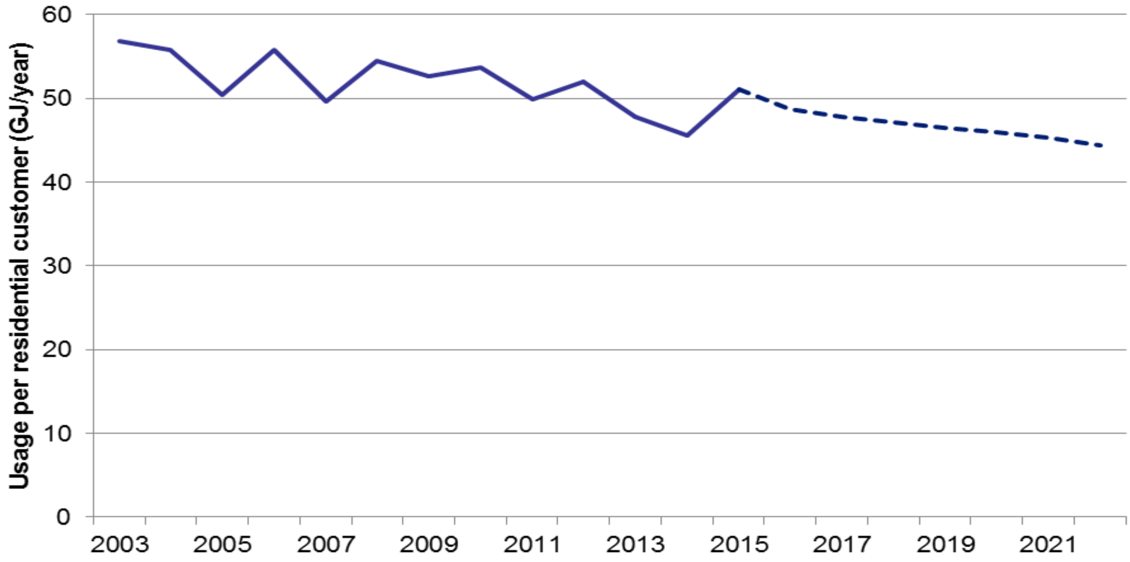


Source: CIE 2018-2022 GAAR Consumption and Customer Forecasts

…but falling gas usage per customer

The current operating environment has seen a change in energy mix and increased energy efficiency across Victoria and our gas network and this is expected to continue. As a result, average consumption per customer is forecast to fall by 1.5% per annum in the 2018-2022 period, an acceleration of the weather normalised trend in the last five years where average consumption per customer fell by 0.9% (see Figure 7).

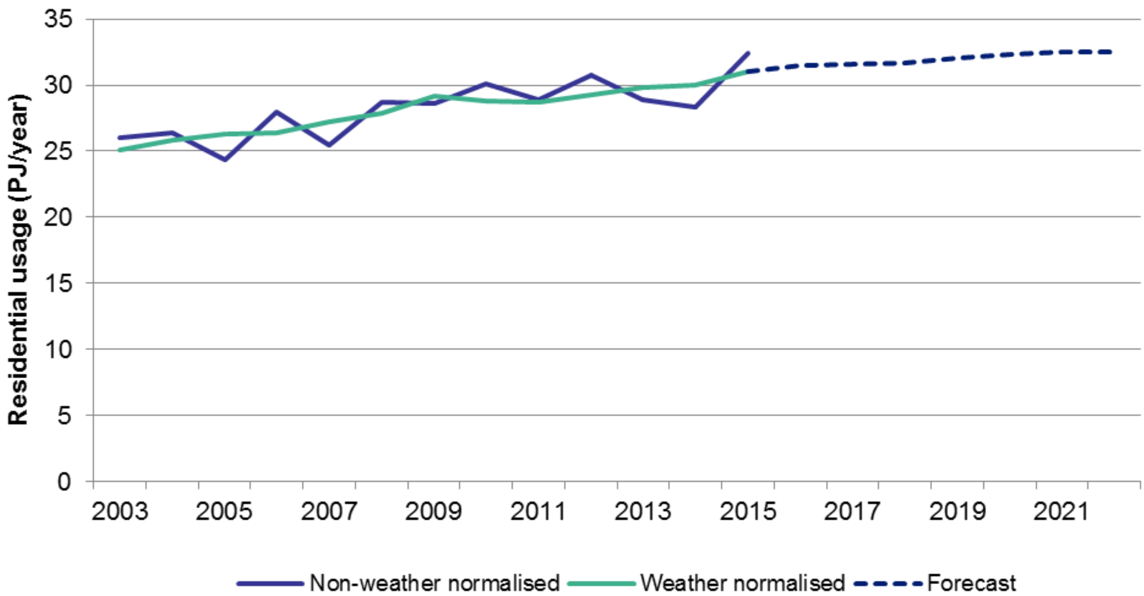
Figure 7: Forecast residential usage per customer (GJ)



Source: CIE 2018-2022 GAAR Consumption and Customer Forecasts

Resident and commercial (Tariff V) consumption is forecast to increase by 0.6% between 2017 and 2022, compared to the 7.6% growth over the five years to 2015. Strong growth in customer numbers, led by forecast household growth, will be largely offset by reductions in consumption per customer (see Figure 8).

Figure 8: Residential consumption (Actual/forecast)



Source: CIE 2018-2022 GAAR Consumption and Customer Forecasts

Marketing program to support gas demand and lower future average prices

Natural gas is a fuel of choice, which means that customers must make a conscious decision to connect to the network and install gas appliances. Marketing plays an important role in encouraging customers to use gas and to improve the relative competitiveness of gas vis-à-vis other fuels. While there has historically been little need to promote the use of natural gas in Victoria to date, average consumption per customer is in decline and this is expected to continue. The Australian Energy Market Operator's (AEMO) most recent projections suggest that annual gas consumption in Victoria will fall from 206 PJ to 193 PJ between 2015 and 2022.[3]

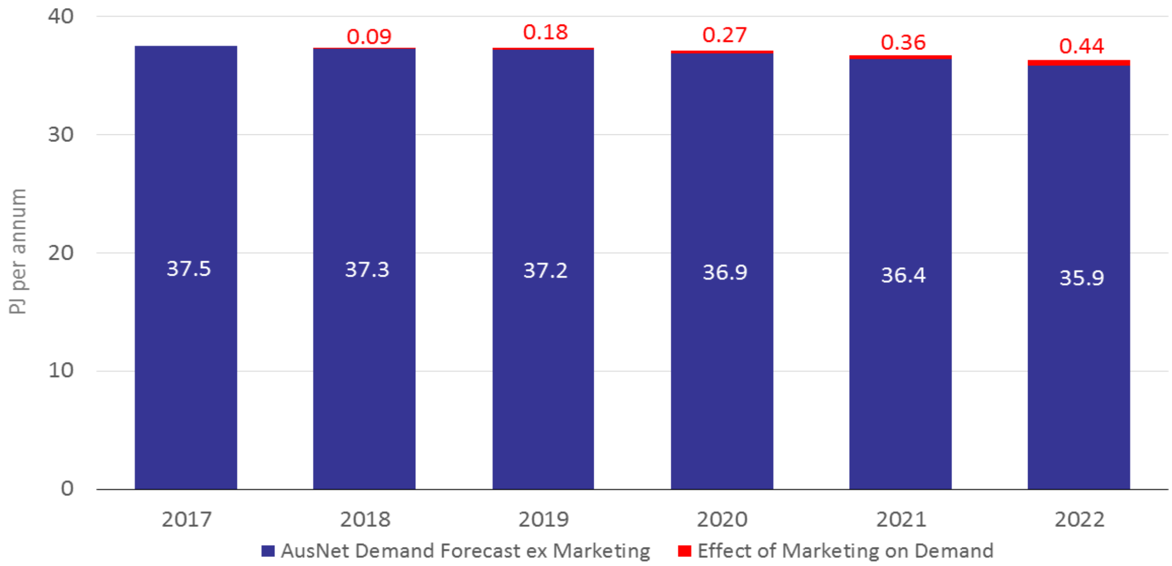
AusNet Services proposes the following measures to mitigate the effect of the projected decline in residential consumption and encourage greater take-up of gas in regional areas:

- an appliance rebate program, which will provide residential customers a financial incentive of up to $750 to purchase gas appliances including gas heaters and hot water systems;
- an advertising campaign, which will use a combination of television, print, outdoor and digital media to promote the use of natural gas, reinforce the benefits of using gas appliances and promote the appliance rebate scheme; and
- industry representation, which will promote the use of natural gas to intermediaries who can influence a residential customer's decision to connect to gas (e.g. builders, developers, plumbers, gas fitters and appliance retailers).

Together, these measures are expected to counter some of the projected decline in demand over the next five years and add 1,054 new connections in AusNet Services' network. By 2022, the additional demand attributable to the proposed marketing activities results in demand being 1.2% higher than would otherwise be forecast.

The incremental effect of the marketing program on demand is shown in Figure 9. The uptake of gas appliances will continue to have an effect on residential and small commercial demand post 2022, with a further 5.8 PJ of demand expected to be added between 2023 and 2041 as a result of the marketing program.

Figure 9: Effect of Marketing Program on Tariff V Demand

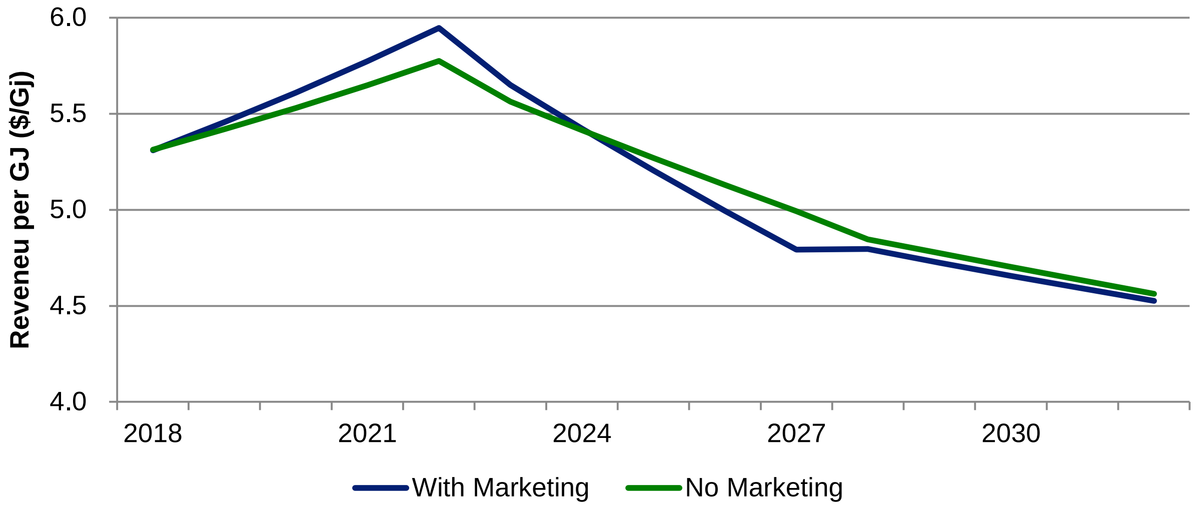


Source: Axiom Economics (2016)

3 AEMO, *National Gas Forecasting Report* V2.0, 2 March 2016.

Independent expert analysis indicates that while the program will result in slightly higher average costs per customer up until 2022, the reduction in average costs per customer in subsequent years brought about by the additional demand will more than offset this increase as the fixed costs of providing services are spread over a greater number of customers (see Figure 10). The marketing program is therefore in the long-term interests of AusNet Services' consumers.

Figure 10: Effect of Marketing Program on Average Cost per GJ



Source: AusNet Services

Note: Smoothed revenue per GJ ($2017)

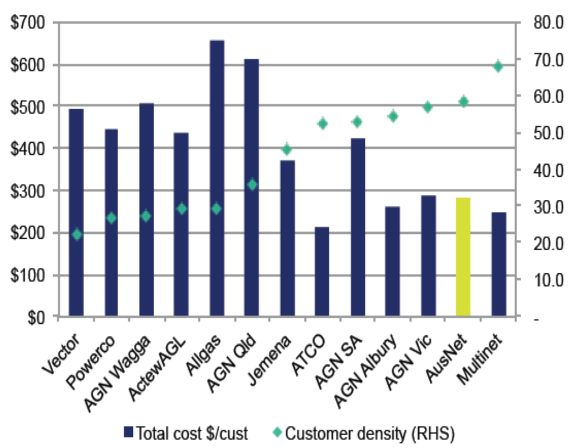
Incentives are working …and need to be strengthened

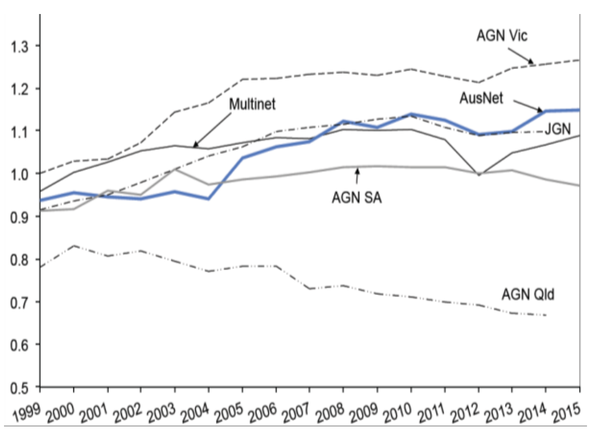
Meeting the needs of the network efficiently

Benchmarking analysis indicates AusNet Services is one of the most efficient gas businesses in Australia. AusNet Services' costs are prudent and efficient as reflected in AusNet Services' average totex (capex plus opex) per customer over 2009-13, which again is one of the lowest amongst gas distributors in Australia.

AusNet Services' productivity compares well. Productivity analysis using the AER's preferred Multilateral Total Factor Productivity (MTFP) economic benchmarking method shows AusNet Services' productivity has improved by more than 10% over the last decade.

Totex per customer is amongst the lowest … and total productivity is second highest





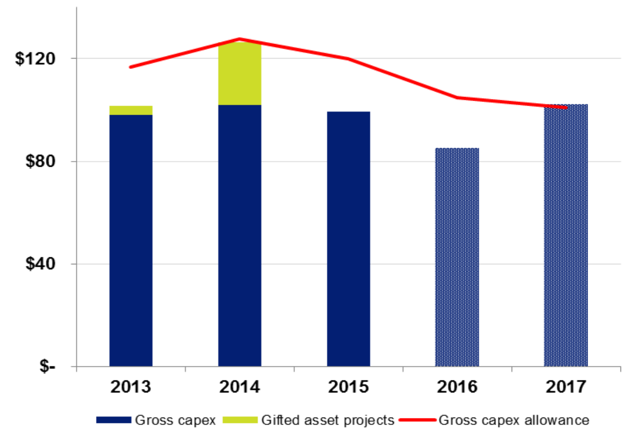
Source: Economic Insights, Benchmarking Gas Businesses Opex and Capital Efficiency, June 2016

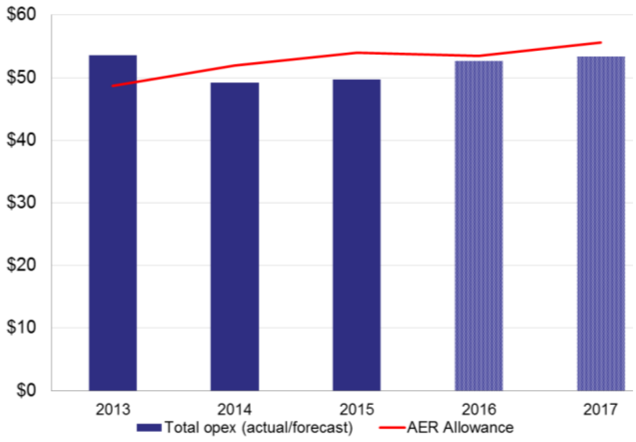
The above high-level indicators of efficiency show that AusNet Services performs well in terms of efficiency. This indicates that AusNet Services is responding to the incentives provided by the regulatory framework. Our positive response to these incentives and sound benchmarked performance demonstrate our practices lead to efficient outcomes.

Current period performance

For the current regulatory period, total (gross) capital expenditure is projected to be 10% under the comparable approved allowance. Total operating expenditure is projected to be 2% below the allowance set by the AER. In the current period, AusNet Services is on track to deliver the approved mains replacement volumes and connect approximately 81,000 new customers. The capital expenditure outperformance expected for the current period is due largely to AusNet Services' ability to drive contractor efficiencies across its service providers, particularly in relation to residential connections.

Capex is 10% below benchmark while … total opex is slightly below





Source: AusNet Service

Note: Real 2017$

AusNet Services has delivered on investments to the network which has led to improvements in its performance since 2004. Between 2013 and 2017, AusNet Services will be removing over 500 kms of mains replacement of its most deteriorated low and medium pressure network. Over the five year period, AusNet Services will also deliver of savings via lower opex costs and capex unit rates. This demonstrates efficient management of AusNet Services' gas network.

Strengthening incentives and encouraging innovation

AusNet Services' performance in opex savings over successive regulatory periods has delivered significant efficiency improvements and thus lower ongoing prices for consumers.

The scope of the incentive arrangements that apply to gas distribution networks is currently much narrower than the arrangements for electricity. There is broad support for strengthening the incentive framework in gas to further improve efficiency and service performance. For the forthcoming regulatory period, AusNet Services proposes to apply:

- **Expenditure efficiency sharing schemes** for opex and capex, which provide incentives to make operating and capital expenditure efficiency improvements. The proposed capital expenditure efficiency scheme includes a conditional payment approach on an asymmetric sliding scale. This means that if AusNet Services achieves capex savings at the expense of not meeting its targets on agreed KPIs, a deflator applies to the efficiency reward.
- A **Network Innovation Scheme**, which provides an allowance for innovative projects which have the potential to deliver benefits to network customers.

- **Guaranteed Service Levels**, which compensate customers who have experienced service performance below the expected standard.

AusNet Services believes that balancing incentives covering expenditure efficiency and innovation will drive continuous improvement in cost and service outcomes for customers.

Ensuring a reasonable return on assets

It is essential that the rate of return is set at a level that reflects the efficient financing costs of a benchmark efficient entity.

AusNet Services is proposing a fair return on its assets from both the perspective of customers and investors, thus achieving the objectives reflected in the National Gas Objective. In particular, the significant fall in interest rates and inflation experienced in worldwide markets are being passed back to customers.

AusNet Services has adopted the AER's Guideline approach for estimating the cost of equity. Using the AER's approach indicates a higher Market Risk Premium should be applied than has recently been accepted by the AER, due to the current lowest ever risk free rate.

AusNet Services has also adopted the AER's Guideline approach to the cost of debt.

AusNet Services' proposed cost of equity (7.3%) and cost of debt (4.5%) are among the lowest approved by the AER and lower than those applied during the current access arrangement period. This yields a proposed rate of return of **5.63%** which is one of the lowest rates ever applied to a regulated electricity or gas distribution network (see Figure 11). This results in considerable savings for customers.

Figure 11: Weighted average cost of capital – electricity and gas distribution

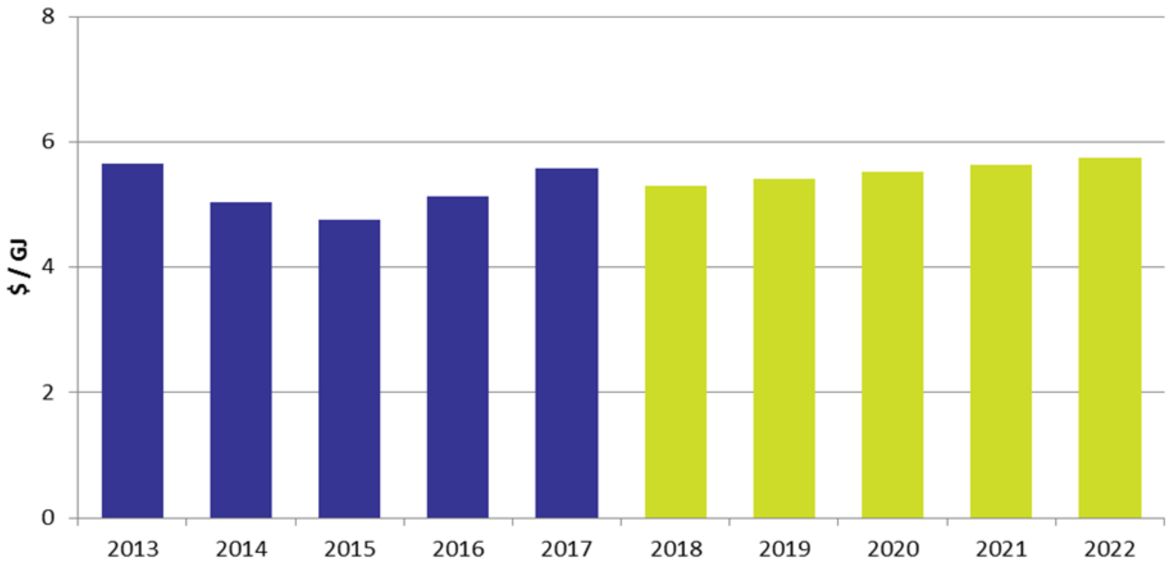
Source: AER (Nominal vanilla weighted average cost of capital)

Further details on AusNet Services' Revenue Proposal

The access arrangement proposal balances each of the elements of the National Gas Objective by continuing to invest significant network capital as is required to meet customers' expectations for their network service and, particularly, to maintain network safety. Simultaneously, the proposal seeks to constrain prices and deliver a network service that is sustainable in the long term.

Total forecast revenues are $1,088M (real 2017$) leading to a 5% real price decrease for customers on 1 January 2018 (see Figure 12).

Figure 12: Proposed price path (real 2017$)

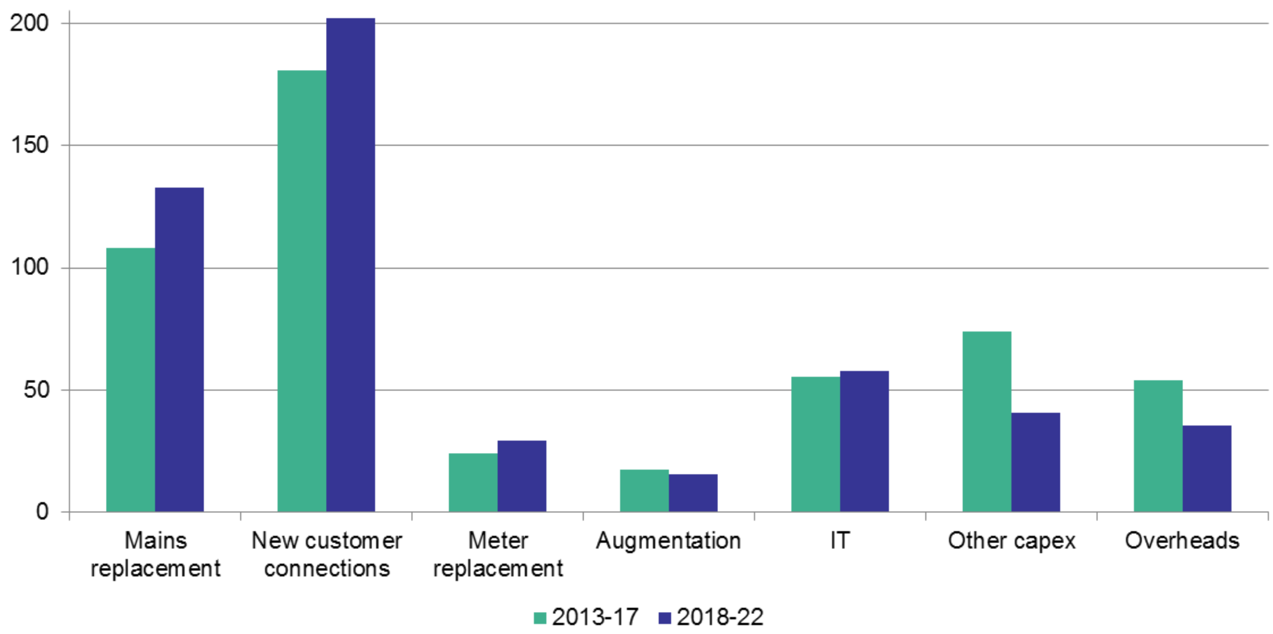


Source: AusNet Services

AusNet Services' total forecast of 2018-22 capital expenditure (capex) is $513.1 million (gross). The forecast equates to $486.7 million of net capex after customer contributions. The forecast is 0.4% lower than the projected capex in the current period.

Expenditure is expected to be relatively flat over the five years, with safety and customer connections driving capital expenditure (see Figure 13). Augmentation, the capital required to expand network capacity to maintain prescribed minimum pressure levels, makes up a smaller portion of the overall capital expenditure than it has in the past.

Figure 13: Total gross capex by category ($M, real 2017$)



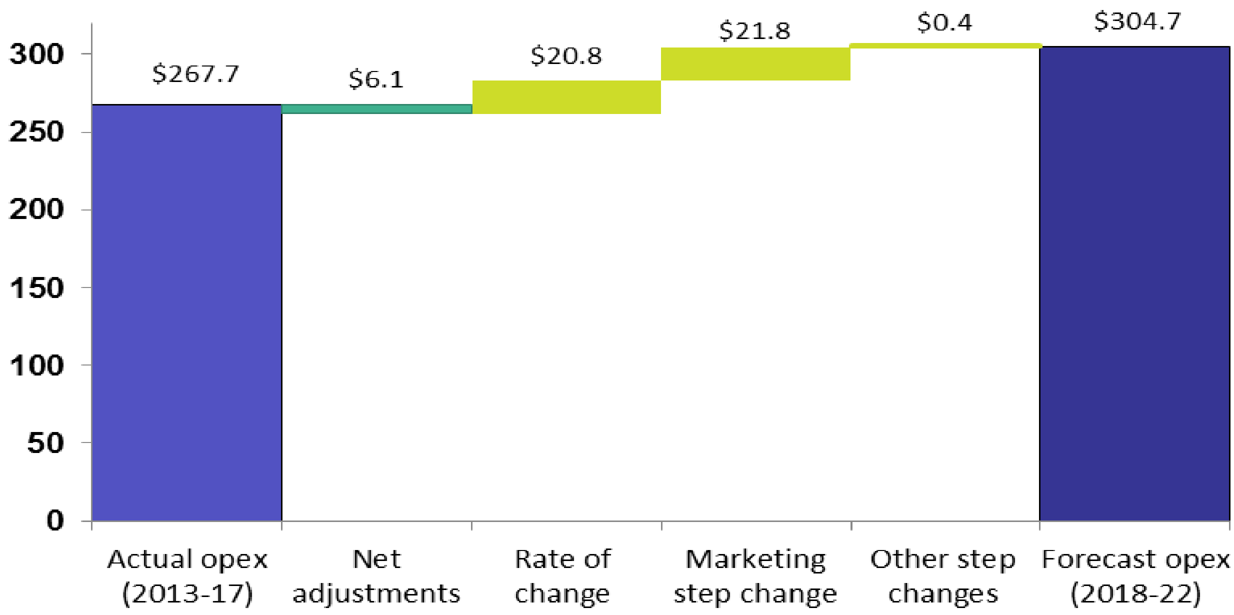
Source: AusNet Services

AusNet Services' capital investments over the next five years will include:

- replacing 465 kms of deteriorating and poor performing gas pipelines;
- connecting 83,000 new customers to the network;
- investing in 27 kms of mains reinforcement to improve quality of supply;
- replacing large end-of-life regulators to improve reliability and quality of supply;
- replacing 150,000 end-of-life gas metering assets at customer premises; and
- improving data capturing processes to optimise the performance of the gas network.

Forecast **operating expenditure** reflects a 'business as usual' outlook, based on current efficient expenditure levels rolled forward with allowance for network growth and labour costs (see Figure 14). An allowance is forecast for marketing activities which will support lower average costs per customer and enable stable future prices.

Figure 14: Total opex ($M, real 2017$)

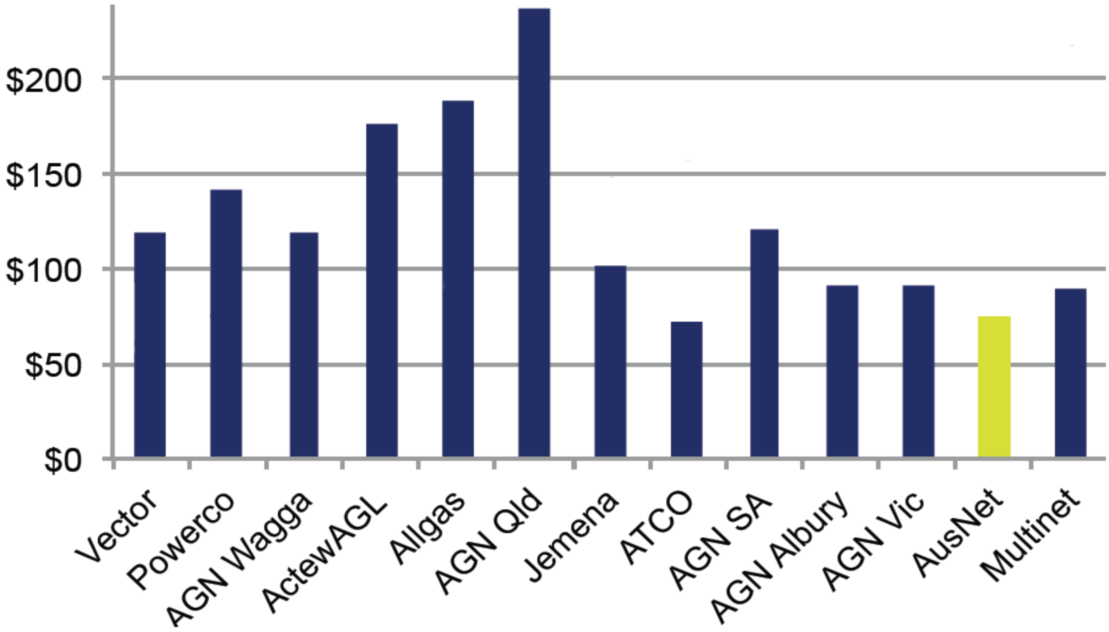


Source: AusNet Services

Note: Includes debt raising costs

As indicated by Economics Insight's analysis, AusNet Services' opex in the current regulatory period has been significantly lower than that of its peers. AusNet Services' average opex per customer between 2011 and 2015 is 20% and 10% lower than AGN and MultiNet respectively.

Figure 15: Annual opex per customer $2010 (2011-2015 avg)



Source: Economic Insights, Benchmarking Gas Businesses Opex and Capital Efficiency, June 2016

Revenue requirements for **taxation** and **depreciation** have been calculated based on the AER's Roll Forward Model (RFM) and Post Tax Revenue Model (PTRM). In the case of taxation, an update to use the AER's current regulatory models reflects evolving regulatory practice and greater consistency across electricity and gas.

Conclusion

AusNet Services' access arrangement proposal properly promotes the long-term interests of its customers by meeting the immediate needs of the network and continuing to provide efficient gas services in a prudent, safe and reliable manner.

AusNet Services has carefully balanced current and future consumers' interests, while addressing the need to attract and retain long-term investment to ensure the distribution business remains capable of delivering safe and reliable gas network services into the future.

1 Introduction

1.1 Purpose of this document

This document, its appendices (including the regulatory information templates) and all supporting material (collectively the “Access Arrangement Information” or “AAI”), is submitted by AusNet Gas Services Pty Ltd ABN 43 086 015 036 (AusNet Services) to the Australian Energy Regulator (AER). The AAI explains AusNet Services’ proposed revisions to its current access arrangement which applies for the 2013-2017 access arrangement period.[4]

Specifically, in accordance with rule 42(1) of the National Gas Rules (NGR), the AAI sets out information that is reasonably necessary for users and prospective users:

- to understand the background to AusNet Services’ access arrangement proposal for the access arrangement period commencing on 1 January 2018; and
- to understand the basis and derivation of the various elements of AusNet Services’ access arrangement proposal.

In all cases, financial information within the AAI, unless stated clearly otherwise, (including but not limited to actual, estimates and forecasts) is stated in real 2016 prices. Escalation is undertaken by reference to September on September Australian Bureau of Statistics All Groups Cities Quarterly Consumer Price Index (weighted average of eight capital cities), with a one year lag. This is consistent with current regulatory practice.

Capitalised terms used in this Access Arrangement Information and not otherwise defined herein have the meanings set out in the Glossary in Part A of AusNet Services’ access arrangement.

As required by rule 42(2), the AAI also complies with the Regulatory Information Notice (RIN) issued by the AER. To demonstrate compliance with the NGR and RIN, AusNet Services has completed checklists that cross-refer to those sections of the AAI that satisfy the compliance obligations. Copies of these checklists are provided in this AAI.

In preparing the forecast information in this AAI, AusNet Services has ensured that it complies with the NGR requirements in rules 74 and 75, which set out general provisions relating to the derivation and presentation of forecasts.

Specifically, rule 74(1) states:

> *“Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.”*

Rule 74(2) states:

> *“A forecast or estimate:*
>
> *(a) must be arrived at on a reasonable basis; and*
>
> *(b) must represent the best forecast or estimate possible in the circumstances.”*

Rule 75 states:

> *“Information in the nature of an extrapolation or inference must be supported by the primary information on which the extrapolation or inference is based.”*

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[4] The current access arrangement was proposed by AusNet Services’ predecessor, SP AusNet. It was approved by the AER on 15 March 2013. Full details are available from the AER’s website at: http://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/ausnet-services-sp-ausnet-access-arrangement-2013-17/final-decision.

In addition, forecasts or estimates in relation to each building block element comply fully with the particular NGR requirements for that element. In each case, the AAI provides an explanation of how AusNet Services has ensured that it complies with the NGR requirements. Marked-up revisions to the current access arrangement and other supporting documents are also submitted to the AER along with this document.

AusNet Services' proposed access arrangement is a full access arrangement[5] because it is an access arrangement that:

- provides for price regulation as required by the NGR for a network of covered pipelines; and
- deals with all other matters for which the NGR requires provision to be made in an access arrangement.

1.2 Composition of AusNet Services' Access Arrangement

AusNet Services' current access arrangement comprises three parts:

Part A sets out the principal arrangements and contains provisions relating to: services policy, capacity management policy, queuing policy, extensions/expansions policy, and the dates for reviewing and revising the access arrangement.

Part B sets out AusNet Services' Reference Tariffs and Reference Tariff Policy, and contains provisions relating to: haulage reference tariffs, ancillary reference tariffs, tariff control formulae, procedures for variations to reference tariffs, new facilities investment, speculative investment fund, incentive mechanisms, fixed principles, and cost pass through arrangements.

Part C sets out the terms and conditions under which distribution services are to be provided to network users.

The architecture and content of the current access arrangement was developed and approved in accordance with the National Third Party Access Code for Natural Gas Pipeline Systems (the National Gas Code). The access arrangement first came into effect on 1 January 1999, with subsequent revisions coming into effect on 1 January 2003, 1 January 2008, and 1 July 2013. The proposed revisions to the access arrangement will therefore be the fifth to apply to AusNet Services' gas distribution network in Victoria.

To minimise the changes to the current access arrangement, AusNet Services will retain its existing three part structure.

1.3 Overview of regulatory framework

The National Gas Law (NGL) and the National Gas Rules (NGR) set out the regulatory framework for gas pipelines. Under the NGL, the AER is responsible for the economic regulation of covered natural gas distribution pipelines in all states and territories except Western Australia.

The NGL sets out the powers and functions of the AER in connection with access arrangements applicable to covered pipelines. The NGL also sets out the matters that the AER must consider and achieve when approving an access arrangement or making a substitute access arrangement.

Specifically, section 28(1) of the NGL requires the AER to perform or exercise its regulatory functions or powers in a manner that will or is likely to contribute to the achievement of the National Gas Objective (NGO). The NGO is set out in section 23 of the NGL, which states:

> *"The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."*

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5 In accordance with the definition of "full access arrangement" set out in the National Gas Law.

Section 28(2) of the NGL also requires the AER to take into account specific revenue and pricing principles when exercising its discretion or making a determination. Those principles provide important guidance not only to the AER, but also to AusNet Services and other stakeholders in preparing and responding to this submission and participating in the subsequent consultation process. The revenue and pricing principles are set out in subsections 24(2) to (7) of the NGL, and are reproduced below.

"(2) A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in—

(a) providing reference services; and

(b) complying with a regulatory obligation or requirement or making a regulatory payment.

(3) A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes—

(a) efficient investment in, or in connection with, a pipeline with which the service provider provides reference services; and

(b) the efficient provision of pipeline services; and

(c) the efficient use of the pipeline.

(4) Regard should be had to the capital base with respect to a pipeline adopted—

(a) in any previous—

(i) full access arrangement decision; or

(ii) decision of a relevant Regulator under section 2 of the Gas Code;

(b) in the Rules.

(5) A reference tariff should allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates.

(6) Regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline with which the service provider provides pipeline services.

(7) Regard should be had to the economic costs and risks of the potential for under and over utilisation of a pipeline with which a service provider provides pipeline services."

In addition to meeting the requirements of the NGL and NGR, this document and the accompanying appendices and templates address the AER's additional information requirements, which it specified in the RIN. This document refers to relevant NGL and NGR provisions where this will assist stakeholders in understanding AusNet Services' proposed revisions.

1.4 Structure of this document

The table below provides an outline of the structure of this document.

Table 1-1: Structure of AusNet Services' access arrangement information

Chapter	Contents
Chapter 1	Provides introductory information including a description of the composition of the access arrangement, and the legal and regulatory framework applying to AusNet Services' access arrangement revision proposal.
Chapter 2	Provides an overview of AusNet Services' gas distribution business, including a summary of the services provided, recent cost and service performance, and the key challenges for the next access arrangement period.
Chapter 3	Provides more detailed information on AusNet Services' performance over the current period, including the level of demand and customer numbers served, capital and operating expenditure, and performance against KPIs.
Chapter 4	Explains AusNet Services' gas demand and customer number forecasts for the forthcoming access arrangement period.
Chapter 5	Sets out information on AusNet Services' approach to customer engagement, the engagement activities undertaken, and the key feedback received from customers.
Chapter 6	Provides details of AusNet Services' capital expenditure forecasts for the forthcoming access arrangement period.
Chapter 7	Provides details of AusNet Services' operating expenditure forecasts for the forthcoming access arrangement period.
Chapter 8	Presents information on AusNet Services' capital base and depreciation.
Chapter 9	Sets out AusNet Services' proposed rate of return and allowance for the cost of corporate income tax.
Chapter 10	Presents a summary of AusNet Services' total revenue requirement in terms of the revenue building blocks.
Chapter 11	Sets out AusNet Services' proposed incentive arrangements, which comprise the AER's Efficiency Benefit Sharing Scheme (EBSS); a Capital Expenditure Sharing Scheme (CESS); a proposed Network Innovation Scheme; and Guaranteed Service Levels (GSLs).
Chapter 12	Presents AusNet Services' proposed pass through arrangements.
Chapter 13	Describes AusNet Services' reference services for the forthcoming access arrangement period.
Chapter 14	Details the proposed price control mechanisms.
Chapter 15	Provides details of AusNet Services' reference tariffs, including an explanation of the charging arrangements and their compliance with the pricing principles set out in the NGR.
Chapter 16	Sets out the fixed principles proposed by AusNet Services.
Chapter 17	Sets out information relating to other matters including the review submission date and revision commencement date, queuing policy, capacity trading policy, and extension and expansion policy.
Chapter 18	Explains the rationale for the proposed changes to Parts A, B and C of AusNet Services' access arrangement terms and conditions.

2. Overview of Gas Business

2.1 Key Points

- AusNet Services' management of its gas distribution network is focused on:
  - Meeting its obligation to deliver a safe natural gas pipeline system in accordance with the National Gas Objective and State legislation;
  - Delivering services in accordance with accepted good industry practice at the lowest sustainable cost;
  - Meeting AusNet Services' regulatory obligations; and
  - Delivering on our vision for the gas distribution network.
- AusNet Services' gas distribution network serves four of Melbourne's fastest developing urban growth corridors. This is reflected in our continued customer growth, but also in our falling consumption per customer, as customers in new dwellings use less gas than those in older dwellings.
- The gas distribution network reflects more than 100 years of development. As a result, the network consists of a variety of different pipeline materials with varying performance characteristics. AusNet Services is, therefore, continuing to invest in the capacity and integrity of the network by replacing old cast iron mains with modern polyethylene pipes.
- AusNet Services delivers its network services as efficiently as possible through competitively sourced contracts with third party service providers. Our efficiency is demonstrated in industry benchmarking where we are one of the most efficient gas distributors in Australia.

2.2 Chapter Structure

This chapter provides an overview of AusNet Services' gas distribution network and business. The remainder of this chapter is structured as follows:

- Section 2.3 provides an overview of the challenges facing the domestic gas market.
- Section 2.4 describes AusNet Services' vision and objectives for the gas distribution network.
- Section 2.5 describes AusNet Services' gas network.
- Section 2.6 concludes the chapter by describing AusNet Services' service delivery model.

2.3 Gas market challenges

The domestic gas market is facing a number of unique challenges that will impact the future of networks. In particular, market conditions are expected to deteriorate over the next regulatory period (2018-2022), ultimately driving down demand for gas.

There are a number of key factors driving this change:

- The decarbonisation of the Australian economy in the medium term, consistent with Government targets, implies that a shift from coal to renewables is required without the transitional step of using gas fired generation.
- Technology improvements and greater customer control in the electricity sector, along with increasing effectiveness and cost efficiency of electrical appliances (relative to gas appliances), threatens the competitiveness of gas.

- The liquefied natural gas (LNG) export market from eastern Australia is pushing up retail prices for domestic gas,[6] a situation that is expected to become more acute in the coming years and make gas less affordable for many customers.
- Increased customer, political and regulatory concerns relating to the affordability of gas in the future.

Fuel switching has not yet emerged as a material trend in Victoria, primarily due to the stronger growth of electricity prices relative to gas and the infrequency of a switching decision (typically, new home construction or at the end of an appliance's life which averages 12 years). However, expected increases in retail gas prices may act as a catalyst for fuel switching in the future. This will ultimately drive down the competitiveness of gas relative to electricity, and result in increased exposure of the gas networks to a downturn in demand and utilisation, and a corresponding increase in future average prices, as fewer customers are available to share the costs of the network.

To assist in addressing these challenges, AusNet Services developed a series of studies to better understand the gas related needs, wants and preferences of its customers. This research program commenced in April 2016 and comprised four distinct studies incorporating focus groups, quantitative surveys, and discussions with customer advocates and stakeholders.

The research has provided valuable insights into the views of stakeholders on the importance of safety, the attributes of gas that are valued, affordability and price, and future demand. The information obtained through this research has assisted AusNet Services in the preparation of this proposal. Further details of the stakeholder engagement activities are set out in Chapter 5.

2.4 Gas Network Vision and Objectives

AusNet Services operates in a dynamic environment, characterised by the challenges described above, along with regulatory changes, technology advancements and shifting customer behaviours and values relating to their energy usage.

Within this ever-changing environment, AusNet Services' purpose is:

> ***"To empower communities and their energy future."***

Our purpose and strategy places customers at the forefront of why we move energy and acknowledges the relationship between individual customers and communities.

Our vision statement for the gas network is:

> ***"To provide our customers with valued services through the continued development and operation of a safe and sustainable gas network."***

To achieve this vision, we will pursue our gas network objectives to:

- maintain network safety in accordance with the Gas Safety Case;
- maintain operating efficiency performance in the top quartile;
- undertake prudent and sustainable network investment; and
- deliver valued services to our customers.

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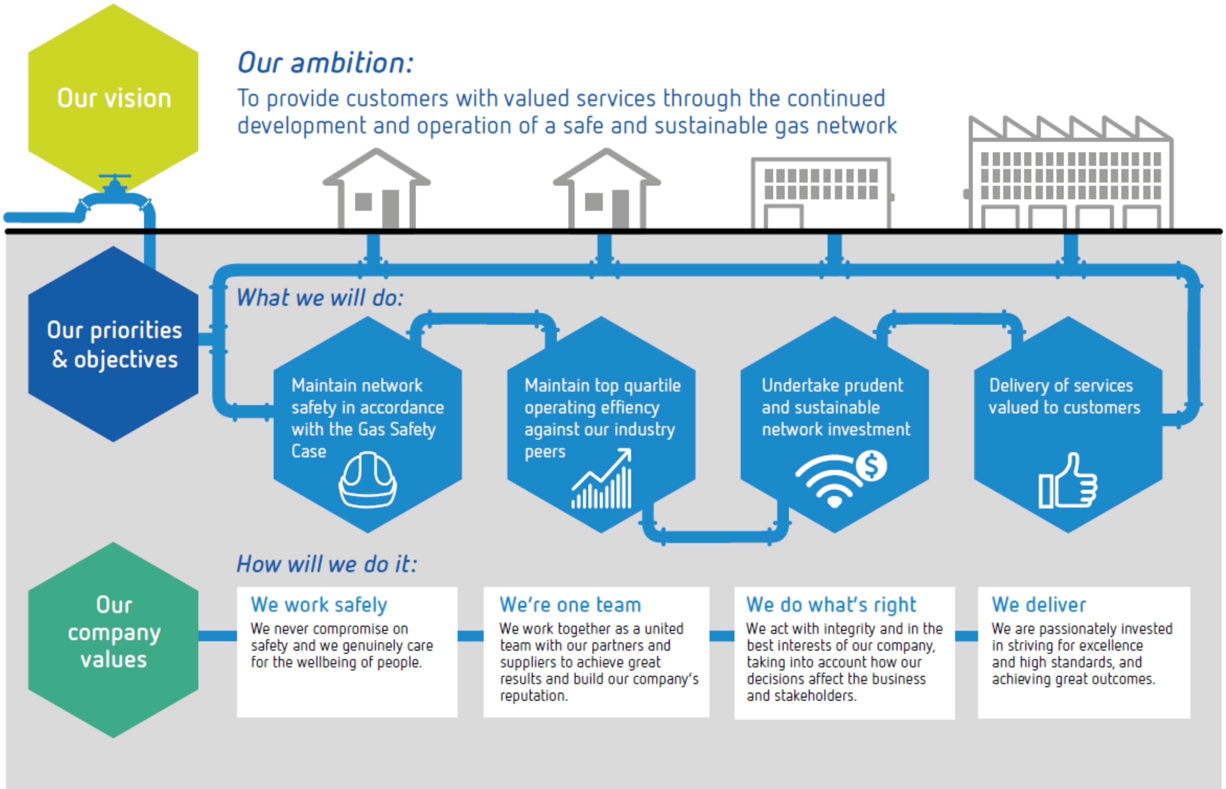
6 AEMO, *National Gas Forecasting Report,* March 2016.

Figure 2-1: AusNet Services' Gas Vision and objectives



AusNet Services balances the cost of increased expenditure against network performance and customer satisfaction in both the short and long term. However, AusNet Services must also meet its regulatory obligations set out in its Gas Safety Case (consistent with the Gas Safety Act and Gas Safety Regulations) and the Gas Distribution System Code.

The expenditure plans for the forthcoming regulatory period are consistent with AusNet Services' regulatory obligations and its vision and objectives for the gas network.

AusNet Services seeks to satisfy its regulatory obligations and deliver on its vision and objectives for the network at stable and competitive prices for our customers.

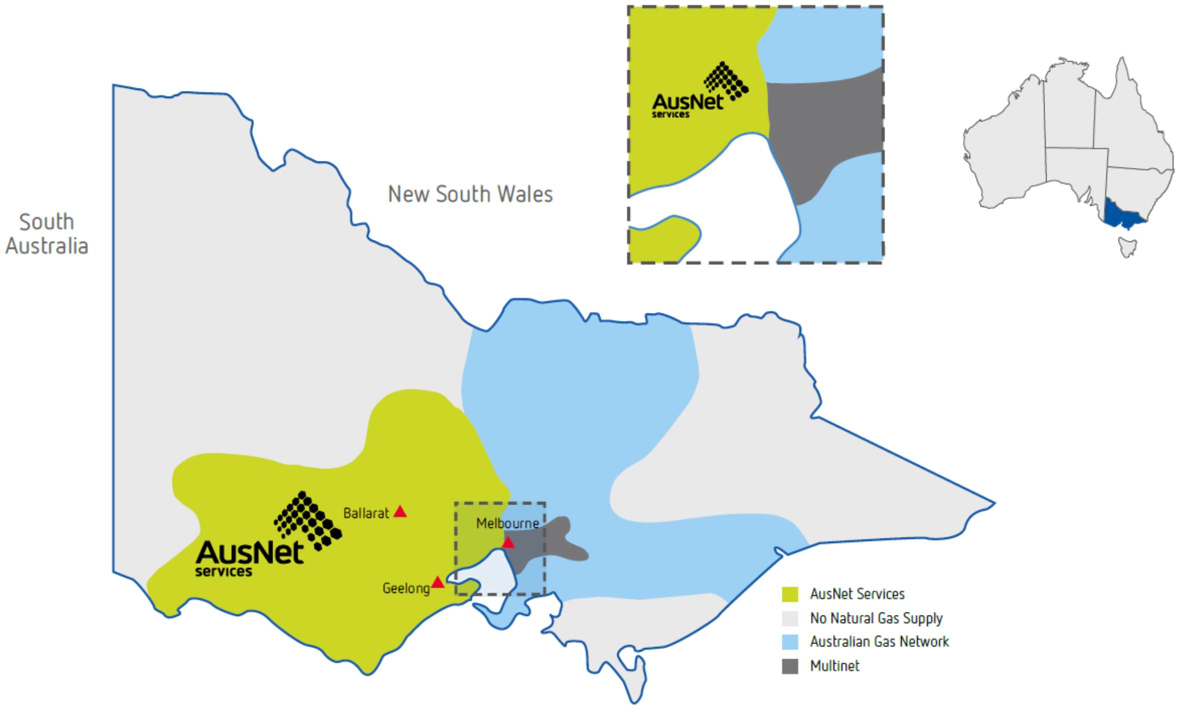
2.5 AusNet Services' Gas Network

AusNet Services' gas network distributes natural gas from the principal gas transmission system to approximately 665,000[7] customers across the west of Victoria, including the outer northern and north-west metropolitan area of Melbourne. The network consists of approximately 11,135 km of mains (pipelines) and hundreds of pressure regulating facilities (such as city gates and field regulators) spanning a geographically diverse region of approximately 60,000 km^2.

The figure below highlights the geographical footprint of AusNet Services' gas and electricity distribution networks. The gas network extends from the Hume Highway to the South Australian boarder, and North of Bendigo and Horsham. In accordance with Rule 48(1)(a), this is the gas pipeline to which this access arrangement information relates. AusNet Services also owns an LPG vapour reticulation network at Mt Baw Baw, which is not the subject of this access arrangement proposal.

7 As of July 2016.

Figure 2-2: AusNet Services' Gas Distribution Network



Source: AusNet Services

At present, the network contains some of the fastest growing urban and regional locations in Victoria. Within the Melbourne metropolitan area, the number of occupied dwellings in Wyndham and Melton have grown at 30% and 23% respectively over the past five years.

In regional Victoria, AusNet Services' gas distribution network covers major population centres such as Geelong, Ballarat and Bendigo. In addition, regional Local Government Areas exhibiting strong growth such as Moorabool, Golden Plains, Macedon Ranges and Surf Coast are all located in AusNet Services' network. Over the period to 2022, customer numbers are expected to grow by approximately 2% per year.

Increasing energy efficiency, fuel switching and a warmer climate are expected to moderate gas consumption, with current forecasts indicating a slight increase in demand volumes to 2022. The gas demand profile of the network is winter peaking, with a pronounced spike arising from the increased customer take-up of domestic heating. Management of the gas peak demand is, accordingly, an important consideration in the management of the network.

The majority of the distribution system operates at high pressure with a minimum allowable pressure of 140kPa to a maximum of 515kPa. 'City gates' regulate supply from the transmission system (owned and operated by APA Group) to AusNet Services' distribution network.

The medium pressure distribution systems operate between 15kPa to 140kPa, with Field Regulators controlling gas supply from AusNet Services' high pressure networks. The low pressure distribution systems operate up to 7kPa with District Regulators controlling gas supply from AusNet Services' high and medium pressure networks. Pipeline corrosion is managed by installing corrosion protections units (CPUs) and sacrificial anode beds.

Meter and regulator assemblies, which vary from large industrial or commercial units to small domestic units, supply gas to consumers. A meter and regulator setup is provided for each supply point (i.e. customer connection) from the distribution network.

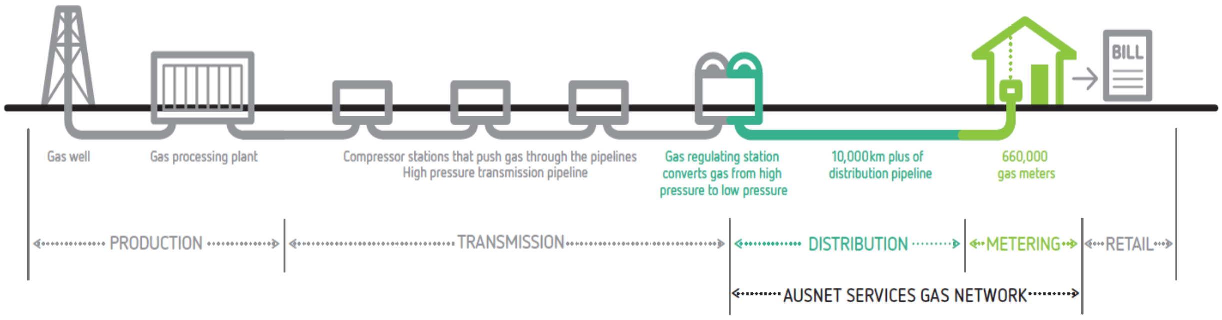
AusNet Services uses a SCADA (Supervisory Control and Data Acquisition) system to monitor and control assets across the network from the transmission system to the network fringe. The

SCADA system provides data on the real-time performance of the assets, and data for long-term evaluation of gas demand and network performance to identify potential system deficiencies.

The SCADA system is made up of Remote Telemetry Units (RTUs), a radio and telephone communications system, and a host computer system supporting the Network Operations Centre, which operates 24 hours a day, 365 days a year.

The diagram below depicts AusNet Services' gas distribution network in the context of the gas supply chain.

Figure 2-3: Process flow of gas distribution in Victoria



Source: AusNet Services

An overview of AusNet Services' gas distribution network assets is provided in the table below.

Table 2-1: Gas Distribution Network Asset Summary

Asset	Number / Length	Mean Service Life (Average Years)	Expected Service Life
Transmission Pipelines	185km	42 years	80 years
Distribution Mains	10,951km	23.8 years	
– High Pressure 2 (HP2)	– 92km	– 30.3 years	60 years
– High Pressure (HP1)	– 9,381km	– 20 years	60 years
– Medium Pressure (MP)	– 702km	– 40.4 years	60 years
– Low Pressure (LP)	– 776km	– 43.8 years	60 years
Meter Types	655,602 units	9.94 years	-
– Domestic Meters	639,882 units	10.13 years	15 years
– Industrial & Commercial Meters	15,702 units	8.48 years	10-15 years
City Gates	38 units	30 years	50 (est.) years

Asset	Number / Length	Mean Service Life (Average Years)	Expected Service Life
Gas Pre Heaters	36 units	19 years	50 (est.) years
Field Regulators	106 units	31 years	50 (est.) years
District Regulators	73 units	26 years	50 (est.) years
SCADA (remote terminal units)	196 units	17.4 years	15 years
Cathodic Protection Units (CPU)	178 units		
Transmission	– 18 units	– Various	30 years
Distribution	– 160 units	– Various	30 years

Source: AusNet Services

The gas distribution network has been constructed over more than 100 years and using a variety of pipeline materials with varying performance capabilities. Cast iron and steel were used predominantly until the introduction in the late 1970s of polyvinyl chloride (PVC) for low pressure pipeline replacement and polyethylene for high pressure networks. Today, PVC is no longer installed in the network, leaving polyethylene as the dominant pipeline material.

The type of material dictates the maximum operating pressure and affects the overall performance of the network. Since cast iron and PVC can only be operated at medium and low pressures compared to polyethylene, the continuing replacement of cast iron mains with polyethylene pipe enhances the capacity and integrity of the network, helping to offset some of the natural age-related deterioration. Polyethylene materials also deliver significant safety benefits over the ageing cast iron assets.

The table below provides a summary of AusNet Services' gas distribution network in terms of pipeline pressure and material.

Table 2-2: Network composition by pipe pressure and material (as at June 2016)

Material	Low Pressure	Medium Pressure	High Pressure 1	High Pressure 2	Trans-mission Pressure	Total
Cast Iron	254km	9km	-	-	-	263km
Polyethylene	17km	244km	7,121km	62km	-	7,446km
PVC	410km	-	-	-	-	410km
Uncoated Steel	43km	243km	-	-	-	286km
Coated Steel	22km	204km	2,259km	29km	185km	2,700km

Material	Low Pressure	Medium Pressure	High Pressure 1	High Pressure 2	Trans-mission Pressure	Total
Other	28km	-	-		-	28km
Total	776km	702km	9,381km	91km	183km	11,135km

Source: AusNet Services

In accordance with the requirements of Rule 48(1)(a), a description of the pipeline can be inspected at http://www.ausnetservices.com.au/Gas.html.

The geographical and physical features of AusNet Services' gas distribution network provide important context for the company's service performance and expenditure plans for the forthcoming access arrangement period. In particular, plans for asset renewal and augmentation are informed by the need to replace cast iron and unprotected steel mains, which impose capacity constraints and performance risks in terms of leakage. Capacity must be expanded to meet demand for network services, given that three of Melbourne's major growth corridors are situated in AusNet Services' network.

2.6 Service Delivery Model

2.6.1 Overview

The core functions associated with AusNet Services' ownership and operation of its gas network are Asset Management, Service Delivery Management, Customer Management, Corporate Services and Strategy. These functions are performed in-house. Operation and Maintenance (including minor capital works) and Major Capital Projects are delivered by external service providers under two separate agreements.

2.6.2 Internally-Resourced Core Functions

The table below describes the core functions that are undertaken by AusNet Services' internal resources.

Table 2-3: The core functions performed by AusNet Services

Business Area	Functions
Network Management	Compliance Strategy in all areas Asset Maintenance & Replacement Strategy Network Planning & Development Network Information Management (Strategy & Analysis) Development of Asset Management Plans & Work Programs Development of Asset Policies, Standards & Technical Bulletins
Service Delivery Management	Management of interface with Service Providers for network services Monitoring of Service Providers operational compliance in all areas Performance Management Large Capital Project Management Health Safety & Environment (HS&E) Oversight Audit
Network Control Centre	Manning of a 24hr / 7 day a week Network Control Centre Provision of 24 hr / 7 day a week Dispatch Function Support & Maintenance of SCADA Real Time Systems
Customer and Market Management	Revenue & Tariff Management Retailer / Customer Connection Management Key Customer/Stakeholder Relationship Management
IT Services	IT Strategy IT Architecture & Planning Asset Management Platforms
Corporate Services	Regulatory Management Regulatory Accounting Financial & Management Reporting Treasury Settlements Corporate Affairs Internal Audit Accounting including Cash Management & Transaction Processing Property Management

Source: AusNet Services

2.6.3 Operations and Maintenance Contract

In April 2013, AusNet Services' operations, maintenance and minor capital contract was outsourced. The structure of the agreement aligns contractor with AusNet Services' incentives to seek continual improvements in network and operational performance. The revised contract was awarded following a competitive tender process, with the contract awarded to Downer as the best compliant and commercial offering.

The agreement is a unit rate contract where the contractor is paid monthly for units completed. These units include such activities as searching for escapes (subsequent to a public report of smell of gas), conducting leakage surveys, repairing mains and other standard maintenance activities. AusNet Services' primary service provider will also undertake the majority of customer connections works, which are standard connections in terms of laying mains and services. For larger developments, the connection work is generally referred to AusNet Services' capital works tender panel.

Ongoing contract performance is monitored and controlled via KPIs, which are regularly reviewed to ensure the contractors' performances continue to be consistent with AusNet Services' businesses objectives.

2.6.4 Major Capital Works

Major capital works projects typically have a value of over $100,000 and are awarded to successful applicants pursuant to the Installation Service Provider (ISP) or capital works agreement. The ISP Panel consists of 5 panel members appointed for a 5 year period (3 + 1 + 1) ending on 31st March 2017. Panel members were selected based on an assessment process where their safety, competeviness, quality, delivery record and financial viability were assessed, and their ongoing performance against these variables determines whether their term on the panel is extended.

Individual projects are periodically released to the panel members, who are invited to bid competitively. Following an appraisal and approval process, the works are awarded to the successful panel member. Projects are typically negotiated to be delivered within a set timeframe and are subject to fixed price agreements to transfer price risk to the service provider. AusNet Services' internal resources focus on the core functions of project planning, overall project delivery and contract management.

AusNet Services' contracting approach benefits AusNet Services and its customers by:

- appropriately balancing the use of internal and external resources;
- utilising market expertise and intellectual property;
- securing lower prices by requiring panel members to compete for work;
- obtaining economies of scale by ensuring that panel members expect to deliver appropriate volumes of work; and
- ensuring high quality and timely project delivery through effective monitoring of performance.

2.6.5 Other Outsourcing Arrangements

AusNet Services sources services from other third parties where efficient or necessary to do so. These services relate to data management, meter reading and asset maintenance. The access arrangement proposal has been developed in accordance with AusNet Services' approved Related Party Arrangements (Appendix 2A) and Cost Allocation Methodology (Appendix 2B). Accordingly, the expenditure forecasts reflect arm's length terms and do not contain any related party margins.

3 Current Period Performance and Future KPIs

3.1 Key Points

This chapter provides an overview of AusNet Services' current period performance to date, for both existing and future key performance indicators (KPIs) for the forthcoming period. The key points are:

- Revenue and gas demand have been lower than expected:
    - AusNet Services' total gas network revenue (CY2013-15) was $536.4 million, which is 1.8% below the allowance.
    - Lower energy consumption (0.8%) has been driven by softer per capita demand and reduced demand from industrial customers.
- Gross capital expenditure is expected to be $55.6 million (10%) lower than the regulatory allowance of $570.7 million due to lower than expected customer connections and mains replacement capex, which largely reflect lower unit costs than those approved at the last review.
- Operational expenditure is $8.0 million (3%) lower than the AER's allowance of $263 million due to efficiency savings and prudent practices.
- Services performance has met or exceeded expectations:
    - Network reliability remains strong (<1min USAIDI).
    - Unaccounted for Gas (UAfG) has been increasing but remains below target levels.
    - Mains and service leaks are steady, reflecting the benefits of the mains replacement programs.
    - Meter leaks have increased but are considered low risk.
- In 2018-22, AusNet Services is targeting levels of performance consistent with its current levels of performance.
- The increased risk of lower asset utilisation and lower energy consumption per customer are important emerging trends.

3.2 Introduction

This chapter, together with the Regulatory Information Templates, provides information on AusNet Services' performance in the current access arrangement period. In particular:

- Section 3.3 provides information on pipeline usage and growth in customer numbers during the current period.
- Sections 3.4 and 3.5 compare AusNet Services' actual expenditure for the current period with the regulatory allowances. Latest expenditure estimates are provided for 2016 and 2017, as actual expenditure is not yet available.
- Section 3.6 presents information on AusNet Services' service and safety performance against targets including recent trends and targets for the forthcoming period.
- Section 3.7 presents AusNet Services' future KPIs for the forthcoming period.

3.3 Demand and Customer Numbers

The series of tables below compare the AER's forecasts of residential and commercial gas usage and customer numbers with actual data.

As actual data is only available for 2013-2015, the tables are limited to this three-year period. Nevertheless, the data indicates the following trends:

- Warmer weather in AusNet Services' region with an associated decline in consumption;
- Newer customers using less gas than the existing customer base;
- An increasing tendency for customers to use electricity rather than gas for heating and hot water (that is, fuel switching).

These indicate there is a risk of declining network usage and customer numbers in the future.

Table 3-1: Forecast versus Actual – Residential Usage

Forecast versus Actual Usage	2013	2014	2015	2013-15
Forecast (TJ)	30,085	30,287	30,502	90,874
Actual – Tariff Report (TJ)	28,895	28,345	32,404	89,644
Actual adjusted for weather using EDD312 (TJ)	29,850	29,971	31,003	90,824
Difference between actual and forecast	-4.0%	-6.4%	6.2%	-1.4%
Difference between actual (weather corrected) and forecast	-0.8%	-1.0%	1.6%	-0.1%

Source: AusNet Services tariff reports and AER's Final Decision

Table 3-1 reflects that gas consumption is weather sensitive. Mild winters in 2013 and 2014 saw gas usage 4% and 6.4% lower than benchmarks respectively. Conversely, a harsher winter in 2015 saw actual demand 6.3% higher than the benchmarks.

After allowing for weather, AusNet Services' weather normalised demand over 2013-15 was highly aligned to the forecast. In the period 2013-2015, weather normalised demand was just 0.1% lower than the volumes approved in the final decision.

During the current access arrangement period, AusNet Services has connected fewer residential customers than forecast in the AER's 2013-2017 Final Decision as shown in Table 3-2 below.

Table 3-2: Forecast versus Actual – Residential Customer Numbers

Forecast versus Actual Customers	2013	2014	2015
Forecasts (no.)	607,990	623,030	638,550
Actual (no.)	605,003	621,104	633,937
Difference (no.)	-2,987	-1,926	-4,613
Difference (per cent)	-0.5%	-0.3%	-0.7%

Source: AER's 2013-2017 Final Decision, Part 2 (Attachments), Table 10.1

The cumulative difference between actual and forecast total residential customer numbers was approximately 4,600 customers by 2015. A continuation of this trend will see a growing gap between actual and forecast residential customer numbers by the end of the current access arrangement period.

Further Table 3-3 below shows that average usage per residential customer (both new and existing) was lower than forecast in 2013 and 2014, but higher in 2015 (on a weather corrected basis). Across the three years, usage per residential customer was within 0.5% of forecast.

Table 3-3: Forecast versus Actual – Usage per Tariff V Residential Customer

Usage per Customer	2013	2014	2015
Forecast Usage per Customer (GJ)	49.48	48.61	47.77
Actual (weather corrected) usage per Customer (GJ)	49.34	48.25	48.91
Difference	-0.3%	-0.7%	2.4%

Source: Weather corrected usage divided by actual customer numbers; forecast usage divided by forecast customer numbers.

However, when considered in a longer time series, weather-corrected usage per customer has continued its long term decline (see Chapter 4).

With regard to the commercial customer class, total gas usage was expected to grow by approximately 0.8% per annum. In contrast to this forecast, Table 3-4 below shows actual commercial usage reduced in 2014, but rebounded strongly in 2015. On a weather adjusted basis, commercial demand has been higher than forecast in each year of the access arrangement period, however is still within 2.5% of forecast on a total basis.

Table 3-4: Forecast versus Actual – Tariff V Commercial Usage

Forecast versus Actual Usage	2013	2014	2015	2013-15
Forecast (TJ)	5,774	5,821	5,839	
Actual – tariff reports (TJ)	5,800	5,746	6,216	
Actual adjusted for weather using EDD312 (TJ)	5,871	5,882	6,117	
Difference between actual and forecast	0.4%	-1.3%	6.5%	
Difference between actual (weather corrected) and forecast	1.7%	1.0%	4.8%	2.5%

Source: AusNet Services tariff reports and AER Final Decision

The actual growth in commercial customers exceeded the forecast growth rate over 2013-15, as shown in Table 3-5 below. By 2015, AusNet Services had 222 additional customers compared to the forecast, however this was accurate overall, with actual customer numbers within 1.4% of forecast.

Table 3-5: Forecast versus Actual – Tariff V Commercial Customer Numbers

Forecast versus Actual Customers	2013	2014	2015
AER forecasts (no.)	15,856	15,963	16,081
Actual (no.)	15,719	16,158	16,303

Difference (no.)	-137	195	222
Difference (per cent)	-0.9%	1.2%	1.4%

Source: AER's Final Decision, Part 2 (Attachments), Table 10.1

Table 3-6 below shows that actual usage per commercial customer exceeded the AER's forecast in 2013 and 2015, but was lower than forecast in 2014. On a weather corrected basis consumption per customer was again higher than forecast, but still accurate – within 1.9% of forecast consumption over the 2013-2015 period.

Table 3-6: Forecast versus actual – Usage per commercial customer

Usage per commercial Customer	2013	2014	2015
Forecast Usage per Customer (GJ)	364.16	364.68	363.09
Actual Usage per Customer (GJ)	368.97	355.63	381.29
Actual (weather corrected) Usage per Customer (GJ)	373.52	364.02	375.24

Source: Weather corrected usage divided by actual customer numbers; forecast usage divided by forecast customer numbers.

The following table compares the forecast and actual maximum hourly quantities for Tariff D and Tariff M customers, who are large industrial customers who consume either more than 10,000 GJ per annum, or more than 10 GJ in one hour. It shows a significant reduction in demand, which reflects a downturn in industrial gas demand following the loss of some major customers and existing customers reducing their demand for gas.

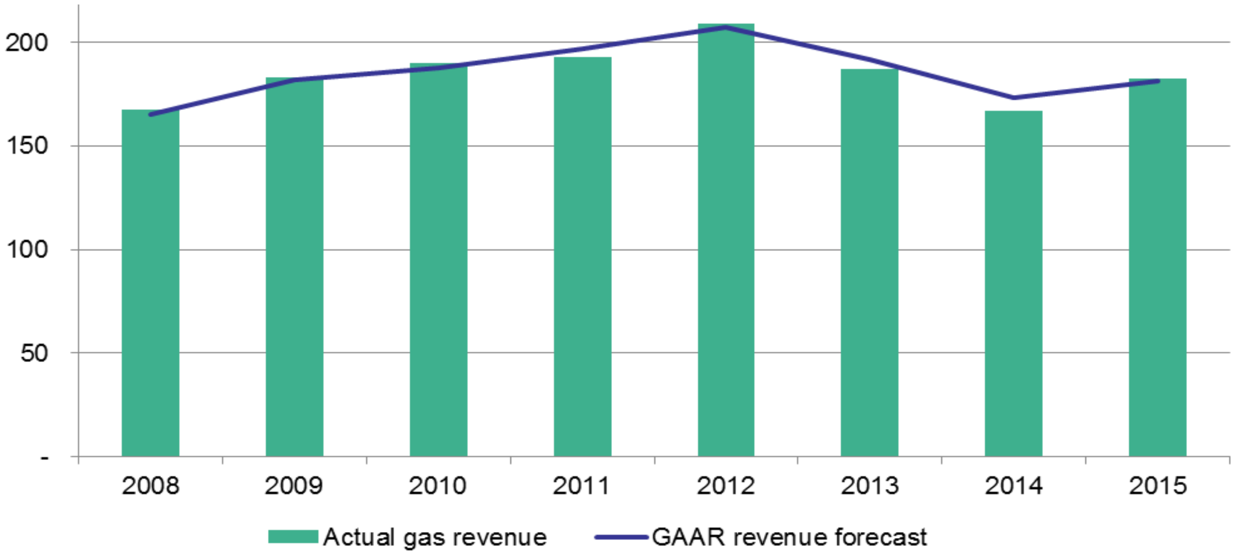
Table 3-7: Forecast versus actual – Tariff D and M maximum hourly quantities (MHQ)

Forecast versus Actual	2013	2014	2015
Forecast Tariff D and M (MHQ)	10,574	10,574	10,574
Actual Tariff D and M (MHQ)	8,341	7,842	8,132
Difference	-21.1%	-25.8%	-23.1%

Source: AusNet Services

The net effect of the actual customer number and demand outcomes is that AusNet Services has recovered less revenue than forecast by the AER in its 2013 Final Decision. As can be seen from the above tables, this was driven by mostly adverse (warmer) weather than assumed in the forecasts. Figure 3-1 below shows revenue outcomes compared to forecasts over the period from 2008 to 2015 inclusive. In aggregate, for the first three years of the current access arrangement period, AusNet Services has under-recovered revenues by 1.4% (or $7.6m).

Figure 3-1: Gas network revenue performance ($m, real 2017)



Source: AusNet Services

In summary, the recent data on network usage and customer numbers indicate falling per capita consumption and an increased risk of lower rates of pipeline utilisation. For the current period, it has also resulted in lower than expected revenues.

These emerging trends inform key elements of the proposal for the forthcoming access arrangement period, including the depreciation forecast (Chapter 8) and the form of control (Chapter 14).

3.4 Capital Expenditure

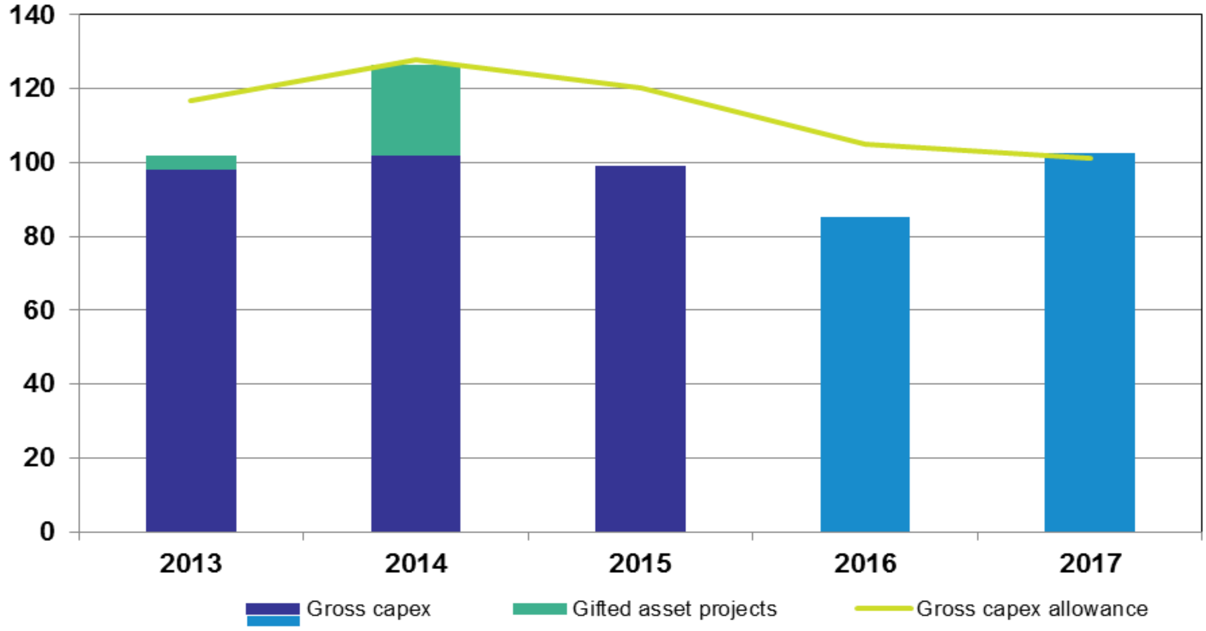
For the current access arrangement period, total gross capital expenditure of $535.8 million (real 2017) was approved. Subsequently, AusNet Services' capital expenditure allowance increased as a result of:

- The State Government's "Energy for the Regions" program, which requires gas reticulation to three towns at a capital cost of approximately $18.7 million; and
- AusNet Services' increased volume of mains replacement at a cost of approximately $16.2 million, which was subject to a pass through application approved by the AER in September 2016.

The updated total gross capex allowance is, therefore, $570.7 million (real 2017). In aggregate, AusNet Services expects to underspend the gross capex allowance by approximately $55.6 million, or 10%.

The figure below shows the breakdown of AusNet Services' actual and estimated capex compared to the regulatory allowance.

Figure 3-2: Gross total capex ($m, real 2017)



Source: AusNet Services and AER's Final Decision.

In 2014, gross capex of $126 million was markedly higher than in other years. This was due to the delivery of the Regional Rail link and Rees Road gifted asset projects at a cost of approximately $28 million, as shown in the figure above.

AusNet Services' commitment to prudent and sustainable investment has delivered capex savings of $37 million (10% underspend) in the first three years of the current access arrangement, even as volumes have been delivered largely to forecast. Between 2013 and 2015, 325km of low pressure mains have been replaced, in line with the approved volume of 329km. Similarly, 48,400 new customers have been connected against an approved volume of 50,600.

Significant savings have been achieved in relation to new connections and mains replacement, which are largely attributable to AusNet Services achieving lower unit costs than those approved at the last review. Capex efficiency gains flow through to capex forecast for the next access arrangement period, which relies on unit rates which are typically based on historical averages.

These efficiencies have been realised through:

- Delivering unit rates for the low and medium pressure mains replacement programs below the forecast rates. The increased replacement rates have driven the cost of associated programs down (i.e. by maintaining the workforce and achieving on-site efficiency benefits).
- Decreasing the volume of meters replaced as a result of the successful field life extension program.
- Implementing a streamlined process for business approval and justification of replacement programs.

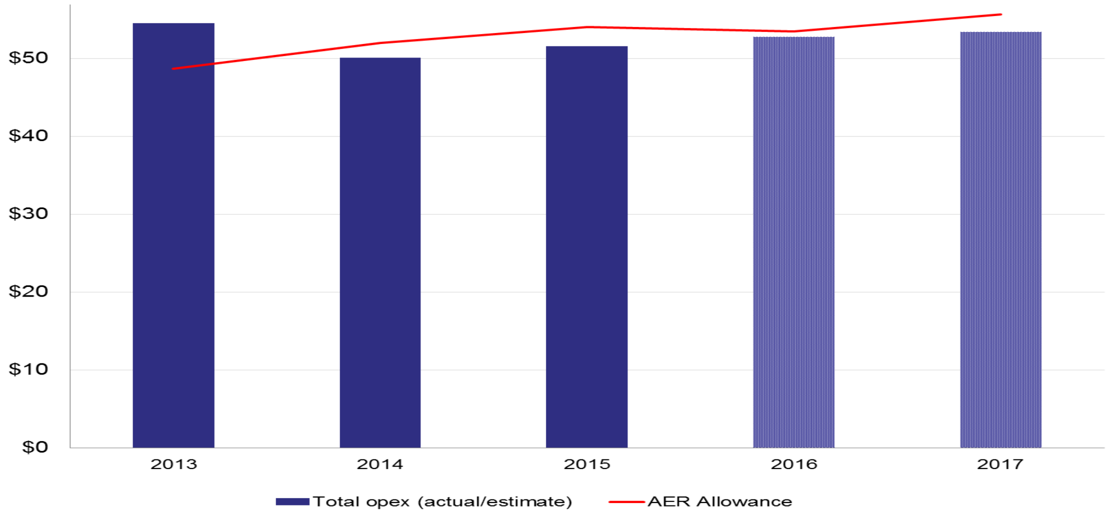
AusNet Services considers that introducing a Capital Expenditure Sharing Scheme (CESS) will strengthen the incentives to deliver further capex efficiencies and will provide balanced incentives between capex and opex (more details in Chapter 11).

AusNet Services' capital expenditure performance in each category is discussed in further detail in Chapter 6.

3.5 Operating Expenditure

Total operating expenditure is currently in line with the regulatory allowance, averaging $51.8 million per annum for the first three years of the period. Total opex is expected to be $268 million (2.0%) below the allowance of $274 million (real 2017).

Figure 3-3: Actual/estimated opex versus benchmark allowance, ($m real 2017)



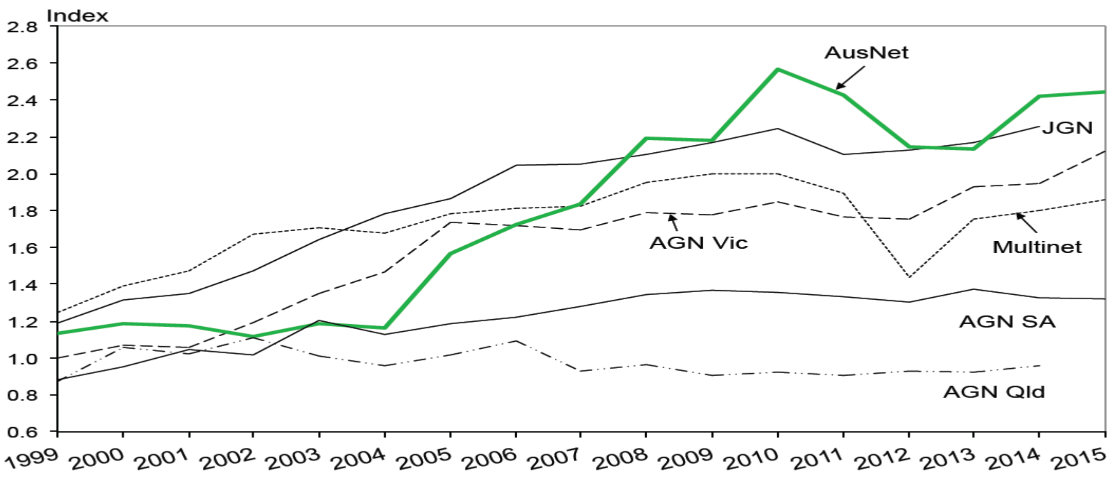
Source: AusNet Services

Note: Actual 2013-15, estimate 2016-17.

In 2013, the gas network recognised an $8.3 million one-off opex increase relating to the environmental provision established for the remediation of historic gasworks sites. In the absence of this additional cost, AusNet Services would have underspent the operating expenditure allowance by approximately 5%. This demonstrates that AusNet Services continues to respond positively to the incentive properties of the EBSS, which rewards companies for delivering efficiency savings.

Furthermore, as illustrated in Figure 3-4 below, a study prepared by Economic Insights shows that AusNet Services' opex partial factor productivity growth has been particularly strong since 1999 compared to other gas distribution networks in Australia. There is evidence, however, of slowing productivity across the industry in recent years.

Figure 3-4: Opex partial factor productivity comparisons 1999-2015



Source: Economic Insights, Benchmarking the Victorian Gas Distribution Businesses' Operating and Capital Costs Using Partial Productivity Indicators, 15 June 2016

3.6 Current Performance against KPIs

For the current access arrangement period, AusNet Services measured its performance against the following key performance indicators (KPIs):

- Emergency Response;
- Unplanned System Average Interruption Duration Index (USAIDI);
- Unplanned System Average Interruption Frequency Index (USAIFI);
- Unplanned Customer Average Interruption Duration Index (UCAIDI);
- Number of unplanned outages affecting less than 5 customers;
- Number of unplanned outages affecting more than 5 customers;
- Unaccounted for gas;
- Mechanical Damage – Mains;
- Mechanical Damage – Services;
- Mains Replacement – km per annum;
- Network Leaks per kilometre; and
- Customer Complaints.

Performance against these measures can be subject to significant variability due to a number of factors that are beyond AusNet Services' control, including:

- Environment – rapid changes in the environment can cause ground movement, leading to cracks in gas mains and gas leakage. In terms of the low pressure distribution system, water ingress into the network can then occur through these cracks, and this is often the cause of outages.
- Weather – in particular, higher rainfall levels have a marked impact on outages caused by water entering the distribution system (predominantly limited to the low pressure network).
- Third Party Damage – many outages are caused by a third party digging into gas mains. AusNet Services seeks to minimise these outages through the expansion of the Dial Before You Dig program, and the continuation of onsite location proving.
- Multiple outages – restoration of supply times can also be affected by the number of outages experienced simultaneously any particular time. A large number of outages at any one time will lead to longer response times.

Further details of AusNet Services' performance against these KPIs are provided below and in the template information accompanying this access arrangement proposal. The key points to note are:

- For the majority of KPIs, AusNet Services has improved its service performance during the current access arrangement period.
- The key reliability measure (USAIDI) has remained below 1 minute for each year of the period.
- AusNet Services has outperformed the Unaccounted for Gas (UAfG) benchmarks for each year of the current period. This improved outcome reflects the AER's establishment of more realistic UAfG benchmarks for the 2013-17 access arrangement period.
- Meter Leaks, which account for 75% of network leaks, have shown an increasing trend over the period. While the safety consequence of a meter leak is low, further work is being undertaken to understand the drivers of this increase and the potential for additional controls.

- Mains and service leaks, which account for 25% of network leaks, have remained flat over the access arrangement period. This outcome is consistent with AusNet Services' forecasts in its proposal for the 2013-17 GAAR.
- AusNet Services' KPI targets for the forthcoming access arrangement period are consistent with maintaining current levels of performance.

3.6.1 Emergency Response

AusNet Services is required to respond efficiently and effectively in the event of an emergency on its gas distribution network. In particular, AusNet Services is required to meet or exceed minimum response time benchmarks set by Energy Safe Victoria (ESV), which require:

- field response within 1 hour for 'A class' (major leaks / emergencies) emergencies; and
- field response within 4 hours for 'B class' (minor) gas escape repairs.

Table 3-8 below shows AusNet Services' performance over the period from 2008 to 2015. AusNet Services has consistently performed better than the benchmark, with the most recent year delivering the best emergency response performance over the period.

Table 3-8: Emergency Response KPI

	Benchmark	2008	2009	2010	2011	2012	2013	2014	2015
Metro Business Hours	95%	98%	98%	98%	99%	99%	97%	98%	99%
Metro After Hours	90%	98%	98%	98%	98%	99%	97%	98%	99%
Non Metro All Hours	90%	98%	97%	97%	98%	99%	96%	97%	99%

Source: AusNet Services

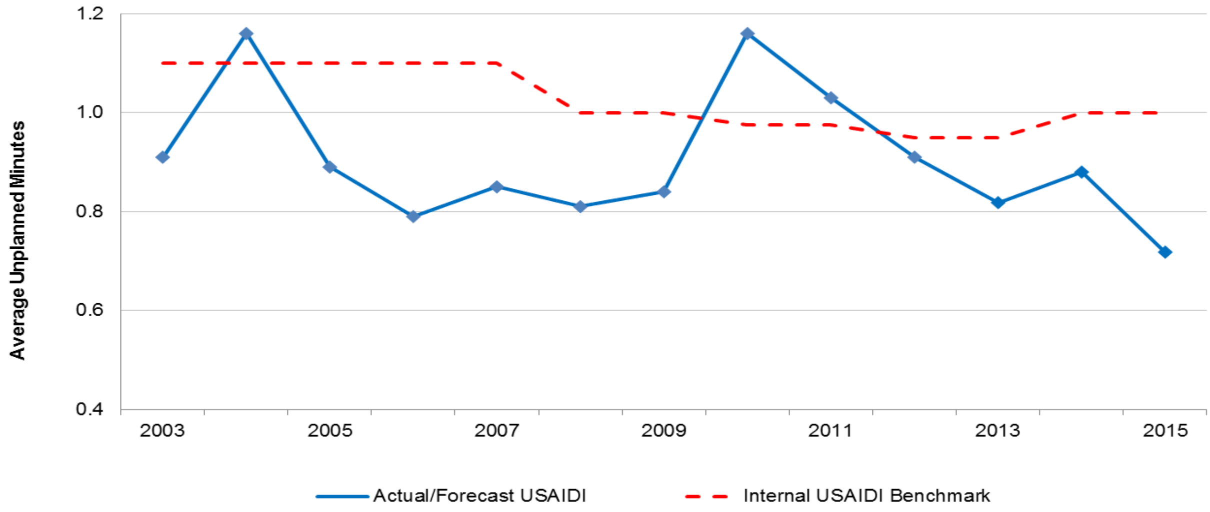
AusNet Services' performance targets for emergency response in the forthcoming period accord with the minimum response time benchmarks set by ESV.

3.6.2 Unplanned System Average Interruption Duration Index

Unplanned System Average Interruption Duration Index (USAIDI) is an important indicator of network reliability. USAIDI represents the average outage duration for each customer. AusNet Services' USAIDI performance over the current access arrangement period is shown in Figure 3-5 below. AusNet Services' internal target performance for the forthcoming period is also shown.

USAIDI has improved during this current access arrangement period due to a combination of lower than average rainfall and continued decommissioning of poor performing mains. AusNet Services believes that with the safety based mains replacement program reducing the number of system leaks, USAIDI can be kept flat, even in a higher rainfall environment.

Figure 3-5: USAIDI actual and target performance

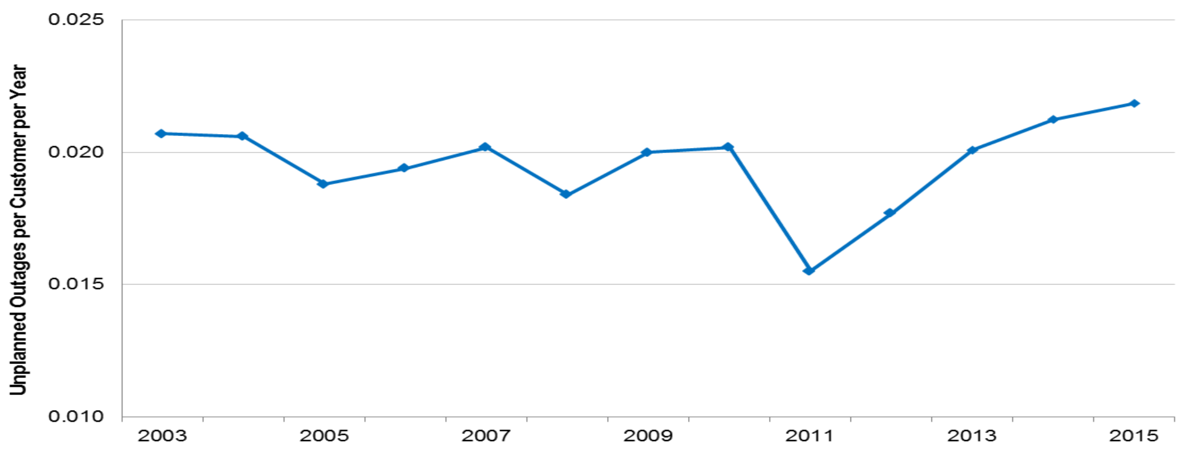


Source: AusNet Services

3.6.3 Unplanned System Average Interruption Frequency Index

USAIFI represents the number of occasions per year when each customer could, on average, expect to experience an unplanned interruption. AusNet Services' USAIFI performance over the current access arrangement period is shown in Figure 3-6 below. The average USAIFI of 0.02 indicates that a gas customer can expect (on average) to experience an outage every 50 years.

Figure 3-6: USAIFI actual and target performance



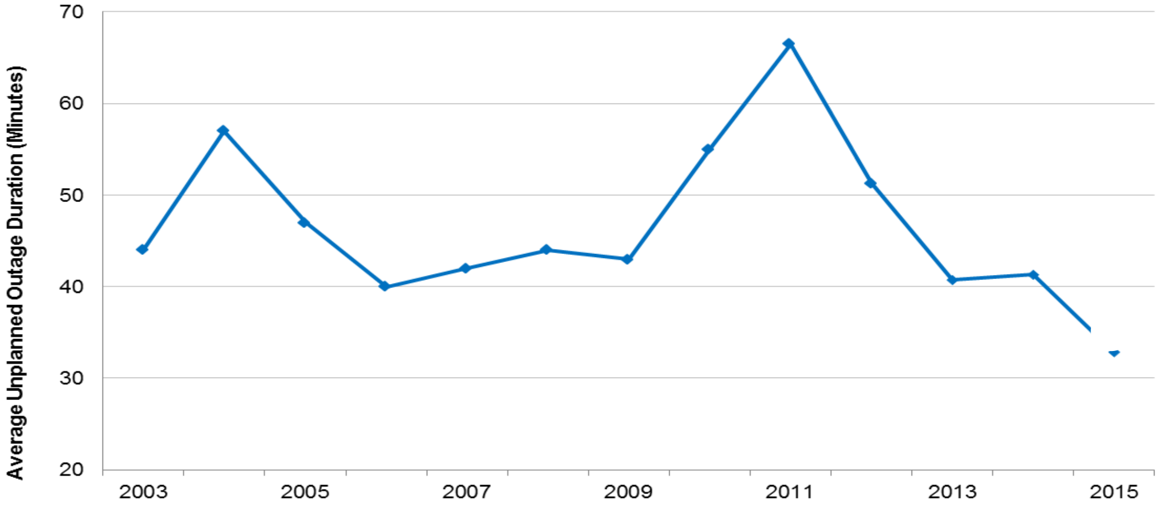
Source: AusNet Services

3.6.4 Unplanned Customer Average Interruption Duration Index (UCAIDI)

UCAIDI represents the average time taken for supply to be restored to a customer when an unplanned interruption has occurred; it is defined as USAIDI/USAIFI. AusNet Services' UCAIDI performance over the current access arrangement period is shown in Figure 3-7 below.

Higher than average rainfall in 2011 resulted in saturated soil conditions and significant amounts of water ingress into AusNet Services' low pressure network. Since then, UCAIDI has returned to historic levels, which may be attributed to AusNet Services' commitment to upgrade leaking, poor performing mains on the low pressure network.

Figure 3-7: UCAIDI actual and future target performance

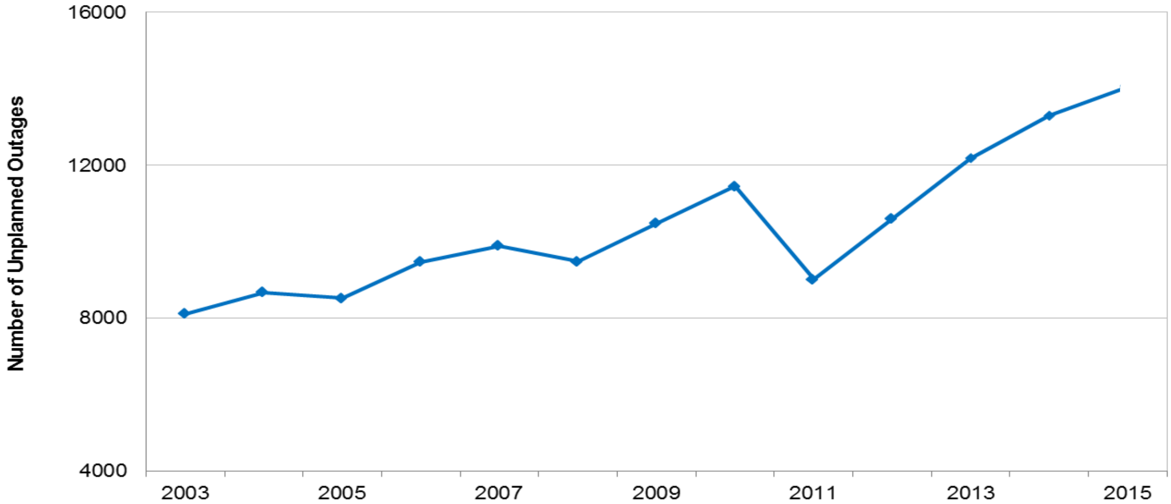


Source: AusNet Services

3.6.5 Number of Unplanned Outages affecting fewer than 5 Customers

As more customers are connected to the network, there is a corresponding increase in network assets. Thus, the number of unplanned outages affecting fewer than five customers is expected to increase. Figure 3-8 below shows AusNet Services' recent actual and future target performance against this KPI.

Figure 3-8: Number of unplanned outages affecting fewer than 5 customers

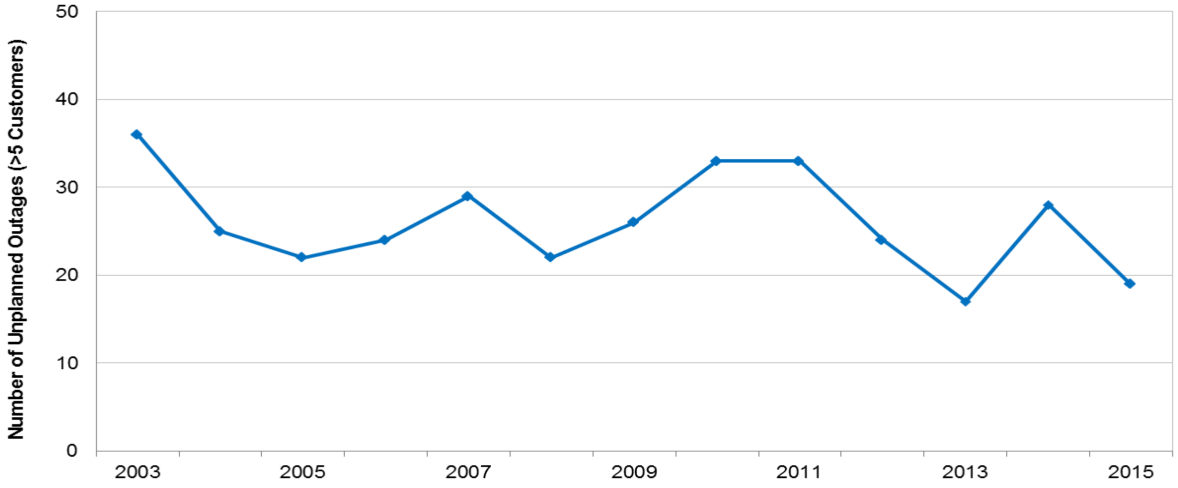


Source: AusNet Services

3.6.6 Number of Unplanned Outages affecting 5 or more Customers

The number of unplanned outages affecting five or more customers indicates relatively major events. This performance measure is targeted to be maintained (which results in a per capita improvement) at average historic levels for the forthcoming access arrangement period, as shown in Figure 3-9 below.

Figure 3-9: Number of unplanned outages affecting more than 5 customers

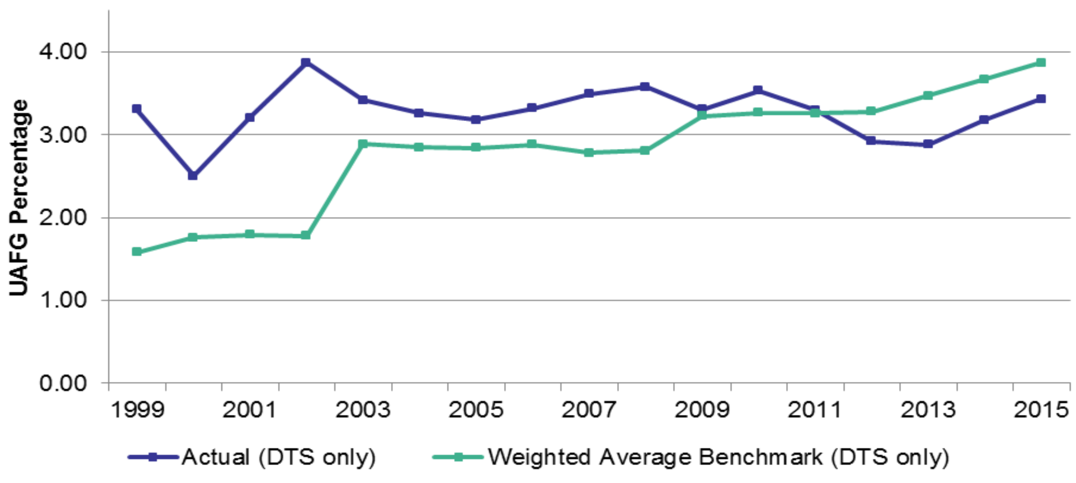


Source: AusNet Services

3.6.7 Unaccounted for Gas

Unaccounted for Gas (UAFG) is the difference between the quantity of gas injected into the distribution system and the quantity of gas withdrawn by consumers. It should be noted that data for 2014 and 2015 is provisional and will be subject to validation. Overall, UAFG has increased in the last two years, after declining for three years. Since 2012, AusNet Services' UAFG has outperformed the benchmark.[8]

Figure 3-10: Unaccounted for Gas (Principal Transmission System Only)



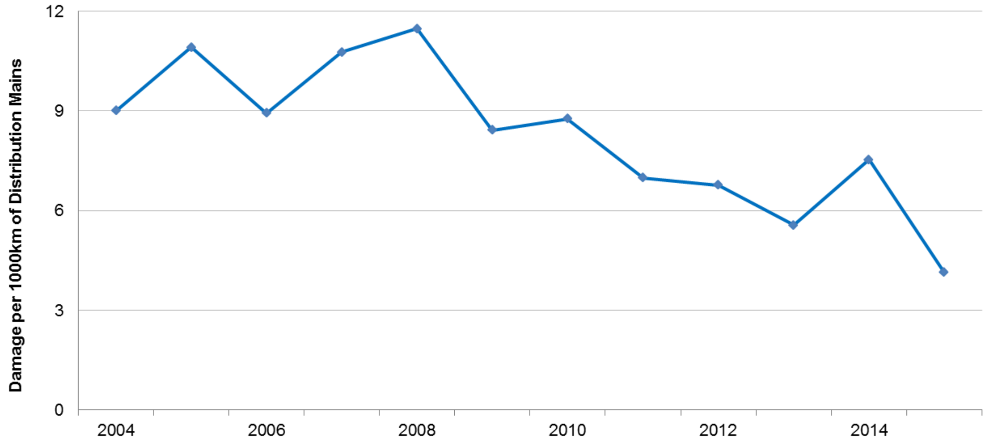
Source: AusNet Services

3.6.8 Mechanical Damage – Mains damages per 1000km of mains

The target frequency of mechanical damage per kilometre of mains is expected to be slightly lower than the average historic level as shown in Figure 3-11 below, reflecting the impact of network growth. AusNet Services has delivered a significant improvement in this KPI since 2004.

[8] 2015 UAFG is an estimate.

Figure 3-11: Mechanical damage - Mains damages per 1000km of mains

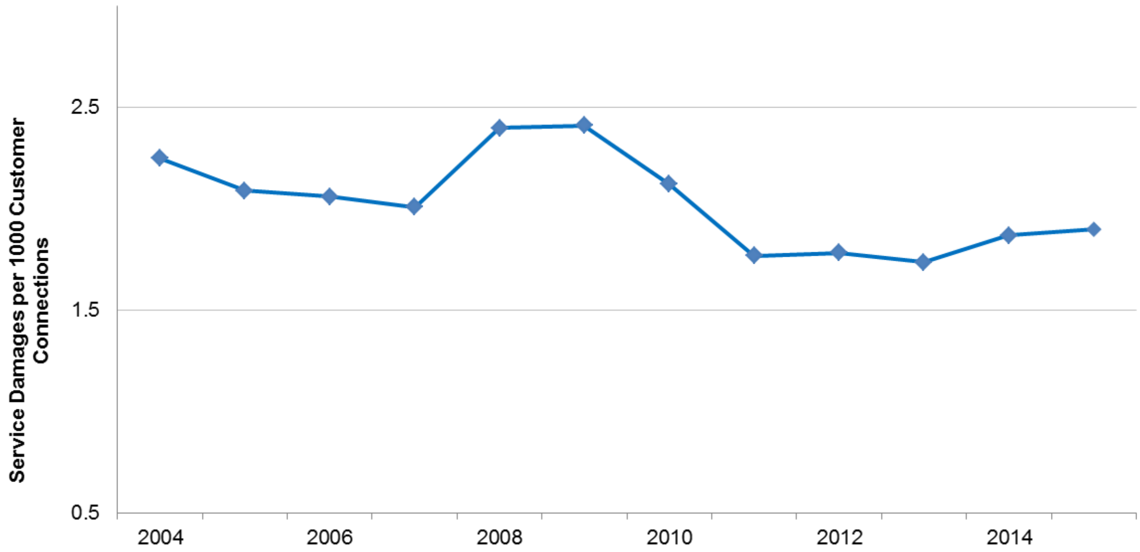


Source: AusNet Services

3.6.9 Mechanical Damage – Customer Connections

The target frequency of mechanical damage to services per customer connection reflects the average historic levels, as indicated in Figure 3-12 below. Recent performance shows a step improvement compared to earlier periods.

Figure 3-12: Service damages per 1000 Customer Connections



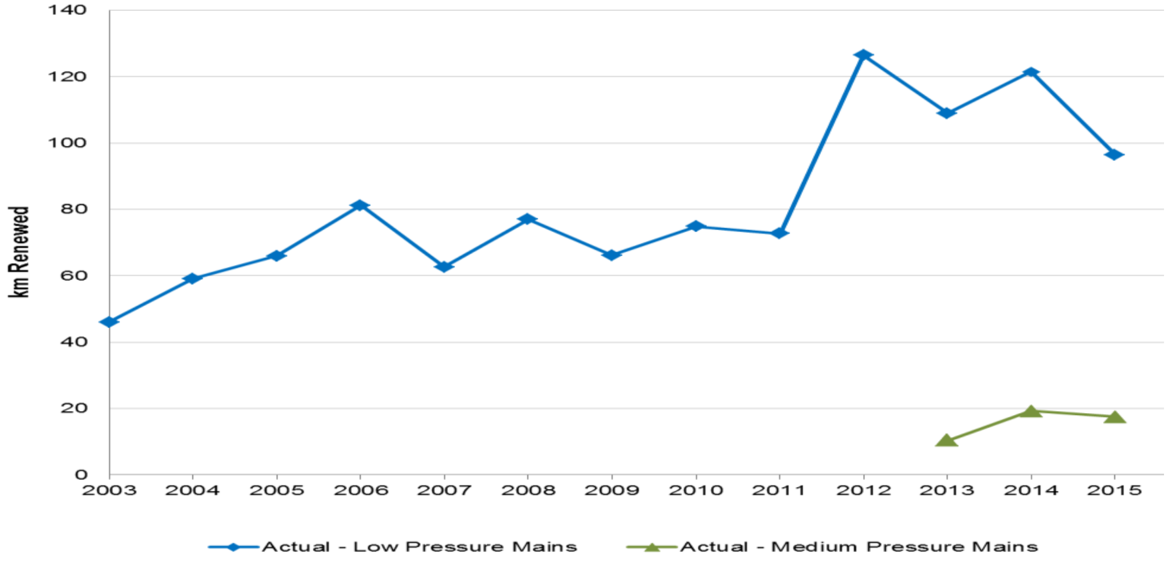
Source: AusNet Services

3.6.10 Mains Replacement

To improve the safety profile of the distribution network, AusNet Services conducts an annual mains replacement program to remove and replace mains to reduce the incidence of leaks on the network and thereby enhance delivery of public safety and reliability improvements, consistent with the NGR, NGL and NGO.

The volume of AusNet Services' recent actual distribution mains replacement work is shown in Figure 3-13 below. It illustrates the significantly higher volume of low pressure mains replacement delivered during the current period, compared to previous periods. The medium pressure pipeline program is much smaller in terms of volume.

Figure 3-13: Distribution Mains Replacement



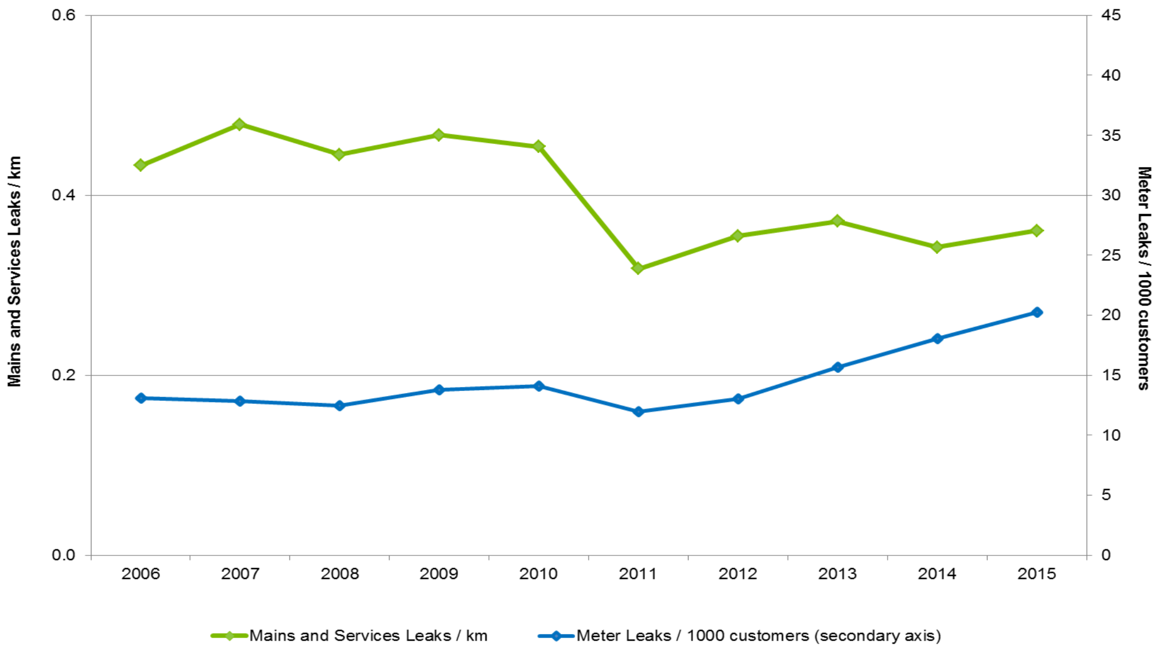
Source: AusNet Services

3.6.11 Network Leaks

The mains and services and meter leakage rates are shown separately in Figure 3-14 below. The reduction in the number of leaks per unit length of mains is the result of the proactive medium and low-pressure mains replacement programs.

In contrast, the meter leak rate has increased, most likely due to meter regulators reaching the end of their life. This trend is expected to continue, reflecting the age profile of the assets. There are strict policies and procedures governing the location and installation of domestic gas meters to ensure that any leaking gas is vented to a non-hazardous location. The risks associated with the reported leak levels are not significant and will be addressed by the proposed increased metering capex program.

Figure 3-14: Network Leaks (Mains, Service & Meter) per kilometre of mains

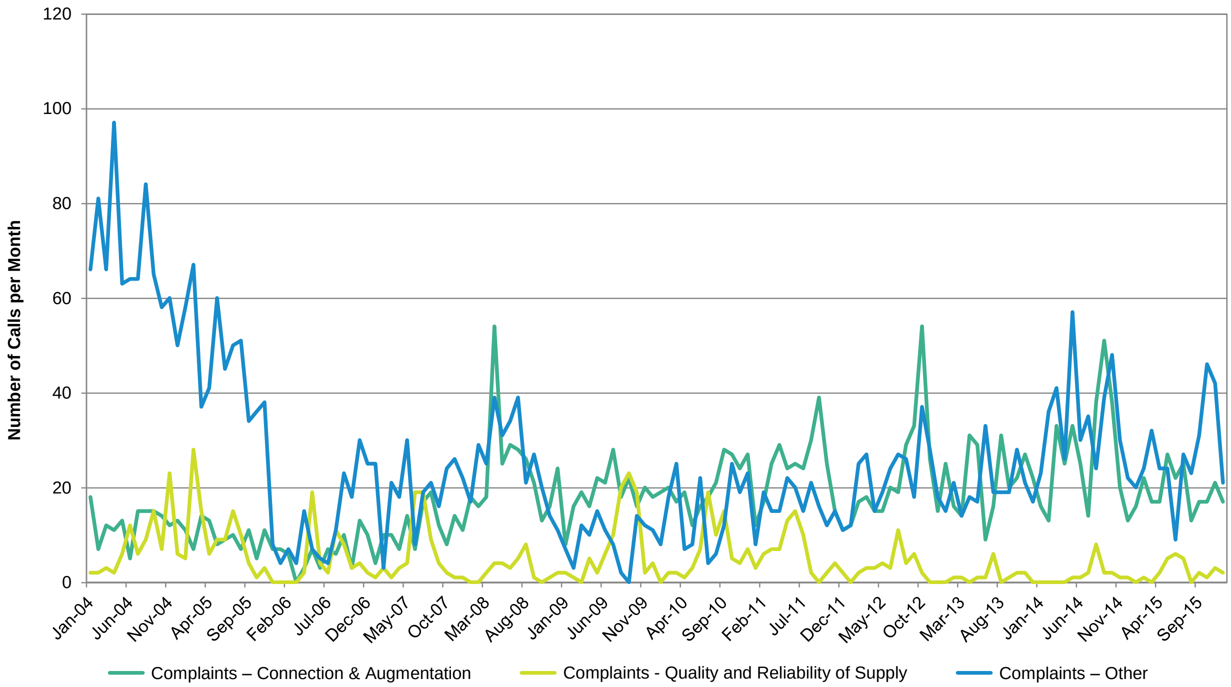


Source: AusNet Services

3.6.12 Customer Complaints

The volume of customer complaints (recorded on a monthly basis) over the current access arrangement period is shown in Figure 3-15 below. AusNet Services will continue to work to reduce the volumes of customer complaints.

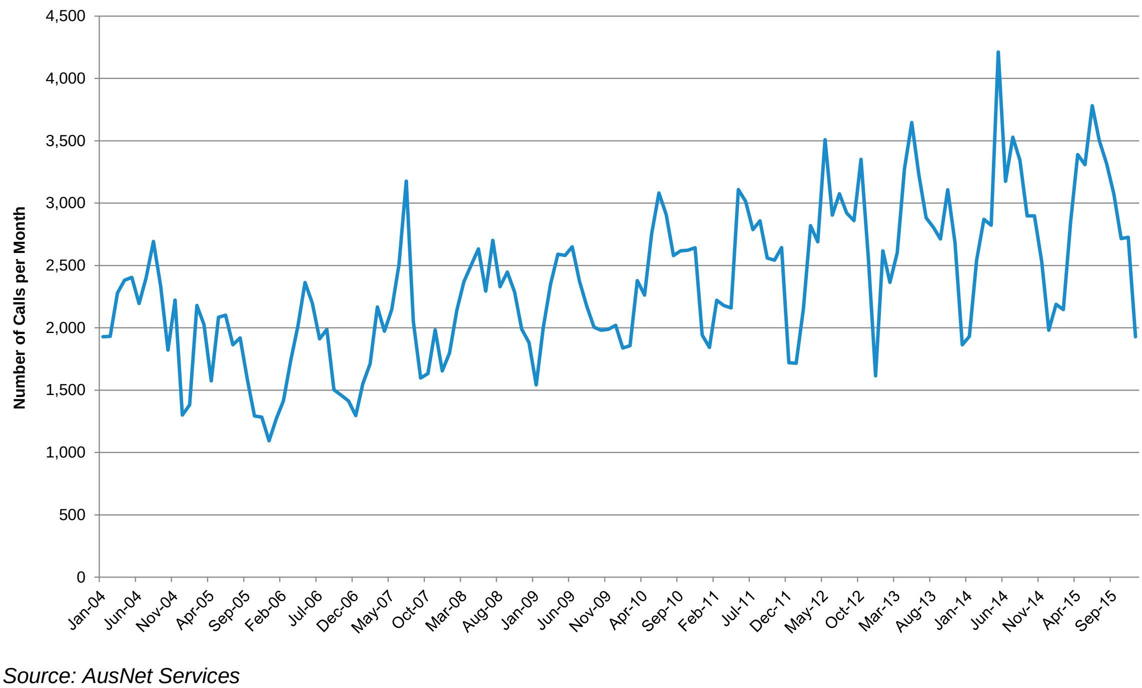
Figure 3-15: Number of Customer Complaints



Source: AusNet Services

The total number of calls received by AusNet Services' fault reporting line is shown in Figure 3-16 below. The moderate trend increase in fault reports reflects the growth in customer numbers.

Figure 3-16: Total number of calls to AusNet Services' Call Centre Fault Line



Source: AusNet Services

3.7 Future KPIs

In the forthcoming access arrangement period, AusNet Services will pursue the following network objectives and KPIs. Each of these KPIs is discussed in further detail below.

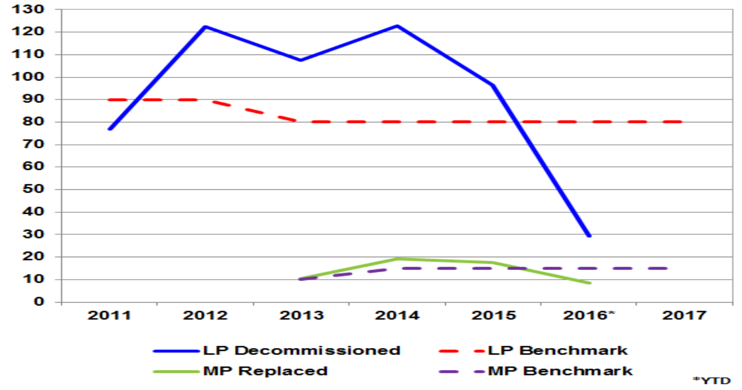
1. **To maintain network safety in accordance with the Gas Safety Case**
    a) Continuation of Mains Replacement Program
    b) Mains Leakage rate by pressure tier
    c) Network Leaks – 12 Month Rolling Average
    d) Third Party Damages on Mains and Services
    e) Recordable Injury Frequency Rate
2. **To maintain operating efficiency performance in the top quartile**
    a) Total Factor Productivity (TFP)
    b) Total expenditure (totex) per customer
3. **To undertake prudent and sustainable network investment**
    a) Capital performance
    b) Unaccounted for gas (UAfG)
4. **To deliver valued services to our customers**
    a) Unplanned Supply Average Interruption Duration Index (USAIDI)
    b) Emergency Response Times
    c) Asset Cost per customer
    d) Number of customer complaints

The following network targets align with the gas network objectives. The targets will be reviewed on an annual basis to ensure they are the most relevant indicator of performance.

Objective 1: Maintain network safety in accordance with the Gas Safety Case

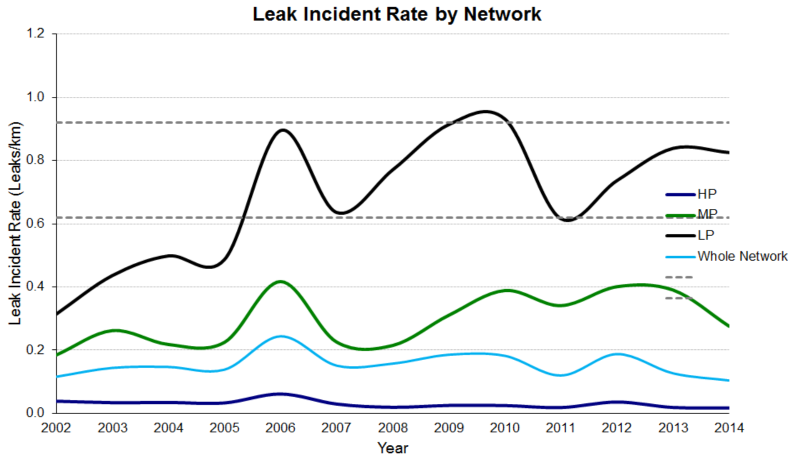
1(a) Proactive replacement of deteriorated mains including low and medium pressure mains replacement

- Reduce total leaks on network.
- Targets based on internal benchmarks.



1(b) Mains Leakage rate by pressure tier

- Benchmark is represented as a band of the highest and lowest leakage rate since 2010. Measures performance of replacement program at each of the network pressures.
- Target leakage rates within the identified bands (0.92 and 0.62 Leaks/km).

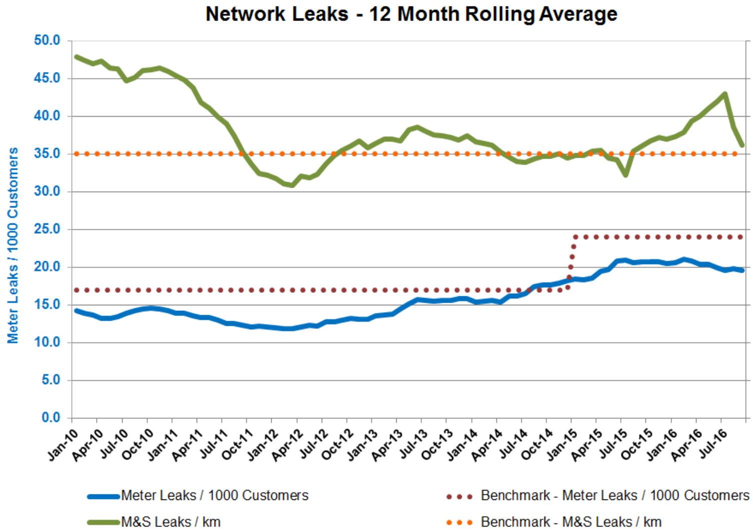


1(c) Network Leaks-12 Month Rolling Average

Target is to minimise leaks on the network, as an indicator of health and safety. Each leak has to potential to cause harm to both property and person.

- Mains and Service leak trend is determined by current 3-year average leak incident rate.
- **Mains and Services leakage rate maintained at 0.35 Leaks/km**

- Meter Leak trend: Determined based on 2016 targets. Program is reviewed with recent failures in regulators.
- **Meter Leak target to be maintained at ≤ 24 Leaks per 1,000 customers**

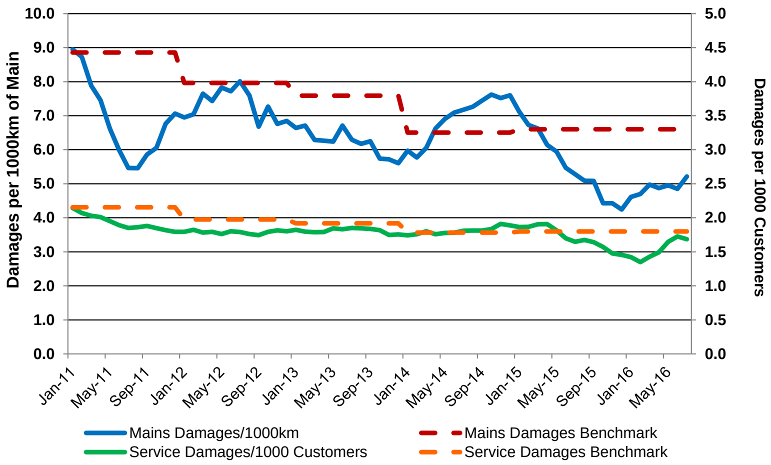


1(d) Rate of third party damages on mains per 1000km, and services per 1000 connections

- Internal benchmarks are set to maintain current performance.

Target: Mains Damages per 1,000 km target ≤ 6.6

Target: Service Damages per 1,000 customer connections ≤ 1.8



1(e) Recordable Injury Frequency Rate

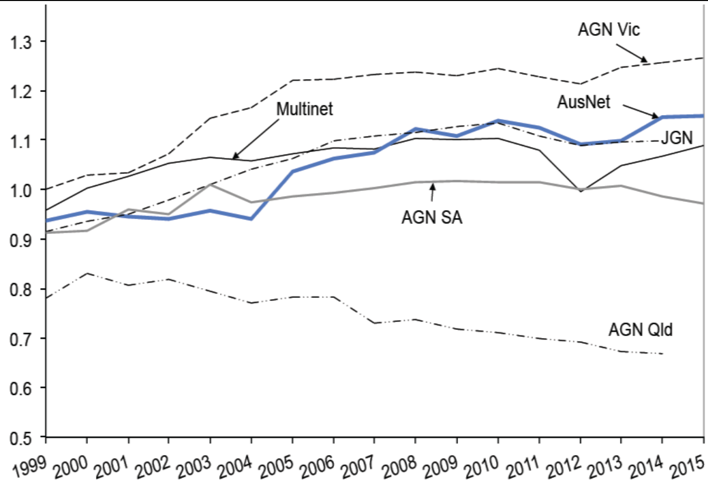
- Monitor trend in gas RIFR

Objective 2: To maintain operating efficiency performance in the top quartile

2(a) Total Factor Productivity

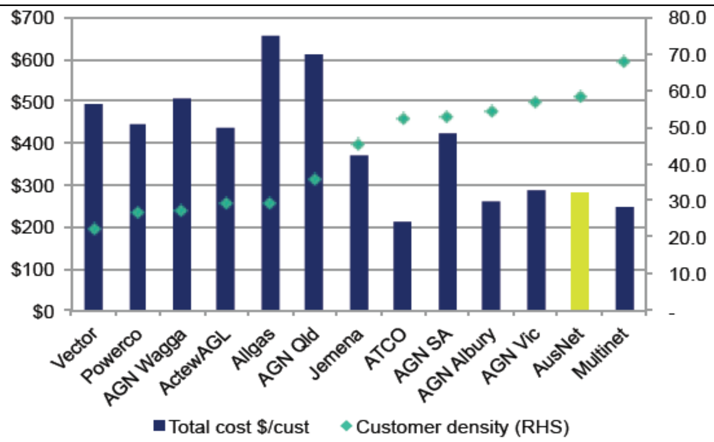
Measure of efficiency of inputs (mains length, services, meters and other capital) to business outputs including customer numbers and system throughput.

- Target: Maintain current top quartile operating efficiency.



2(b) Totex per customer (2009-2013)

- Maintain operating and capital cost relative to customer density.
- Target: Maintain low Total cost per customer.



Objective 3: Undertake prudent and sustainable network investment

3(a) Capital performance

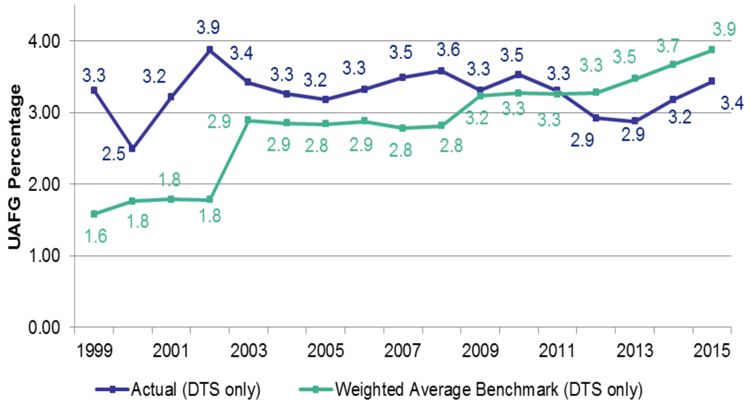
- Maintain cost to connect customers to network.
- Maintain current replacement programs in line with customer numbers.

Criteria	Average unit rate (2013-17)	Target unit rate (2018-2022)
Residential connections capex	$2,030 per connection	<$2,030 per connection
Replacement capex	$57 per customer	>$50 and <$70 per customer

Note: direct expenditure; dollars are expressed in real 2017.

3(b) Unaccounted for Gas (UAfG)

- Regulatory benchmarks are established by the regulator for each regulatory period. AusNet Services has outperformed benchmarks in the last four years.
- Maintain current rate of performance.

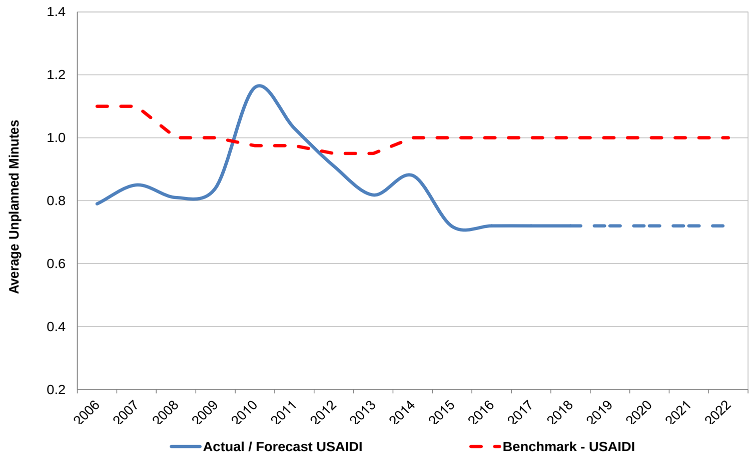


Objective 4: To deliver valued services to our customers

4(a) Unplanned Supply Average Interruption Duration Index (USAIDI)

USAIDI represents the average outage duration for each customer. The gas network is inherently reliable and with this measure primarily influenced by rainfall.

- AusNet Services' customers experience on average a 0.81 minute outage p.a. (2016).
- Internal benchmark is to be maintained at 1 min outage p.a.

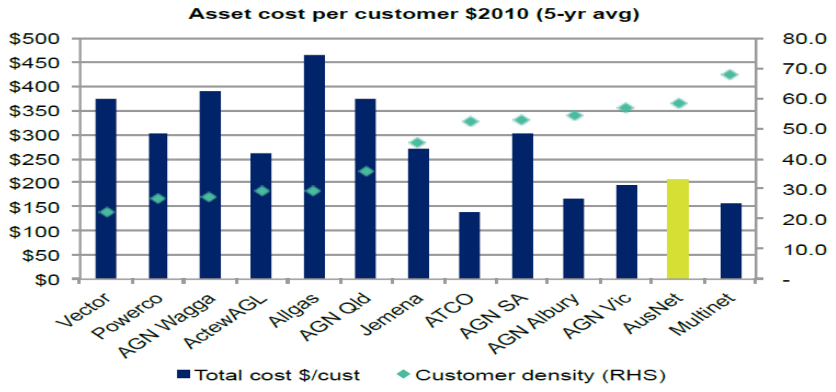


4(b) Emergency Response Times

Emergency response times are a core reactive safety indicator. Benchmark is set by Energy Safe Victoria (ESV).

- They are a measure of the percentage of 'Class A' emergencies responded to within 60 minutes.
- Tracked on a monthly basis.
- Target: Maintain current performance in line with meeting regulatory benchmark.

Priority A Response	Benchmark[1]	2010	2011	2012	2013	2014	2015
Metro Business Hours	95%	98%	99%	99%	97%	98%	99%
Metro After Hours	90%	98%	98%	99%	97%	98%	99%
Non Metro All Hours	90%	97%	98%	99%	96%	97%	99%

4(c) Asset Cost per customer • Benchmark is to maintain low cost per customer.	
4(d) Number of customer complaints • AusNet Services expects continuous decrease of customer complaints.	AusNet Services will track its customer service via customer complaints and customer effort (how difficult/easy it was for the customer to obtain a resolution). AusNet Services has had a recent decrease in complaints, after concerted efforts to reduce customer dissatisfaction regarding reinstatement after mains renewals.

4 Demand and Customer Forecasts

4.1 Key points

The key features of AusNet Services' demand forecasts in this proposal are:

- AusNet Services' customer base is forecast to grow by 2.1% per annum, led by strong household growth and recent trends in the proportion of new dwellings whose owners choose to connect to gas.
- The long term trend of warmer weather in AusNet Services' region and the associated impact on volumes is expected to continue.
- A trend of newer customers using less gas than the existing customer base is expected to continue.
- An increasing tendency of customers to use electricity rather than gas for heating and hot water (that is, appliance switching) will continue to have a downward impact on future demand.
- The above factors mean that on a weather normalised basis, the forecast is for average residential consumption to fall by 1.5% per annum over 2018-22, compared to the 0.9% fall which took place in 2010-15. This forecast incorporates the positive impacts of the proposed marketing program.
- Total demand for residential and commercial customers (Tariff V) is forecast to grow by only 0.6% in total between 2017 and 2022, compared to the 7.6% growth over the five years to 2015. Strong growth in customer numbers, led by forecast household growth, will be largely offset by reductions in consumption per customer.
- By the end of the period, the additional demand attributable to AusNet Services' proposed marketing activities (see Chapter 7) is expected to result in Tariff V demand being 1.2% higher than would otherwise be forecast.
- Demand from industrial customers (measured by maximum hourly quantity) is forecast to fall by 12% between 2018 and 2022, in line with AEMO's projections for state-wide Tariff D consumption.

4.2 Introduction

Demand forecasting refers to three separate forecasting elements which each play an important role in network planning and pricing. These are:

- Customer number forecasts. These forecasts are the basis of energy forecasts, since the number of customers in the network is a key determinant the volume delivered through the gas network.
- Energy consumption forecasts. Since all residential and commercial customers are billed in part based on their consumption, it is essential to have a robust and reliable forecast of the volume of gas which will be delivered to customers.
- Maximum Hourly Quantity (**MHQ**) forecasts. Industrial customers are billed based on their maximum demand in any one hour, and therefore, the forecasts for these customers are based on MHQ instead of total annual volume.

AusNet Services developed an independent view of demand forecasts in AusNet Services' network for the forthcoming access arrangement period by engaging The Centre for

International Economics (**CIE**). CIE also prepared AusNet Services' demand forecasts for the 2013-17 access arrangement period, which were largely accepted by the AER.[9]

In addition to CIE's forecasts, the Victorian gas distribution businesses commissioned a study on the additional costs and revenues associated with a marketing program which promoted the use of gas. This was undertaken by Axiom Economics. Axiom's findings are discussed in Chapter 7 of this Access Arrangement Information. The impact on connections and energy consumption of the marketing proposal are outlined as an incremental increase to our initial forecasts, as explained in section 4.5.[10]

The remainder of this chapter is structured as follows:

- Section 4.2 describes AusNet Services' customer forecast methodology and proposed customer forecast for the forthcoming access arrangement period;
- Section 4.3 explains AusNet Services' energy forecast methodology and proposed energy forecast for the forthcoming access arrangement period;
- Section 4.4 describes AusNet Services' MHQ forecast methodology and proposed MHQ forecast for the forthcoming access arrangement period; and
- Section 4.5 sets out the incremental impact on demand of AusNet Services' proposed marketing allowance.

CIE's report on AusNet Services' demand forecasts is included as Appendix 4A. This chapter provides an overview of CIE's findings and should be read in conjunction with CIE's report.

4.3 Customer Number Forecasts

4.3.1 Residential customer forecast methodology

AusNet Services' customer forecasts are developed at a postcode level. This level of granularity has a number of benefits:

- The forecasts can be easily translated into AusNet Services' pricing zones, which are largely segregated by postcode;
- There is a large amount of publicly available data at the postcode level, or at the Local Government Area (**LGA)** level, which can be applied to the postcodes within each LGA; and
- Forecasts of customer growth and demand at the postcode level allow for AusNet Services to more confidently prepare network strategies and asset management plans.

AusNet Services' customer number forecasts for 2013-2017 have been highly accurate. However, this overall accuracy obscured two underlying contradictory trends:

- Population growth has been higher than anticipated; and
- Actual penetration were rates lower than anticipated.

9 The AER accepted that the methodology used by CIE was reasonable, however disagreed with the EDD forecast used as an input into the calculation of the forecasts.

10 AusNet Services has also populated two versions of the access arrangement Regulatory Information Notice (**RIN**) templates. One which includes the costs, connections, energy and revenue associated with the proposed marketing program and one that does not.

The 2013-2017 customer number forecasts were based on the Victorian Government's 2012 publication *Victoria in Future* (**ViF**). The ViF report contains five-yearly forecasts of the number of occupied dwellings in each of Victoria's LGAs. Since the publication of the 2012 ViF, the Victorian Government has released three further editions, with the latest publication being the 2016 ViF. The 2016 edition of the report contains higher forecasts for 2016-17 than wereapproved in the 2013-2017 access arrangement.

The AER has accepted the use of ViF projections as the basis for customer growth forecasts in several previous price determinations, including AusNet Services' 2013-2017 gas access arrangement[11] and its 2016-2020 electricity distribution price determination.[12] The ViF projections are an independent, public source and are the official forecasts used by the Victorian Government for planning.

Gas, unlike electricity, is a fuel of choice. Whilst the ViF forecasts can be relied upon almost solely to forecast electricity customers,[13] another variable needs to be added when forecasting gas customers: the penetration rate. The penetration rate is the proportion of new households which choose to connect to gas (or the overall proportion of houses in a given population who are already connected to gas). For example, if the number of households was growing by 2.0% per annum, but only half of those households chose to connect to gas, the number of gas customers would grow by 1.0% per annum whilst the electricity growth rate would be closer to 2.0%.

At the same time that population and household growth has been higher than anticipated, the penetration rate has been falling. In particular, dwelling growth in AusNet Services' metropolitan area has not been matched by customer growth.

Falling penetration rates are of concern to gas distribution businesses and existing gas customers alike. For a gas distribution business, falling penetration rates make planning the network and setting tariffs more difficult. If penetration rates fall further than the distribution business expects, there will be fewer customers to fund the assets in service, potentially increasing prices and making gas less competitive.

Using data from the Victorian Government household forecasts, ABS data and AusNet Services' customer numbers, CIE was able to estimate the penetration rate within AusNet Services' network over the past decade. Penetration rates were calculated at the LGA level which can lead to a distortion of the overall penetration rate if AusNet Services has only a small proportion of customers within a given LGA.[14] CIE therefore calculated two penetration rates: one which reflected the penetration rate of all LGAs in which AusNet Services has some customers (however small) and the other which focused only on LGAs in which AusNet Services' network had a large footprint. As can be seen from the chart below, penetration rates have fallen across AusNet Services' network since 2006 regardless of the method of estimation.

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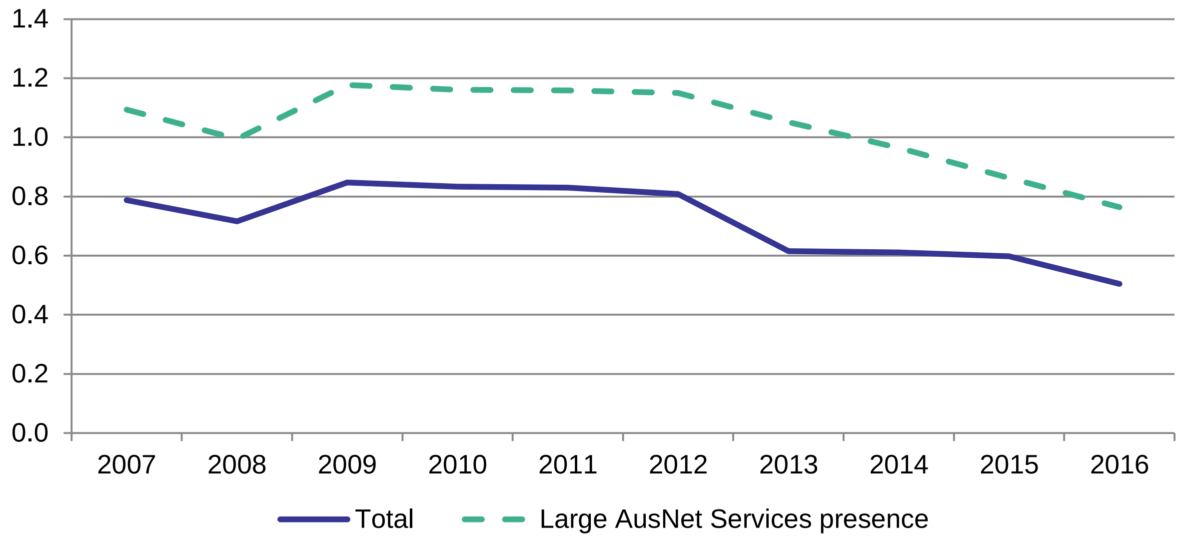
11 AER, *Access arrangement final decision, SPI Networks (Gas) Pty Ltd 2013-17, Part 2 (Attachments)*, March 2013, p.155.

12 AER, *FINAL DECISION, AusNet Services distribution determination 2016 to 2020, Attachment 6 – Capital expenditure*, May 2016, pp. 6-101.

13 Given that going "off-grid" is not an economically positive decision to make.

14 Because the household growth in LGA will include many houses which fall outside AusNet Services' network and therefore cannot be connected by AusNet Services. This will have the effect of skewing the penetration rate towards a lower number.

Figure 4-1: AusNet Services' marginal penetration rate



Source: AusNet Services

The declining penetration rate for gas is suggestive of an increasing tendency for the developers and owners of new dwellings to connect solely to electricity, rather than both electricity and gas. CIE's report[15] notes that the Australian Energy Market Operator (**AEMO**), the Alternative Technology Association (**ATA**) and AusNet Services' own customers have all commented that gas is becoming less competitive relative to electricity and this is changing customers' preferences for fuel sources within the home.

Retail gas prices are expected to increase relative to electricity prices in the future, which suggests that the penetration rates could be expected to decline further.[16] However, it is difficult to establish a reliable relationship between the gas/electricity price ratio and the marginal penetration rate. For forecasting purposes, CIE used the revealed 2016 penetration rate, which captures the changes in preferences that have been observed to date. This has been broken down into LGA level.

CIE's customer forecasts are derived by determining how much of a given postcode resides within a specific LGA. The 2016 ViF growth rates for that LGA are then used to grow the number of customers within that postcode. The penetration rate established for that LGA by CIE is then applied to the household growth rate to forecast the number of new gas customers.[17] The result is a customer number forecast at the postcode level, which can be used to forecast the number of customers in each of AusNet Services' pricing zones.

AusNet Services is also extending its network to three regional towns which currently do not have reticulated gas supplies. The townships of Winchelsea, Bannockburn and Avoca are being connected as part of the Victorian Government's *Energy for the Regions* (**ERP**) program. A fourth town, Huntly, has already been connected under the ERP program and is included in AusNet Services' baseline consumption. CIE's forecast for these towns is based on the expected connections and construction timelines as outlined in AusNet Services' ERP plans.[18]

15 CIE, *2018-2022 GAAR Consumption and Customer* Forecasts, 2016, pp. 21-22.

16 Forecasts were taken from AEMO's 2015 National Gas Forecasting Report. The medium price scenario forecast residential retail gas prices to rise from $17.98/GJ in 2015 to $21.64 in 2022, an increase of 20.3% over the period.

17 CIE's report details how these penetration rates are calculated. In summary, CIE compares the number of new customers within a given postcode to the number of dwellings estimated to have been constructed, using data from the Australian Bureau of Statistics (**ABS**) and Federal and State Governments.

18 AusNet Services' *Proposed Gas Network Extension Map for Energy for the Regions program*, September 2016.

4.3.2 Residential customers – historic and forecast

Table 4.1 summarises AusNet Services' residential customer forecasts over the forthcoming access arrangement period. Forecasts reflect *net growth*, that is, new connections less abolishments (disconnections).

Table 4-1: Residential customer number forecasts (average annual customers)

Region	2017	2018	2019	2020	2021	2022	Growth 2017-22	Growth 2010-15
Central	505,965	515,833	525,991	536,448	547,215	557,601	51,636	54,848
West	141,116	144,353	147,648	151,000	154,411	157,733	16,617	14,006
Adjoining central	1,571	1,973	2,283	2,525	2,715	2 867	1,295	641
Adjoining west	10,387	10,913	11,385	11,820	12,227	12 621	2,234	3,274
Total	**659,039**	**673,072**	**687,307**	**701,793**	**716,568**	**730,821**	**71,783**	**72,769**
Growth rate		*2.1%*	*2.1%*	*2.1%*	*2.1%*	*2.0%*	*10.9%*	*13.0%*

Source: AusNet Services

The average annual growth rate of 2.1% over the forthcoming access arrangement period is broadly consistent with the historical trend in AusNet Services' network. Growth in metropolitan Melbourne LGAs such as Wyndham, Brimbank and Melton is slowing and growth in smaller LGAs outside of metropolitan Melbourne is not compensating for the lower growth around the higher-density Melbourne area.

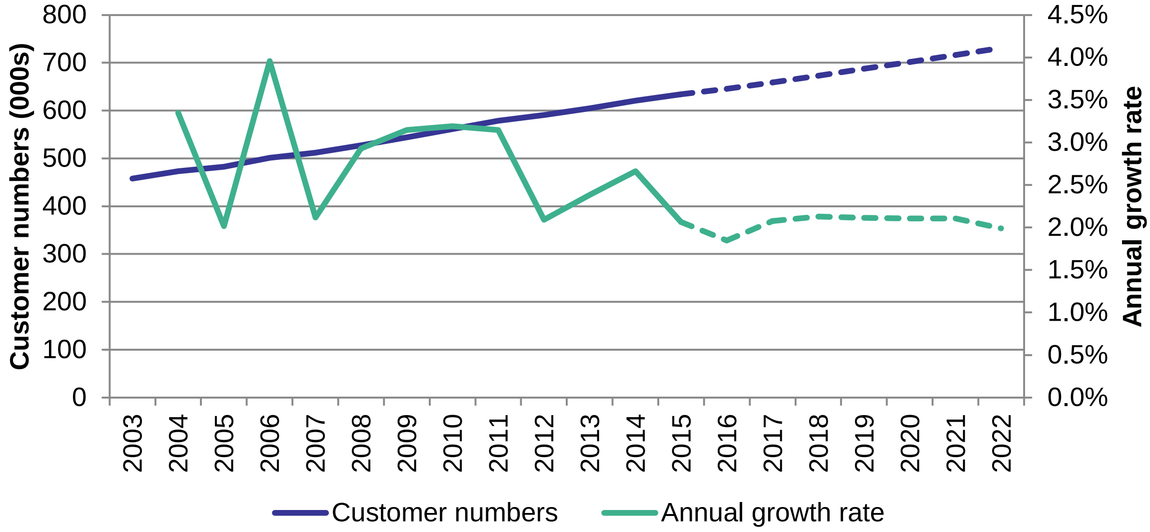
Despite slowing growth in AusNet Services' more densely populated areas, a growth rate of 2.1% on an increasing customer base still represents strong growth. On face value, this provides a seeming counterpoint to the expectations that appliance switching will drive consumers away from gas. However, this growth is underpinned by the Victorian Government's projections of strong growth in the overall number of dwellings in AusNet Services' region.[19]

Between 2017 and 2022, the Victorian Government's forecasts imply an additional 86,100 occupied dwellings in LGAs where AusNet Services has a large footprint. The corresponding figure in the five years to 2015 is 72,800. If the growth in the number of occupied dwellings in 2018-2022 was the same as 2011-2015, AusNet Services' customer forecasts would be close to 11,000 lower by the end of 2022. To the extent that the Victorian Government forecasts change in 2017, AusNet Services intends to reflect the up to date forecasts in its Revised Proposal (or ask that the AER incorporates them into its Final Decision, should the 2017 ViF be released after the Revised Proposal but in time for the Final Decision).

The below chart shows the total number of actual and forecast customers since 2003 and the corresponding annual growth rate on the right hand axis.

[19] Refer to the discussion by CIE on pp. 47-48 in its report (Appendix 4A).

Figure 4-2: Residential customer growth (LHS) and growth rate (RHS)



Source: AusNet Services

The above graph shows that although customer numbers will continue to grow, the rate of growth has fallen and is expected to flatten at 2% per annum.

4.3.3 Commercial customer forecast methodology

Commercial customers are forecast on a different basis to residential customers. Unlike household growth, there is no independent forecast of the number of businesses that will be operating in a given area. CIE identifies two options for forecasting commercial customer growth:

1. A 'top-down' approach, which use forecasts of Gross State Product (**GSP**) in Victoria to forecast the total number of commercial customers in AusNet Services area. This forecast would then be allocated to LGAs and postcodes.
2. A 'bottom-up' approach, whereby local drivers are used to forecast customer numbers at the LGA level, and summing each LGA to derive AusNet Services' total customers.

The second option is preferable, so long as reliable indicators at the local level are available. This is because local factors may be more reflective of growth in that area than statewide economic indicators.

The growth in residential customers is one such local-level indicator of economic activity in an area. As CIE notes in its report:

> *"Businesses will connect to the gas network as preferences change and as the availability of the network changes. At the LGA level, perhaps the best measure of this is residential customer numbers."*[20]

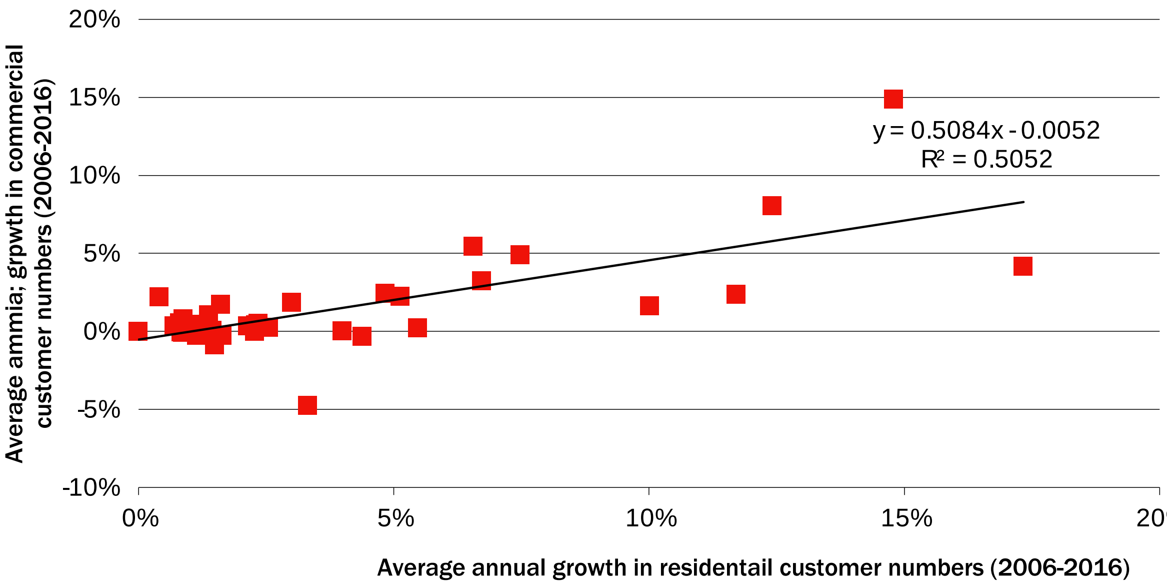
On this basis, CIE's bottom-up method for forecasting commercial customer numbers was to use the residential customer number forecast as a base and forecast how many new commercial customers would connect, given the residential growth occurring in the LGA. This same approach was used in the 2013-17 access arrangement review and accepted by the AER.[21]

20 CIE, *2018-2022 GAAR Consumption and Customer* Forecasts, 2016, p. 70.

21 AER, *Access Arrangement Draft Decision, SPI Networks (Gas) Pty Ltd, 2013-17, Part 2 Attachments,* Sept 2012, p. 196.

For the 2018-22 forecasts, CIE was able to establish a statistically significant relationship between the change in commercial customers and the change in residential customers. This is depicted in the below chart.

Figure 4-3: Change in commercial customers vs change in residential customers 2006-2016



Source: CIE (2016)

CIE noted that the number of new commercial customers created per new residential customer was noticeably higher in the 2013-2016 period compared to the 2006-2012 period. So as not to underestimate the number of new commercial connections, CIE based the 2018-2022 commercial customer forecast on the more recent data. This approach resulted in approximately 12 new commercial customers for every 1,000 residential customers in the forecasts.

4.3.4 Commercial customer numbers

Table 4-2 summarises AusNet Services' commercial customer forecasts to 2022. Forecasts reflect *net growth*, that is, new connections less abolishments (disconnections).

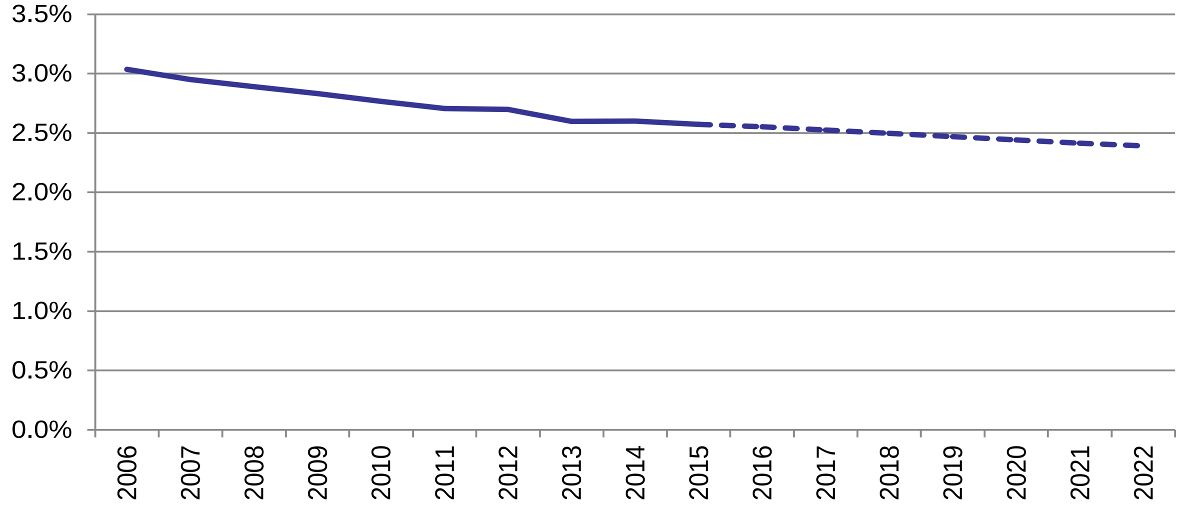
Table 4-2: Commercial customer number forecasts (average annual customers)

Region	2017	2018	2019	2020	2021	2022	Growth 2017-22	Growth 2010-15
Central	10 204	10 319	10 437	10 558	10 683	10 804	600	633
West	6 175	6 214	6 253	6 292	6 333	6 372	197	44
Adjoining central	12	16	19	22	24	25	14	4
Adjoining west	246	251	255	259	263	267	21	97
Total customers	**16 637**	**16 800**	**16 964**	**17 132**	**17 303**	**17 468**	**831**	**777**
Total growth rate		*1.0%*	*1.0%*	*1.0%*	*1.0%*	*1.0%*	*5.0%*	*5.0%*

Source: AusNet Services

The proportion of commercial customers in AusNet Services' total customer base has been gradually declining over the last decade.[22] The customer forecasts produced by CIE continue this trend, as indicated in Figure 4-4.

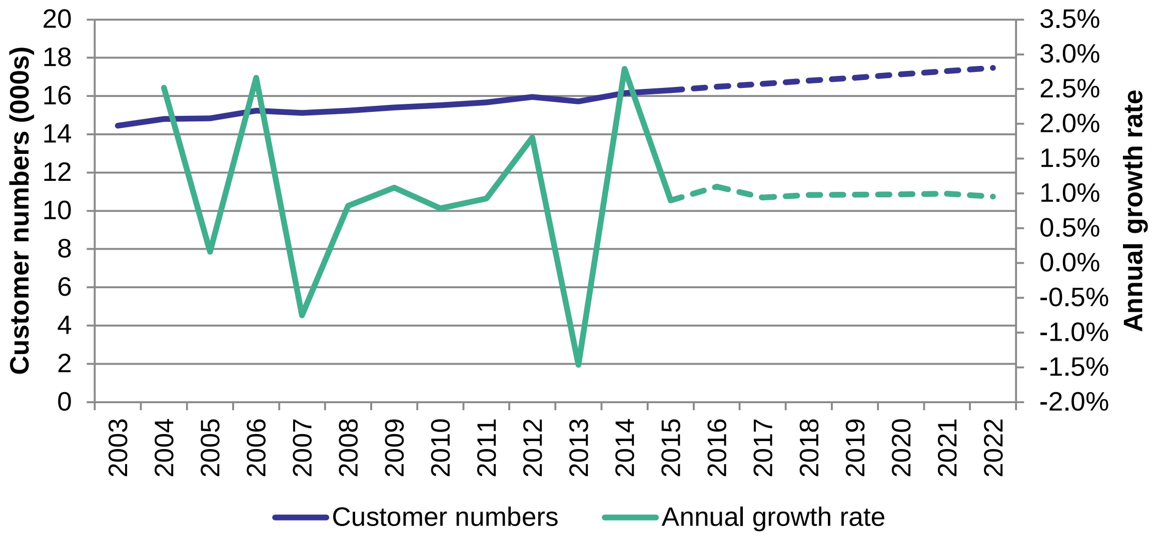
Figure 4-4: Commercial customers (as a percentage of residential customers)



Source: CIE (2016)

Figure 4-5 below shows the total number of actual and forecast new customers each year since 2003 and the corresponding annual growth rate on the right hand axis. The commercial growth rate is more volatile than the residential growth rate (although as previously noted, the two are correlated), but there is no discernible trend towards increasing or falling growth rates. The reasonably flat forecast growth rates are, therefore, reasonably consistent with the trend to 2015.

Figure 4-5: Commercial customer growth



Source: CIE (2016)

[22] This is despite the fact that the number of new commercial customers per new residential customer has grown. It is still the case that more residential customers connect to the network relative to commercial customers, hence over time the proportion of commercial customers to residential customers will fall.

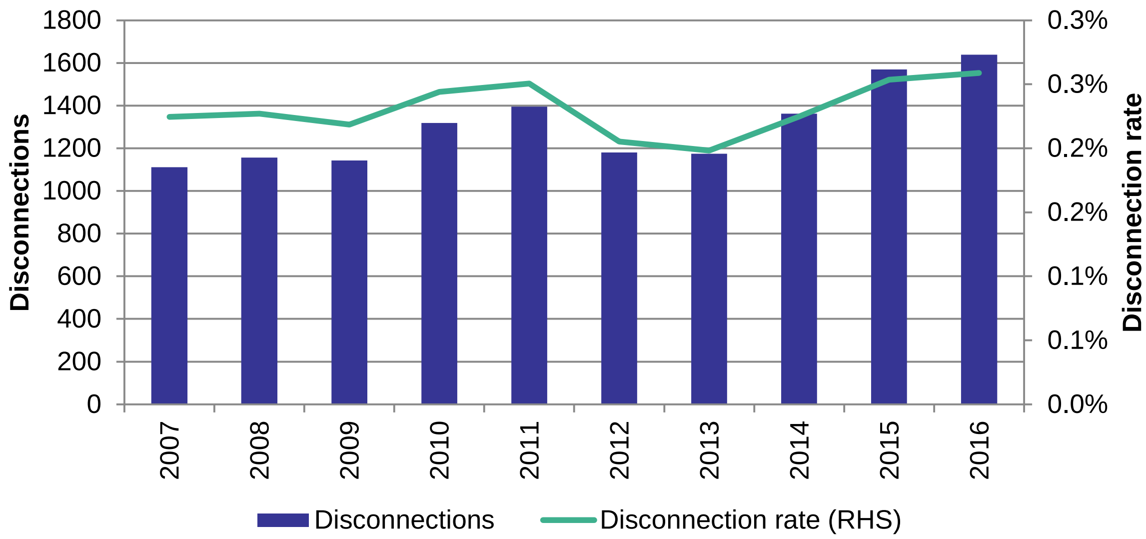
4.3.5 Gross customer connections

The forecasts provided in the above discussion were focused on net growth, that is, the number of new customers who connected to the network less the number of customers who were disconnected (also known as 'abolishments'). To derive the number of customers who connected to the network (known as 'gross connections'), the number of disconnections needs to be added back to the net growth in customers.

CIE's forecasts are based on a net customer approach. That is, CIE establishes the increase in net connections for every increase in new dwellings. Disconnections are forecast using a post-model adjustment using the net customer growth as a base.

The residential disconnection rate in AusNet Services' network (that is, the proportion of customers who disconnect relative to the entire customer base) has fluctuated between 0.20% and 0.26% over the past ten years, although it has been increasing in recent years, as noted in the discussion above due to changing customer preferences.[23] The trend in disconnections is shown below.

Figure 4-6: Residential disconnections 2007-2016



Source: AusNet Services

For the purposes of forecasting disconnections, CIE used the average disconnection rate from the last three years, which incorporates the observed changes in preferences in relation to electricity and gas.[24] It is important to note that, as the disconnection rate is a post model adjustment, changing the number of disconnections will not change the number of net connections, as these have been established using CIE's 'net customer' methodology.

The reconciliation between AusNet Services' forecast net customer growth and gross connections is presented in Table 4-3 below.

Table 4-3: Gross connections forecast

Region	2018	2019	2020	2021	2022
Residential net growth	14 033	14 235	14 486	14 775	14 254

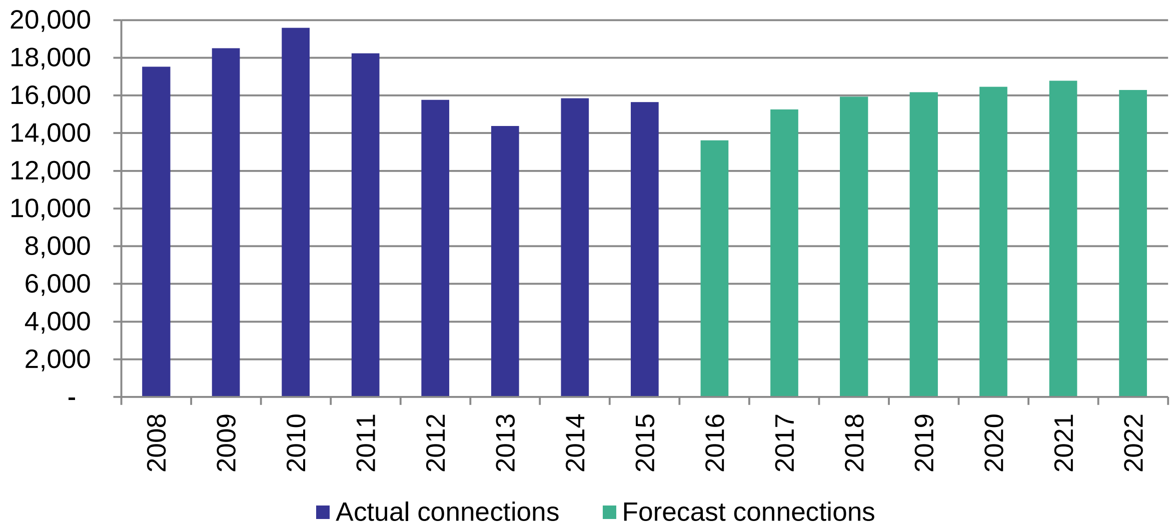
[23] This analysis is based on years from July to June, to take account of the most recent actual data.
[24] The same approach was used for commercial customers.

Region	2018	2019	2020	2021	2022
Residential disconnections	1 617	1 652	1 686	1 722	1 758
Residential gross connections	**15 650**	**15 887**	**16 172**	**16 497**	**16 012**
Commercial net growth	162	165	168	171	165
Commercial disconnections	115	116	117	118	119
Commercial gross connections	**277**	**280**	**284**	**288**	**283**
Total gross connections	**15 927**	**16 167**	**16 456**	**16 785**	**16 295**

Source: AusNet Services

Figure 4-7 below shows forecast gross connections compares and actual connections since 2009. Whilst the number of connections in the 2018-2022 period is higher on average than in recent years, this is driven by ViF 2016 forecasts, as previously discussed.

Figure 4-7: Actual and forecast gross connections



Source: CIE (2016)

4.4 Energy Consumption Forecasts

4.4.1 Residential energy consumption drivers

Total energy forecasts are derived by combining customer number forecasts and energy per customer forecasts. Customer number forecasts were discussed in the preceding section. This section describes the methodology used to calculate energy per customer. Section 4.4.3 then presents the total residential energy forecast.

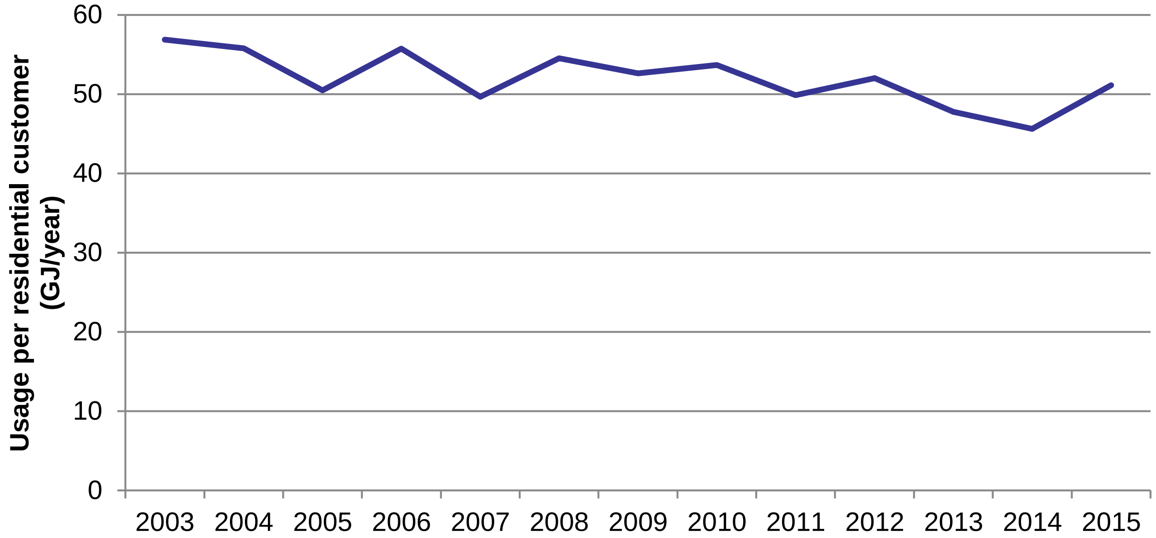
CIE undertook formal statistical analysis of historical gas use and combined this with independent forecasts of future key assumptions to produce its energy forecasts. CIE's report contains a lengthy discussion of the statistical techniques and sources used in its work.[25] This section summarises some of CIE's insights and high level findings as well as the outcomes of its analysis.

At the outset, it is worth noting that residential gas consumption per household has been declining for a number of years. CIE attributes this fall in gas demand to a number of drivers, including:

- improvements in the energy efficiency of new housing stock compared to existing housing stock (that is, new dwellings demand less gas than older dwellings);
- a higher proportion of new connections are smaller units and flats than the overall population of existing connections;
- increasing retail gas prices;
- increasing consumer preferences for electrical appliances over gas appliances. This trend, known as "appliance switching", has also been noted by AEMO and factored into its electricity and gas forecasts; and
- a long term trend of a warming climate, as measured by both Effective Degree Days[26] and average temperatures.

The combination of the above drivers has seen per customer consumption fall by 10% over the past 12 years (actual volumes, not weather normalised). The falling energy consumption per customer is clearly illustrated in the below chart.

Figure 4-8: Actual consumption per residential customer (GJ p.a.)



Source: AusNet Services

As noted above, these historical drivers of gas demand are combined with forecasts of future drivers to produce AusNet Services' residential usage forecasts. The next section will focus on some of the historic drivers of gas demand.

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25 CIE, *2018-2022 GAAR Consumption and Customer* Forecasts, Chapter 6, 2016.

26 Effective Degree Days are discussed further in section 4.3.2 and in Appendix D of CIE's report.

4.4.2 Energy consumption trends in the residential gas sector

Energy efficiency

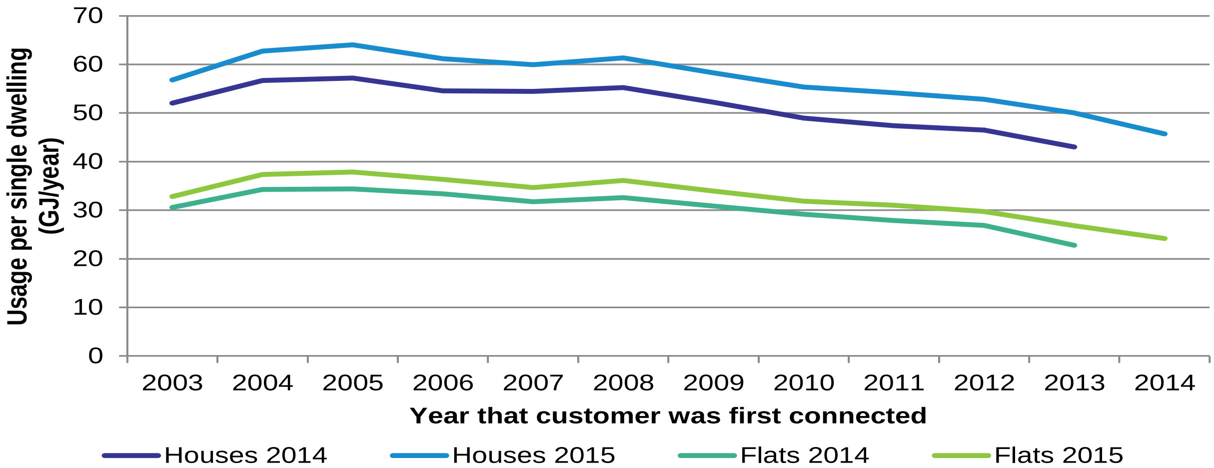
As in the electricity sector, the effect of energy efficient appliances and government policies relating to energy efficiency have contributed to new dwellings consuming less gas than older dwellings. AusNet Services' 2013-2017 access arrangement proposal summarised a number of these initiatives, including:

- 5 star energy efficiency standards, which came into effect in Victoria in July 2005;
- Solar hot water system take up;
- Low flow showerheads that reduce water use and hence gas used for heating water;
- Greater efficiency of gas instantaneous hot water systems; and
- Programs aimed at thermal efficiency improvements such as ceiling insulation.[27]

The continued impact of these initiatives for new customers (or existing customers replacing appliances) means that the overall average consumption per household will continue to decline over the medium to long term. To the extent that new customers use less gas than existing customers, this is an important variable to account for in energy consumption forecasts.

To test the hypothesis that energy efficiency continues to play a role in customers' consumption profiles, CIE analysed 2014 and 2015 consumption at the individual customer level and grouped customers into the years in which they connected to the network. For both flats and free-standing dwellings, it was clear that customers who connected to the network more recently (and therefore were assumed to be residing in more recent housing stock) used less gas than customers who connected in the years before. This relationship is presented in the below chart.[28]

Figure 4-9: Usage in 2014 and 2015 based on year when first connected to gas – single houses



Source: CIE (2016)

27 SP AusNet, *2013-2017 Gas Access Arrangement Review – Access Arrangement Information*, March 2012, p. 79.

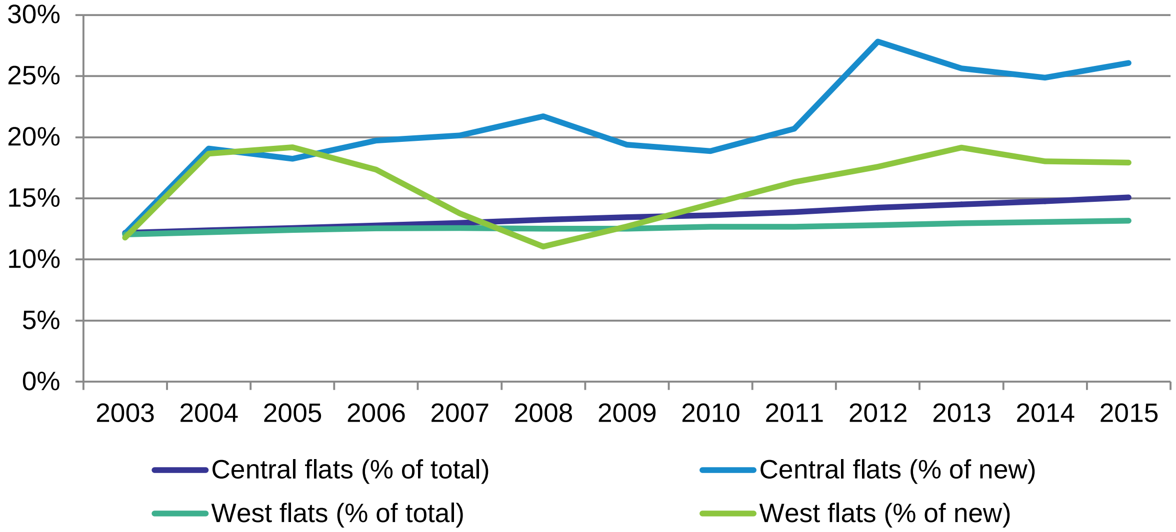
28 The volumes have not been weather-normalised because this would require establishing separate weather sensitivities for, firstly, houses and flats and secondly, for dwellings constructed in each of the years presented. CIE has already established sensitivities to weather at each of AusNet Services' four inclining blocks across the entire residential and commercial customer bases and attempting to weather normalise at the dwelling type/year would introduce a layer of complexity not required for the forecasts. The much colder conditions in 2015 compared to 2014 is the reason why the 2015 usage per customer is higher than the 2014 usage per customer.

The above figure shows that in both 2014 and 2015, there was a clear negative relationship between consumption and year of dwelling construction. It is important to note that this is not the same trend as shown in Figure 4-8 above. Figure 4-8 shows the declining consumption per household over the 2003-2015 period. The above figure shows consumption in only 2014 and 2015, with dwelling age on the x-axis.

Dwelling types

Further impacting the gas consumption of new customers is the increasing proportion of flats and units in AusNet Services' customer base. CIE performed a forensic analysis of the number of flats and units in AusNet Services' de-identified customer data by using the street address to determine whether each dwelling was likely to be a free standing house or a flat/unit. CIE's analysis found that since 2003, the proportion of new connections which are flats has more than doubled in AusNet Services' Central region and increased by more than 50% in the West region.

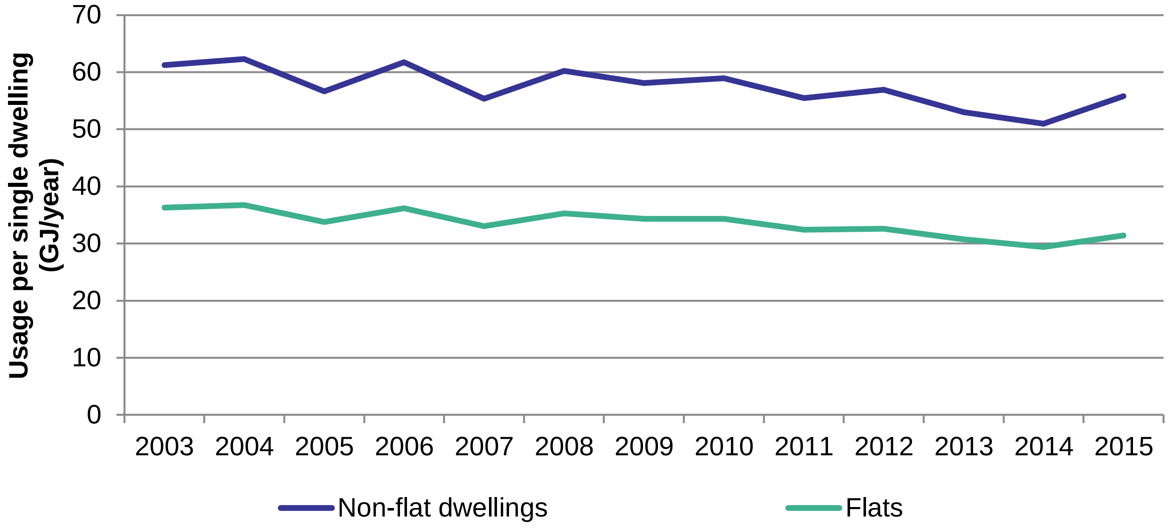
Figure 4-10: Proportion of flats in AusNet Services network



Source: CIE (2016)

The proportion of flats in the overall population of customer numbers is an important input to the forecasts because flats use less gas than free-standing dwellings. Customer growth skewed more heavily towards flats will, therefore, result in a lower consumption forecast than customer growth comprising fewer flats. By analysing AusNet Services' consumption data by dwelling type, CIE was able to demonstrate that customers in flats used approximately 40%-45% less gas than customers in free-standing dwellings. Furthermore, this relationship has held constant over a long period of time.

Figure 4-11: Average residential usage for flats and free-standing dwellings



Source: CIE (2016)

CIE has accounted for both the increasing tendency of new connections to be flats and the fact that flats consume less gas than non-flats in its forecasts. In its statistical model, this is picked up via the *Flats* variable, which provides for a lower usage for any customers assumed (or known) to be residing in a flat, rather than a free standing dwelling.

Gas prices

Retail gas prices have been increasing for a number of years, despite the large reduction in gas distribution network prices in 2013 and 2014. As with other commodities and services, as the price of gas increases, demand for gas reduces. This relationship is referred to as the price elasticity of demand. When forecasting the consumption of a product such as natural gas, it is important to factor in future movements in the price of gas and the associated impact on consumption.

There has been a significant amount of discussion by industry participants and commentators with respect to the future of gas prices in Australia. Retail gas prices will be heavily influenced by the wholesale price of gas, which in turn is influenced by the contracts secured by Liquefied Natural Gas (LNG) producers in the northern part of Australia.

Rather than attempt to forecast the retail price of gas itself, CIE has relied on the retail gas price projections used by AEMO in its 2015 National Gas Forecasting Report (**NGFR**). It is understood that AEMO will release its 2016 NGFR in December 2016, and any changes to AEMO's retail price forecasts will be updated in AusNet Services' revised access arrangement proposal.

Appliance switching

As already noted in section 4.2.1, gas is a fuel of choice and customers can, therefore, more easily elect to increase or decrease their dependency on natural gas on the basis of price, quality and reliability than they can for, say, electricity. AEMO recognised the increasing attractiveness of electricity relative to gas in its 2015 National Electricity Forecasting Report (**NEFR**) by incorporating an increase in electricity consumption from customers who have elected to use electricity rather than gas as their fuel source.

CIE's report cites a number of different reports[29] which point to the challenges faced by gas industry participants in a future where electricity is more competitive, including:

- AEMO's 2016 NEFR, which notes that energy use for heating with electricity is around 20% of that for gas;
- a survey by the Alternative Technology Association, which found that 65% of respondents were 'much less likely' or 'less likely' to choose a gas appliance now compared with 5 or 10 years ago; and
- research undertaken by Colmar Brunton on behalf of AusNet Services which found that 4% of existing customers expected to disconnect in the next five years and 10% of customers in the next 10 years.

As CIE's report notes, AEMO assumes the following with respect to appliance switching:

- Hot water consumption
  - Existing homes - hot water units are replaced over the next 10 years with solar units or heat pumps, reducing consumption of existing homes;.
  - New homes - driven by a changeover of existing hot water units to electric .appliances.
- Heating consumption
  - Existing homes – heating units replaced within 20 years by smaller gas space heaters or smaller gas space heaters combined with reverse cycle air conditioners;
  - New homes – insignificant changes to appliance switching.[30]

CIE's approach to estimating drivers of historic gas consumption would include some element of appliance switching to the extent that it is already taking place, either through CIE's *time trend* variable or *price* variable. However, as CIE notes:

> *"It is not possible to determine the extent to which the time trend is correctly accounting for appliance switching yet also accounting for other variables with an upward impact on usage. Another factor such as improved customer service from gas companies may enter into the estimated time trend and have an upward impact on demand. Thus the trend may appropriately account for appliance switching despite having a smaller downward impact on usage than AEMO's adjustment.*
>
> *However, given the strong expectation that appliance switching will increase in the future, we have decided to follow AEMO NGFR 2015 and make an adjustment for appliance switching to forecasts of residential usage per customer."*[31]

As the above paragraph explains, CIE incorporated a post-modelling adjustment in its forecasts to address the expectation that appliance switching will accelerate in the future, relative to historical levels. The predicted acceleration in appliance switching is based on the evidence from AEMO, ATA and AusNet Services' customer research, as summarised above.

There is, however, inherent uncertainty as to the precise extent of the acceleration of appliance switching. To clearly show the impact of the post-modelling adjustment, CIE included two scenarios in its modelling: one with the post-modelling adjustment for appliance switching and one without. Figures 4-16, 4-17 and 4-19 in section 4.4.3, below, show the difference that the post-modelling adjustment makes.

Demand forecasts are a key determinant of the approved price path for the forthcoming access arrangement period. Forecasts which are too low place unnecessary upward pressure on the prices paid by customers. However, if forecasts are too high, distribution businesses may not

[29] CIE, *Ibid*, pp. 21-22.
[30] CIE, *Ibid*, p. 63.
[31] CIE, *Ibid*, p. 65.

recover the efficient costs of investing in and operating the network. Given the level of uncertainty as to the precise extent of the acceleration of appliance switching, and the need to limit increases in network charges and promote the use of gas as a fuel of choice, AusNet Services has elected to adopt CIE's forecast excluding the post modelling adjustment for appliance switching. AusNet Services will continue to investigate the drivers underpinning future demand, including via consultation with AEMO between now and the Revised Proposal.

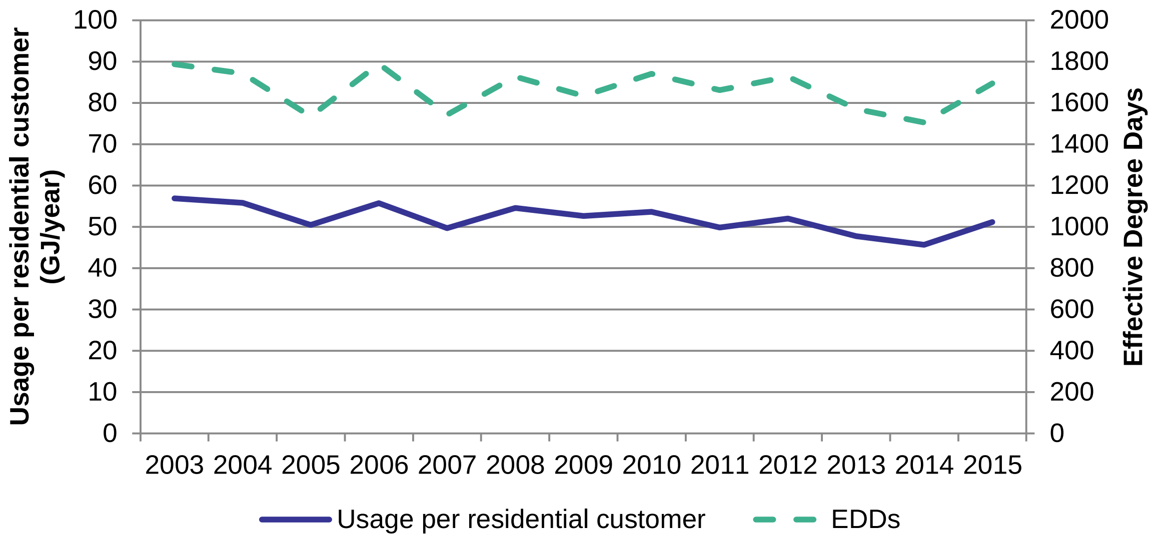
Investigating ways to increase the demand for gas is one reason why AusNet Services is proposing an allowance for gas marketing over the forthcoming access arrangement period. The expected impact on demand of these marketing activities is discussed in section 4.5.

Warming climate

Space heating is the largest driver of residential and commercial (Tariff V) gas consumption in distribution networks. For this reason, there is a clear correlation between weather and the demand for gas. AusNet Services uses *effective degree days* (**EDDs**) as an indication of how cold any particular day is. EDDs use temperature, wind speed and sunlight hours to quantify a level of coldness that provides a more accurate assessment than simply using temperature. EDDs are also used by AEMO in its planning and forecasting role and AusNet Services has adopted AEMO's formula for calculating EDDs in its network.[32]

Figure 4-12 shows the correlation between annual gas consumption and annual EDDs.

Figure 4-12: Annual usage per customer and annual EDD



Source: AusNet Services

Given the strong relationship between EDDs and gas consumption, it is important that any expected changes in future EDDs are included in the forecast model. This is because a lower EDD forecast (lower EDDs = warmer weather), would result in a lower consumption forecast.

CIE has projected that future EDDs will fall by 8.5 EDDs per year. As CIE explains,[33] this trend is the estimated combined effect of greenhouse warming and the Urban Heat Island effect by Suppiah and Whetton of the Commonwealth Scientific and Industrial Research Organisation (**CSIRO**).[34]

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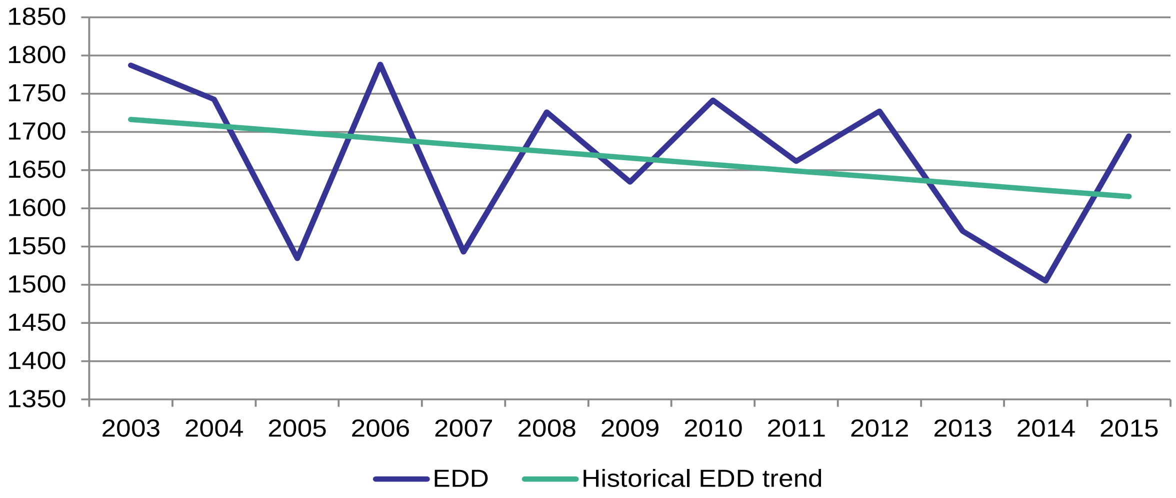
32 The EDD312 (2012) weather standard.

33 CIE, *2018-2022 GAAR Consumption and Customer* Forecasts, 2016, p. 116.

34 Suppiah, R. and Whetton, P., *Projected changes in temperature and heating degree-days for Melbourne, 2012-2017*, CSIRO, 2012.

Suppiah and Whetton's decline of 8.5 EDDs per year exactly aligns with the trend experienced in AusNet Services' network over the period 2003-2015, as the figure below shows. This provides strong support that it is appropriate to adopt Suppiah and Whetton's trend for AusNet Services' network. Further, CIE noted that this was similar to the trend independently developed by the National Institute of Economic and Industry Research (**NIEIR**), which calculated a warming trend of 7.6 EDDs per year.[35]

Figure 4-13: Effective degree days in AusNet Services' network 2003-2015

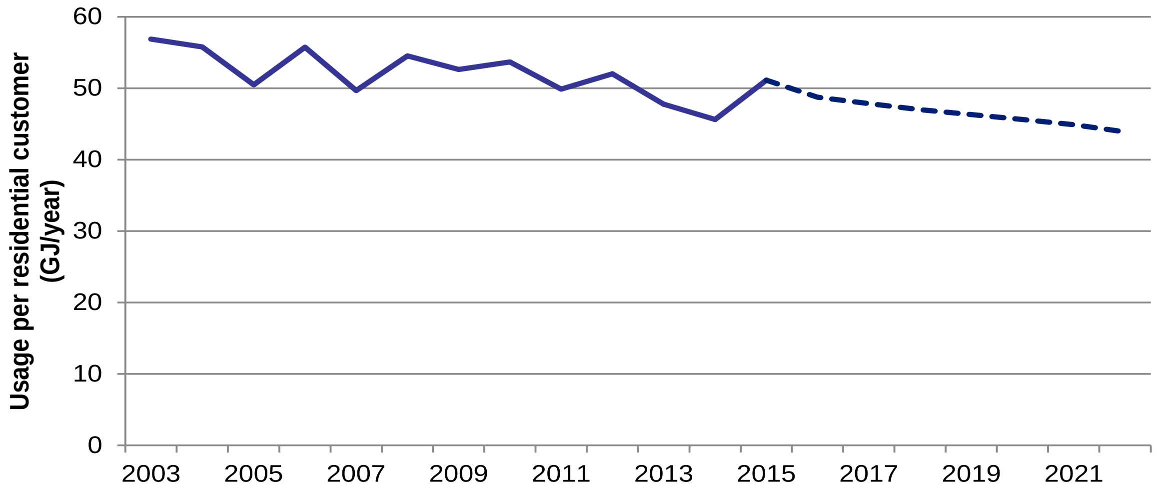


Source: AusNet Services

4.4.3 Residential energy forecasts

Once all of the above factors were taken into account by CIE, it arrived at energy consumption forecasts at the customer level. CIE has forecast a decline in consumption per customer of 1.7% per annum in the 2018-2022 access arrangement period, as depicted in Figure 4-14.

Figure 4-14: Forecast residential usage per customer (GJ)

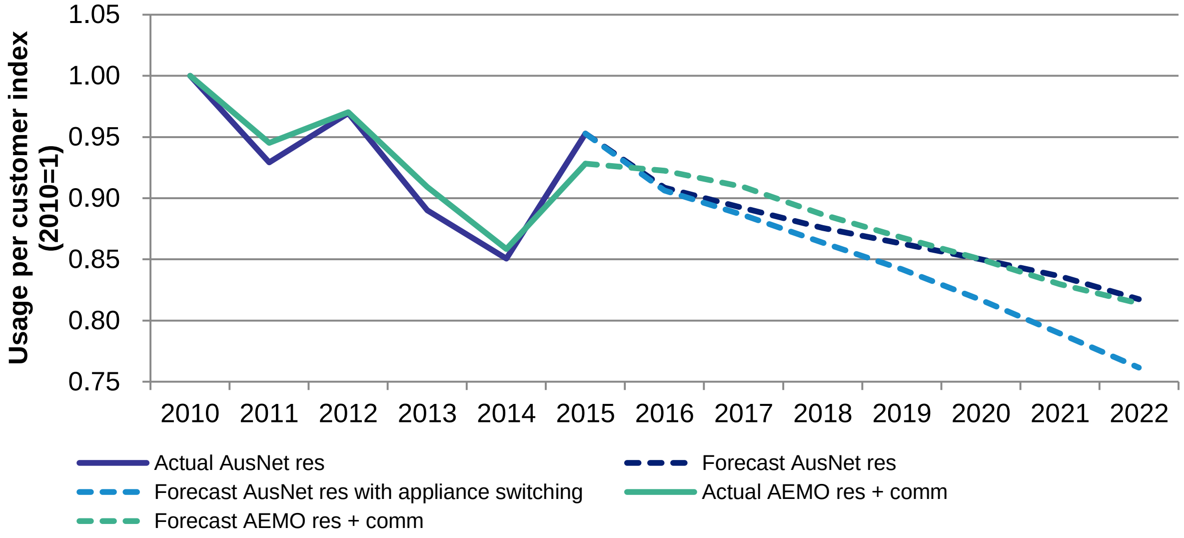


Source: CIE (2016)

35 NIEIR used temperature data from Melbourne Regional Office and Melbourne Olympic Park, both of which are warmer than Melbourne Airport, which is the weather station used to derive AusNet Services' EDDs. The two analyses are therefore not directly comparable, however the closeness of the reducing trend provides strong evidence to support a declining trend in EDDs.

As can be seen above, CIE's forecast resulted in a continuation of the declining consumption per customer that has been occurring since 2003. CIE also notes that its forecasts without the appliance switching post model adjustment are comparable to those produced by AEMO in its 2014 NGFR. However, with the possibility of an increasing (rather than stable) trend of appliance switching, AEMO's 2014 forecasts may be too high. CIE noted that its suggested post model adjustment to take account of appliance switching would lead to lower forecasts than AEMO overall, as shown below.

Figure 4-15: Comparison of CIE and AEMO consumption per customer



Source: CIE (2016)

It is important to note that AEMO's data is a combined residential and commercial forecast. Since CIE's forecast reduction for residential is more than double that of commercial (see section 4.3.4), one would expect the AEMO forecast to be higher than a purely residential forecast. Offsetting this is the fact that commercial demand is approximately 20% of the size of residential demand.

That is, whilst the residential forecasts adopted by AusNet Services, which do not include the post modelling adjustment, align with AEMO's 2015 residential and commercial forecasts, one would expect residential forecasts to be slightly lower than combined residential and commercial forecasts. As noted above, AusNet Services will continue to investigate the impact of appliance switching to determine whether CIE's proposed post-modelling adjustment should be included in the Revised Proposal.

The usage per customer forecasts developed by CIE are multiplied by the number of customers presented in section 4.2.2 to arrive at total consumption forecasts. These are presented in Table 4-4.

Table 4-4: Residential consumption forecasts (TJ)

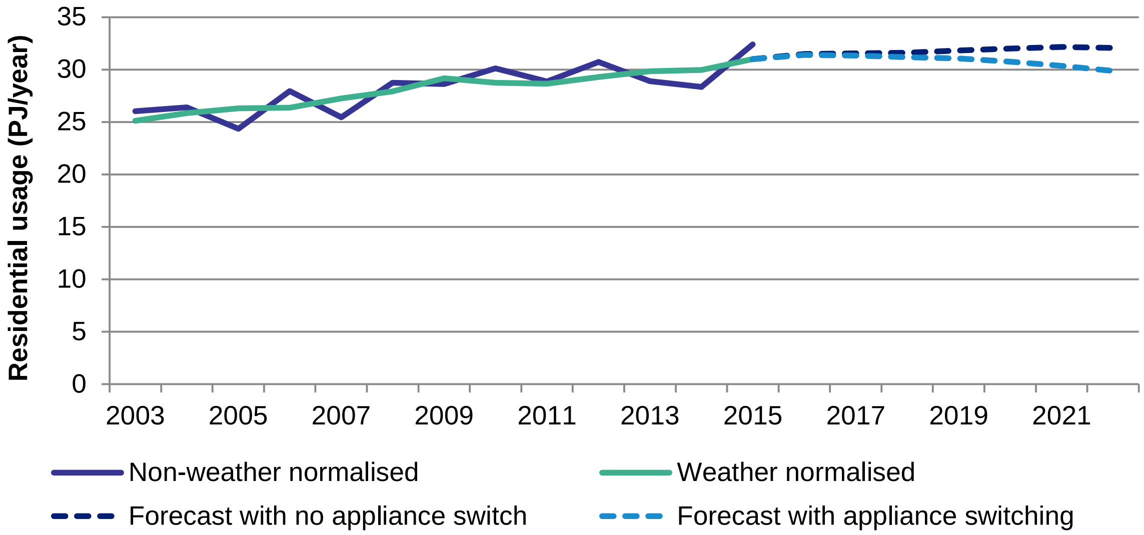
Region	2017	2018	2019	2020	2021	2022
Central	24 175	24 205	24 333	24 455	24 542	24 457
West	6 777	6 806	6 861	6 913	6 955	6 939
Adjoining central	58	67	74	79	83	84
Adjoining west	530	543	556	567	576	577

Region	2017	2018	2019	2020	2021	2022
Total volume	**31 540**	**31 621**	**31 824**	**32 014**	**32 156**	**32 056**
Total growth rate		*0.26%*	*0.64%*	*0.60%*	*0.44%*	*-0.31%*

Source: CIE (2016)

The below figure shows how the total volume forecasts compare to AusNet Services' actual and weather-normalised volumes since 2003.

Figure 4-16: Actual and forecast residential consumption (GJ)



Source: CIE (2016)

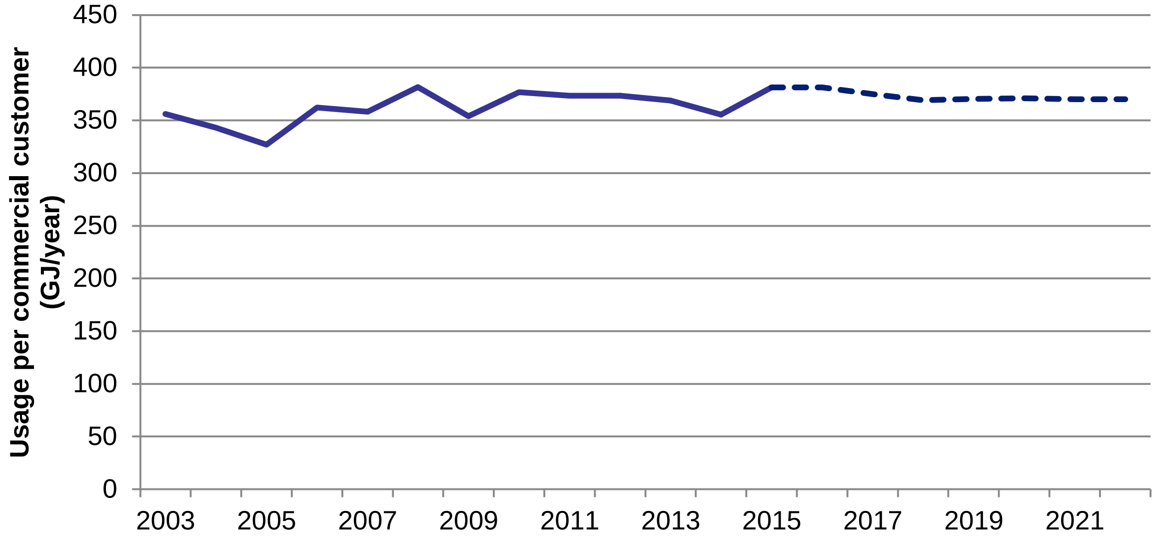
4.4.4 Commercial energy forecasts

Gas consumption in the commercial sector is impacted by many of the same drivers as residential gas consumption, such as energy efficiency, price, competitiveness of electricity and weather. The only variable that CIE modelled for residential consumption that had no relevance for commercial consumption is the *flats* variable, which is irrelevant in a commercial context.

Whilst the variables impacting consumption are similar across the residential and commercial sectors, there are differences in terms of the extent of each variable's impact. For example, commercial customers are less sensitive to weather, but more sensitive to price. The combination of the historical trend in consumption, forecast price increases and the lower expected EDDs leads to commercial consumption per customer remaining reasonably constant over the period. It should be noted that if the appliance switching post modelling adjustment were included, a downward trend would be forecast.

CIE's forecast of consumption per commercial customer are presented below.

Figure 4-17: Forecast commercial usage per customer (GJ)



Source: CIE (2016)

Once these forecasts are multiplied by the forecast commercial customer numbers, they result in the consumption forecasts in each of AusNet Services' pricing zones in Table 4-5.

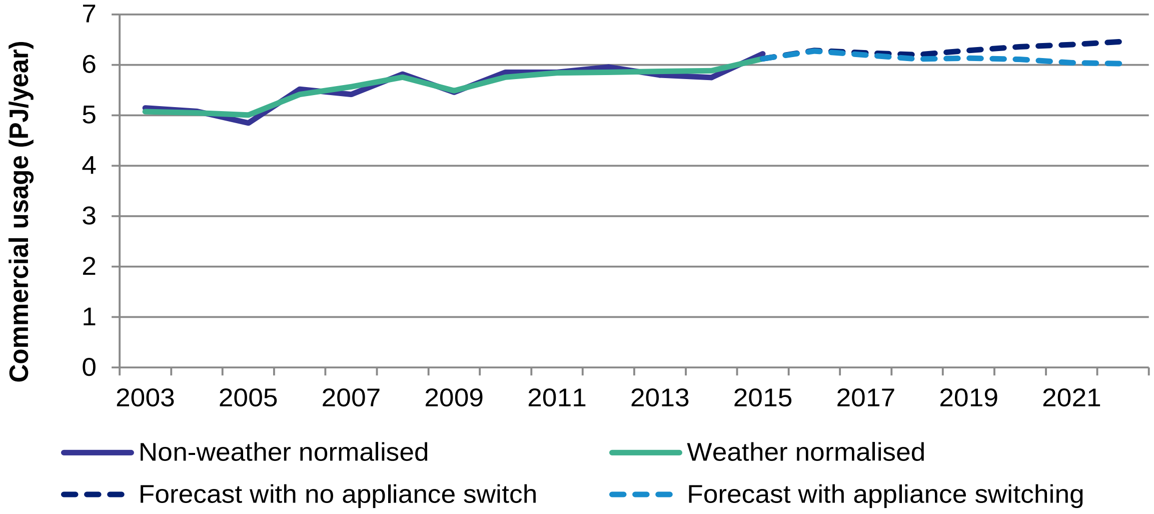
Table 4-5: Commercial consumption forecasts (TJ)

Region	2017	2018	2019	2020	2021	2022
Central	4 527	4 505	4 570	4 629	4 668	4 716
West	1 609	1 594	1 609	1 621	1 627	1 639
Adjoining central	4	5	5	6	6	7
Adjoining west	97	97	99	100	101	102
Total volume	**6 236**	**6 200**	**6 283**	**6 356**	**6 402**	**6 464**
Total growth rate		*-0.58%*	*1.34%*	*1.17%*	*0.72%*	*0.96%*

Source: CIE (2016)

Figure 4.18 below shows how the total volume forecasts compare to AusNet Services' actual and weather-normalised volumes since 2003.

Figure 4-18: Actual and forecast commercial consumption (GJ)



Source: CIE (2016)

4.5 Tariff D and M demand

4.5.1. Tariff D and M

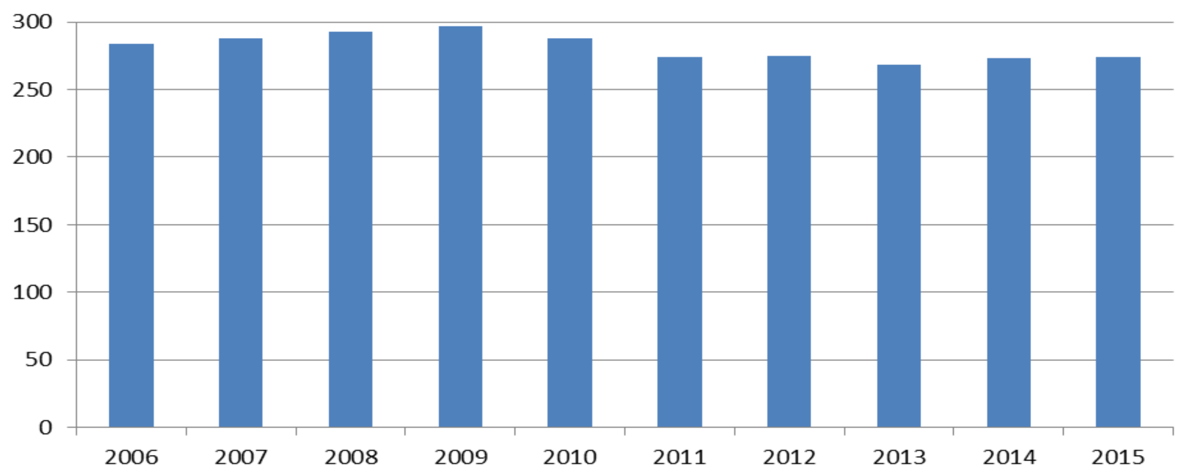
Tariff D and Tariff M customers are gas consumers who consume either more than 10,000 GJ per annum, or more than 10 GJ in one hour. These are typically large industrial customers, such as manufacturers, processers, hospitals, etc. Tariff D and Tariff M customers are not billed on the basis of their overall consumption, as is the case with residential and commercial customers (the Tariff V customer group). Rather, these customers are charged based on the peak demand for gas in any one hour (their MHQ).

Because of the manner in which these customers are charged, forecasting overall consumption is not required. Rather, it is the Tariff D and Tariff M MHQ which needs to be forecast.

4.5.2 Customer numbers

Over the past 10 years, Tariff D and Tariff M customer numbers have been through a growth, decline and stabilisation phase. In the period between 2006 and 2009, customer numbers grew from 284 to 297. Over the next two years, this customer base contracted by close to 10%, before stabilising at around 275 customers for the last five years, as depicted in the Figure 4-19.

Figure 4-19: Tariff D and Tariff M customer numbers



Source: AusNet Services

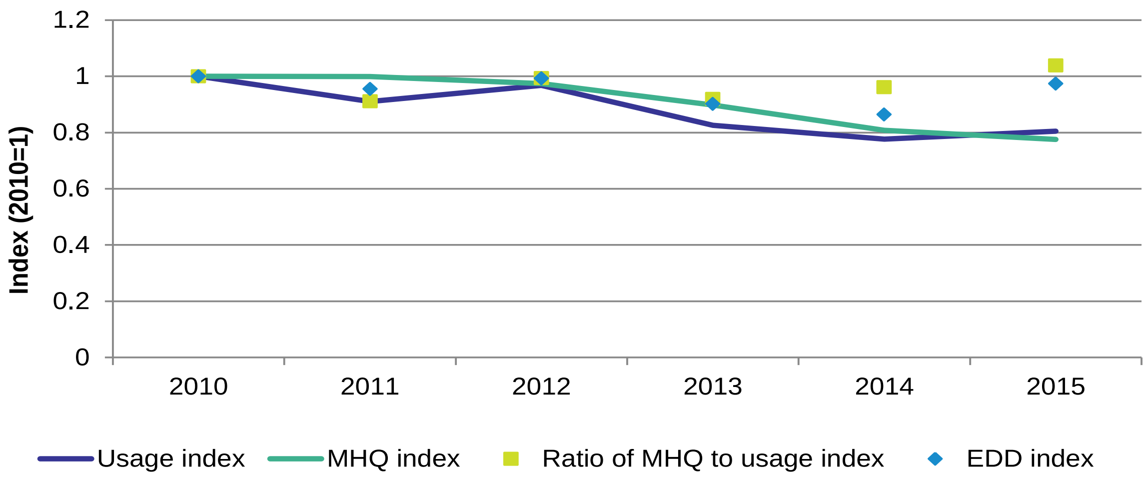
Because Tariff D and Tariff M customers are not levied a fixed charge, forecasting the number of these customers in the forthcoming access arrangement period is not required. Further, there is no expenditure associated with connecting new Tariff D and Tariff M customers that is not funded by the customers themselves. Any expenditure associated with the provision of assets to enable the connection is borne by the customer, either through a customer contribution, separate charges (Tariff D) or the Haulage Reference Service charge (Tariff M).

4.5.3. MHQ forecasts

To develop MHQ forecasts, there are two broad options. The first option is to attempt to forecast MHQ from the bottom up. That is, develop a model that estimates the drivers of MHQ and attempt to forecast these drivers and the continued relationship they have on MHQ. The second option is a top down approach, whereby the forecast change in MHQ is derived on the basis of change in another, related, variable, such as total consumption.

The top down option is appropriate if (1) a robust relationship between MHQ and another variable can be established and (2) a forecast for the other variable is easier to derive than a bottom up forecast of MHQ. To address the first point, CIE first investigated the relationship between MHQ and total consumption. To do this, CIE constructed an index of Tariff D consumption and MHQ between 2010 and 2015. The ratio between the two indices is constant, which suggests that a Tariff D consumption forecast should provide a sound basis for forecasting changes in MHQ.

Figure 4-20: Index of Tariff D consumption and MHQ (2010-2015)



Source: AusNet Services

With regards to the second point about deriving a forecast of the other variable, AEMO has a Tariff D consumption forecast for Victoria in its 2015 NGFR. This forecast is based on a combination of sectoral models, econometric models and industrial customer surveys. The survey data in particular is something that AusNet Services does not hold and therefore AEMO's Tariff D consumption forecast is considered a reasonable forecast for that customer segment.

Since CIE has established that changes in Tariff D consumption are reflected in changes in MHQ and AEMO's forecast Tariff D consumption has already been developed and is considered robust, CIE elected to adopt the top-down option and use AEMO's Tariff D consumption forecast to forecast AusNet Services' Tariff D and Tariff M MHQ.

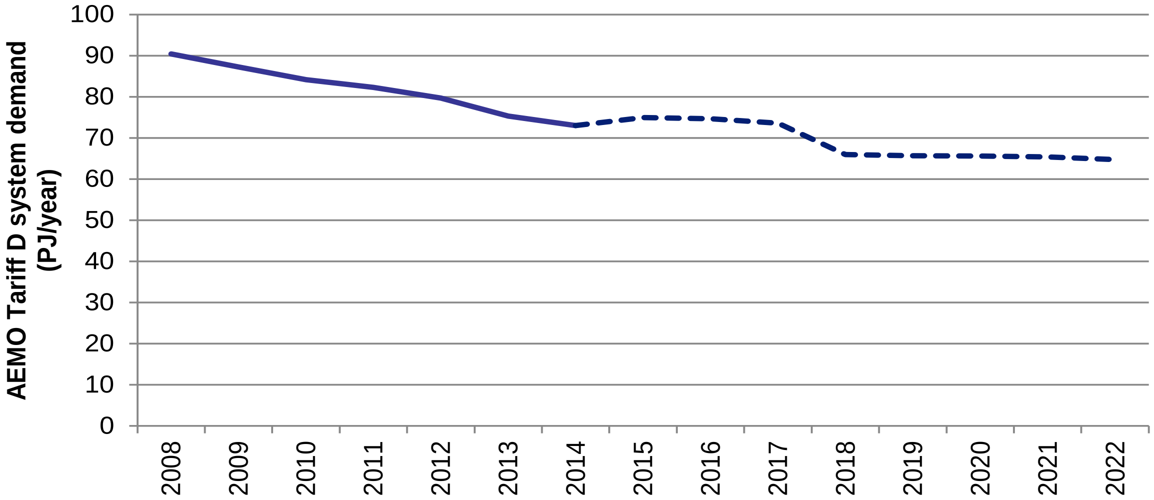
Before finalising the forecasts, CIE took account of the fact thatboth the Ford and Toyota manufacturing plants have announced plans to cease operations in 2017-2018. Whilst these closures have been taken into account by AEMO in its state-wide Tariff D forecast, the fact that both of these customers are within AusNet Services' network may have a disproportionate impact on AusNet Services' demand compared to Victoria's overall demand.

CIE addressed the impact of Ford and Toyota's plans in two ways. First, it analysed AusNet Services' metering data and established that Ford and Toyota accounted for approximately 2% of total industrial demand. CIE then looked at the closures that occurred between 2011-2015 and established that industrial closures in that period ranged between 1% and 4% annually in that time period. On this basis, the closures of Ford and Toyota would be commensurate with historical closures within AusNet Services' network.

Secondly, CIE established that there were other announced closures (for instance, the Holden engine plant in Port Melbourne) which were also likely to be large, but outside of AusNet Services' area. Since these closures are also taken into account by AEMO, the risk that AusNet Services' industrial demand will fall by a higher percentage than AEMO's state-wide demand forecast is low.

On balance, CIE considered that forecasting AusNet Services' MHQ in line with AEMO's Tariff D consumption forecast was appropriate. AEMO's 2015 NGFR contained the following forecast of Tariff D consumption.

Figure 4-21: AEMO Tariff D system demand forecast



Source: CIE (2016)

CIE applied the annual percentage changes in forecast consumption to the most recent year of available MHQ (2015). This resulted in the below forecast for AusNet Services' Tariff D and Tariff M MHQ.

Table 4-6: Forecast Tariff D and Tariff M MHQ (2018-2022, GJ)

Region	2018	2019	2020	2021	2022
Tariff D – Central and West	6 949	6 915	6 909	6 885	6 814
Tariff M – Central	126	126	126	125	124
Tariff M – West	39	38	38	38	38
Tariff D – Adjoining Central and West	46	46	46	46	46
Tariff M – Adjoining Central	0	0	0	0	0

Region	2018	2019	2020	2021	2022
Tariff M – Adjoining West	0	0	0	0	0
Total Tariff D & M	**7 160**	**7 125**	**7 119**	**7 094**	**7 022**
Total growth rate		*-0.5%*	*-0.1%*	*-0.4%*	*-1.0%*

Source: CIE (2016)

4.6 Impact of marketing activities

As discussed in Chapter 7 the distribution businesses commissioned a study on the additional costs and revenues associated with a marketing program which promoted the use of gas. This study was undertaken by Axiom Economics, whose report is included as Appendix 7D to this Access Arrangement Proposal.

The customer numbers and energy consumption forecasts presented in this chapter so far have not included the incremental demand that is expected to occur in AusNet Services' network in the event that the marketing proposal is approved by the AER and rolled out by AusNet Services. The expected increase in demand attributable to the proposed marketing program is addressed in this section.

AusNet Services' proposed marketing program would, amongst other things, offer rebates to customers for purchasing gas central heating and space heating units and gas hot water systems. Axiom Economics estimated that the majority of rebates will be taken up by existing customers who would otherwise switch gas appliances to electrical appliances. The rebate is therefore expected to reverse some of the anticipated decline due to appliance switching discussed above.

Axiom Economics estimates that 5% of appliance rebates will result in new connections.[36] In AusNet Services' network, this leads to a forecast increase of 263 additional connections per annum, an increase of 1.6% above CIE's forecast gross connections.

The tables below summarise the impact on both customer numbers and energy consumption of the marketing program. The 'base' rows show the forecast without the marketing allowance, whilst the 'marketing' row shows the forecast with the marketing allowance. All incremental demand is assumed to come from residential customers.

Table 4-7: Impact on residential customer numbers of marketing proposal

Region	Version	2018	2019	2020	2021	2022
Central	Base	515 833	525 991	536 448	547 215	557 601
Central	Marketing	516 035	526 396	537 055	548 025	558 613
West	Base	144 353	147 648	151 000	154 411	157 733
West	Marketing	144 410	147 761	151 170	154 638	158 016
Adjoining central	Base	1 973	2 283	2 525	2 715	2 867

[36] Axiom Economics, *Consistency of the Victorian gas distribution businesses' joint marketing campaign with rule 91 of the NGR*, 2016, p. 31.

Region	Version	2018	2019	2020	2021	2022
Adjoining central	Marketing	1 974	2 284	2 527	2 718	2 870
Adjoining west	Base	10 913	11 385	11 820	12 227	12 621
Adjoining west	Marketing	10 917	11 393	11 831	12 242	12 640
Total	Base	**673 072**	**687 307**	**701 793**	**716 568**	**730 821**
Total	Marketing	**673 335**	**687 834**	**702 583**	**717 622**	**732 139**
Incremental increase		*263*	*527*	*790*	*1 054*	*1 318*

Source: AusNet Services

Table 4-8: Impact on residential consumption of marketing proposal (TJ)

Region	Version	2018	2019	2020	2021	2022
Central	Base	24 205	24 333	24 455	24 542	24 457
Central	Marketing	24 273	24 470	24 660	24 816	24 798
West	Base	6 806	6 861	6 913	6 955	6 939
West	Marketing	6 825	6 899	6 971	7 032	7 035
Adjoining central	Base	67	74	79	83	84
Adjoining central	Marketing	67	74	80	84	85
Adjoining west	Base	543	556	567	576	577
Adjoining west	Marketing	544	559	571	581	584
Total	Base	**31 621**	**31 824**	**32 014**	**32 156**	**32 056**
Total	Marketing	**31 710**	**32 002**	**32 281**	**32 512**	**32 501**
Incremental increase		*89*	*178*	*267*	*356*	*445*

Source: AusNet Services

This section has presented an overview of the incremental impacts on demand of AusNet Services' proposed marketing program. Axiom Economics' report, included as Appendix 7D, provides more details on the assumptions underpinning the outcomes presented above.

4.7 Appendices

The following documents provide further information on AusNet Services' demand forecasts:

- CIE's 2018-2022 GAAR Consumption and Customer Forecasts report (Appendix 4A)

5 Customer and Stakeholder Engagement

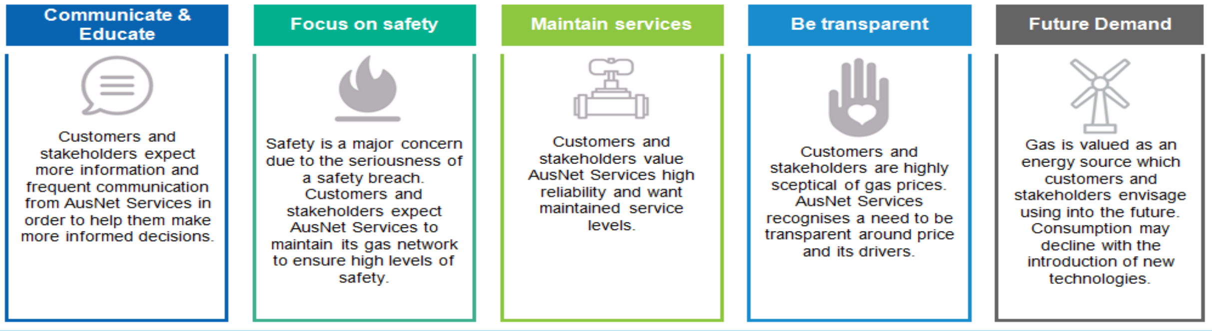
5.1 Key points

Summary of engagement efforts

- The energy industry is facing an uncertain future driving the need for network businesses to better engage with customers.
- AusNet Services conducted a comprehensive research program as part of the customer and stakeholder engagement program to understand the gas-related needs, wants and preferences of our customers and stakeholders.
- Research targeted a range of groups including residential customers, small to medium businesses, large businesses, land developers, local councils and customer advocates. A total of 700 customers and stakeholders participated in the program.
- The insights gleaned from the research were an important input into AusNet Services' decision making for the gas network. Having regard to these considerations ensures that AusNet Services is operating its network in a way that aligns with the long term interests of customers and stakeholders.
- As part of its ongoing engagement, AusNet Services monitors a range of customer performance indicators on its gas network. AusNet Services also has a range of performance indicators in place to ensure that contractors, responsible for the carrying out of works on our gas network, meet their standards across a range of customer interactions.

Key customer and stakeholder insights

- Safety is of paramount importance to customers and stakeholders and they expect AusNet Services to manage its network in a way that ensures these high levels of safety in the future.
- Customers and stakeholders would like more frequent and targeted communications from AusNet Services, especially around ways they can effectively manage their bills.
- Customers and stakeholders are satisfied with the current levels of reliability of the gas network with many never having experienced an outage.
- While customers and stakeholders believe that gas is a reasonably priced fuel, they would like greater transparency around how AusNet Services sets its price.
- Customers expect to be using less gas in the future, due to the introduction and adoption of new technologies.



5.2 Introduction

AusNet Services' Customer and Stakeholder Engagement Program was designed to identify and understand the customer and stakeholder preferences that AusNet Services could use to inform the key business decisions necessary to prepare this access arrangement proposal.

The following chapter details each phase of the customer and stakeholder engagement and shows how the engagement outcomes have been incorporated into AusNet Services' plans for the 2018-22 access arrangement period.

5.2.1 Changes in the gas market

The Australian natural gas market is facing considerable change, with conditions over the coming access arrangement period expected to reduce the demand for gas. AEMO's most recent projections suggested that annual gas consumption will fall by approximately 1% per annum between 2015 and 2022[37].

A range of factors are driving these changes:

- The new liquefied natural gas (LNG) export market from eastern Australia is pushing up retail prices for domestic gas[38], a situation that is expected to worsen in the coming years and make gas less affordable for people.
- Many Victorians have resorted to 'economic fuel switching' (i.e., switching from gas to electricity by installing heat pumps and replacing gas stoves with induction cook tops) as a result of rising gas prices.
- Increased customer engagement and awareness of the benefits of solar technology has resulted in the installation of more than 1.4 million solar powered systems in Australia[39], driving down demand for gas-based appliances.
- A range of influential key stakeholders within the industry (i.e., local councils and consumer advocacy groups) are actively promoting the 'electrification' of homes, dissuading the installation of gas appliances.
- Customer perceptions of natural gas and its environmental benefits have been damaged by the ongoing negative publicity that coal seam gas production has attracted in Australia.[40]

In light of these factors, it is becoming increasingly important that, if they are to remain viable in an uncertain environment, service providers must engage more closely with customers and stakeholders.

5.2.2 Future vision of AusNet Services' gas network

In early 2016, AusNet Services conducted a scenario planning workshop designed to challenge its existing strategic objectives and develop a 15-20 year vision for the future of its gas network. The workshop identified a set of key issues for the future vision of AusNet Services' gas network.

37 AEMO, *National gas forecasting report for eastern and south-eastern Australia,* December 2015.
38 AER, *State of the energy market,* 2015.
39 Clean Energy Council, *Clean energy Australia Report,* 2014.
40 Newgate Research, *Research report on community attitudes towards energy networks,* March 2016.

Those of particular relevance to the GAAR 2018-22 Customer and Stakeholder Program were:

- a need to better understand its customers, including connecting behaviour and gas usage;
- affordability concerns from customers and within the greater political landscape; and
- reducing the cost to serve by spreading the fixed costs over the entire network.

These issues highlight the need to undertake customer and stakeholder engagement for purposes beyond the 2018-22 GAAR, and for future planning of the gas network.

5.2.3 Learnings from existing customer and stakeholder engagement programs

Following changes to the National Electricity and Gas Rules in 2012 requiring service providers to engage with customers and stakeholders as a part of (and beyond) regulatory determination processes, many service providers developed comprehensive engagement programs. The success of these programs, in terms of feedback from customer advocates and the AER, have been mixed. AusNet Services considered this feedback in designing its 2018-22 GAAR engagement program:

- It was consistently noted that service providers need to demonstrate authentic customer and stakeholder engagement efforts, driven by customer and stakeholder priorities and not network priorities. External stakeholders expect that service providers avoid simply engaging with customers to validate issues that are assumed to be important to customers and stakeholders. Instead, they expect providers to develop and implement meaningful and robust stakeholder engagement programs that seek to identify issues that are genuinely important to customers and stakeholders.
- It is critical that AusNet Services is committed to conducting meaningful and robust customer engagement beyond regulatory reviews. As changes occurring in the gas sector could impact on customer value, there is a growing need to understand customer and stakeholder preferences and priorities so these can be reflected in network planning decisions and the services the company delivers.

5.2.4 Objectives of customer and stakeholder engagement

The overarching objective of AusNet Services' Customer and Stakeholder Engagement Program is: *to deliver authentic, customer priority-driven engagement that will meet external stakeholder expectations, and inform the development of the GAAR proposal and business planning*.

This objective acknowledges that AusNet Services' approach to engagement is driven by an understanding of the long-term interests of consumers of natural gas. This approach serves the dual purposes of addressing the requirements for customers and stakeholder engagement, as well as longer term network planning for the gas network.

To support this objective, the following goals have been identified:

- Build enhanced customer and stakeholder understanding of AusNet Services, its obligations, network issues and role in the supply of gas to homes and businesses;
- Increase AusNet Services' understanding of customers' and stakeholders' needs, wants and preferences in relation to the supply of gas;
- Build long term, trust-based relationships with customers and key stakeholders; and
- Align the regulatory proposal to customers and stakeholder preferences where possible and, where this has not been possible, explain why this is the case.

5.2.5 Definition of customers and stakeholders

For this proposal, AusNet Services has distinguished between 'customers' and 'stakeholders':

- 'Customers' – any person who consumes gas supplied by AusNet Services for non-commercial purposes. Essentially, customers are the residential 'end-users' of gas.
- 'Stakeholders' – any other (non-residential) persons or entities that are either end-users of the gas supplied by AusNet Services (i.e., businesses) or are engaged with or working within the gas sector (i.e., customer advocates, local councils, land developers).

5.3 Engagement approach

Development of the customer and stakeholder approach was informed by the following factors:

- the National Gas Objective;
- requirements and Rules of the AER; and
- the ENA's customer engagement handbook which outlines best practice approaches to customer engagement efforts within the industry.

5.3.1 National Gas Objective

The NGO, which is set out in section 23 of the National Gas Law (NGL), states that:

> *"The objective of this [National Gas] Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."*[41]

Effective engagement with customers and stakeholders is key to assisting AusNet Services to both understand and operate its natural gas distribution networks in a manner that is consistent with the "*long term interests of consumers of natural gas."*

5.3.2 Requirement and Rules of the AER

In developing the engagement approach, AusNet Services adopted the AER's Customer Engagement Guidelines[42]. The Guideline provided a framework for AusNet Services to integrate customer and stakeholder engagement into its business-as-usual operations. This framework is centred on the following components:

- Principles – adhering to a set of best practice principles to guide customer and stakeholder engagement (which include the need for engagement to be clear, accurate and timely; accessible; transparent; measurable);
- Priorities – the need to identify the issues and priorities for customers and stakeholder engagement to ensure AusNet Services understands and incorporates customer and stakeholder views into business planning, recognising that stakeholders have diverse views;
- Delivery – setting the manner by which customer and stakeholder engagement will occur for different groups;

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41 AEMC, *Nation Gas Rules*, March 2016.

42 AER 2013, "*Better Regulation Consumer Engagement Guideline for Network Service Providers",* November 2013.

- Results – articulating the outputs of customer and stakeholder engagement and how the outcomes impacted business planning; and
- Evaluation and Review – implementing a robust process to identify areas of continuous improvement.

AusNet Services also adopted the International Association for Public Participation (**IAP2**) engagement spectrum on an issue-by-issue basis. For most of the issues AusNet Services identified, the level of engagement was at the '*consult*' and '*involve*' levels. This reflects the considerable improvement in the quality of AusNet Services' customer and stakeholder engagement, going beyond simply 'informing' these groups on key issues.

5.3.3 ENA's customer engagement handbook

AusNet Services' engagement program was also informed by a draft version of the ENA's customer engagement handbook. This handbook is 'designed to provide a set of industry-endorsed features and methods of engagement that best support consistent, high-quality and effective engagement by energy network businesses with their end-users'[43]. AusNet Services adopted the following 'best practice' features and methods:

- Provide information – effective information provision helps individuals to understand the issues and to decide whether they want to participate in consultation or a more active participation.
- Consult and involve – consultation provides important opportunities to develop two-way relationships between businesses and customers, and may run in parallel with information and collaboration-based strategies.
- Collaborate and empower – effective engagement moves beyond information sharing and consultation to actively involving customers and communities in planning and decision-making processes.
- Sharing engagement outputs – sharing the results and outputs of engagement fosters transparency between the business and its customers and is important for building trusting relationships, and a business' social licence.

5.4 Customer and Stakeholder Engagement Plan

AusNet Services' Customer and Stakeholder Engagement Plan identified four key phases, involving activities for engagement as a part of this access arrangement review and beyond:

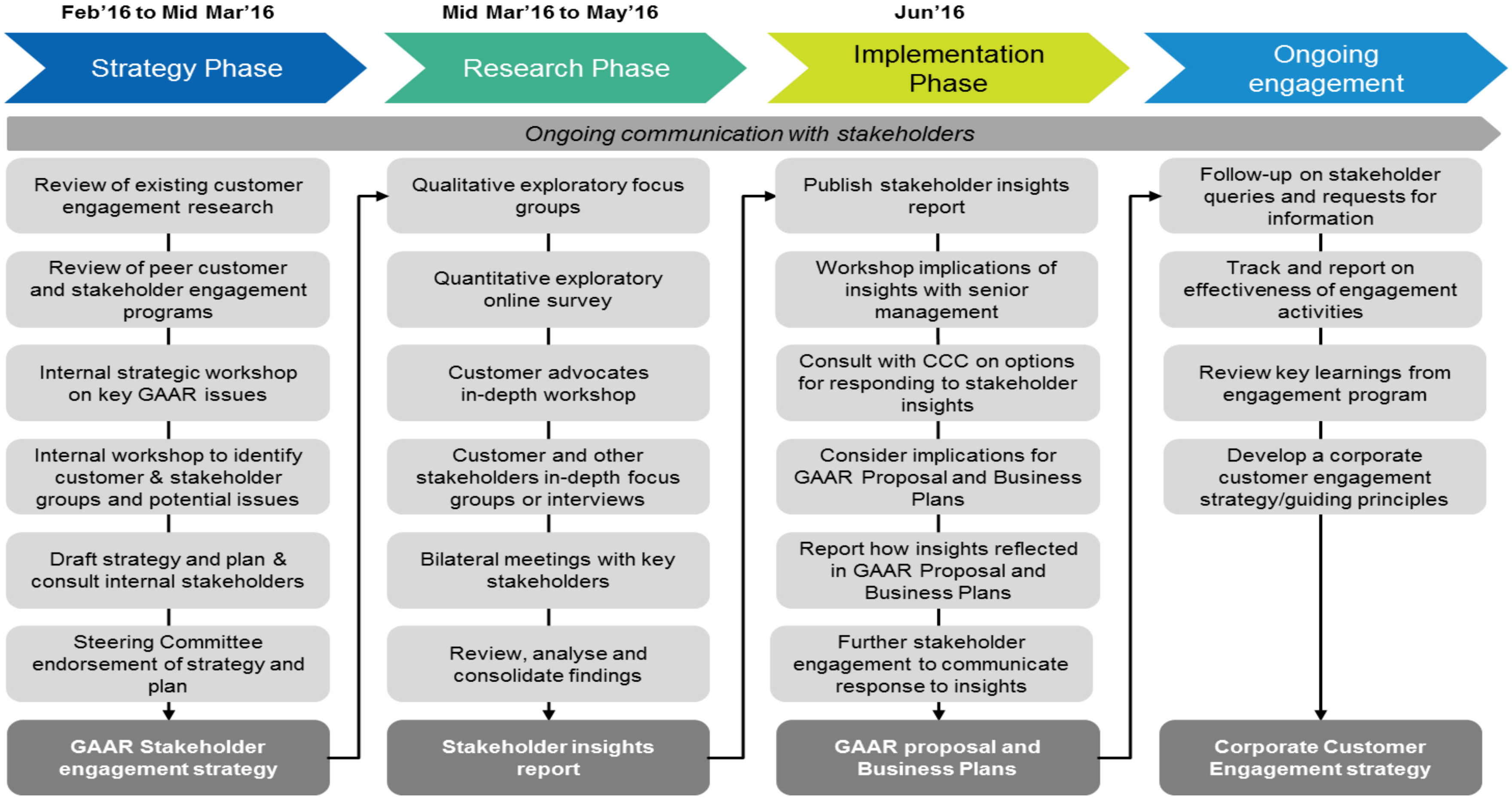
1. **Strategy Phase** – development of a strategy that was informed by the objectives and scope of the engagement.
2. **Research Phase** – research was undertaken to:
    - provide a greater understanding of the needs, wants and perceptions of customers and stakeholder towards gas, as well as investigating customer preferences in relation to service delivery and communications; and
    - understand customer and stakeholder views on trade-offs that are most important to them in the context of gas.
3. **Implementation Phase** – the implications of customer insights for the GAAR and business planning more generally.

[43] ENA, DRAFT *Customer Engagement Handbook*, February 2016.

4. **Ongoing Engagement Phase** – recognised that customer engagement continues beyond the regulatory review process as part of the business-as-usual practices.

The key activities to be undertaken in each phase are outlined in Figure 5-1 and explained in more detail in subsequent sections.

Figure 5-1: Summary of the Customer and Stakeholder Engagement Plan



5.4.1 Strategy Phase

The primary objective of the Strategy Phase was to develop a robust approach to customer and stakeholder engagement. As outlined in Figure 5-1, this phase incorporated a range of activities.

To begin, AusNet Services conducted an internal audit of its current customer and stakeholder engagement efforts for the gas network. This audit identified significant opportunities for improvement. AusNet Services then conducted a review of other customer and stakeholder engagement programs in the industry to identify key customer and stakeholder groups and the gas issues that mattered to each group. An internal workshop was then conducted to validate issues and incorporate them in AusNet Services' engagement program. The findings from each of these efforts are presented in Table 5-1.

Table 5-1: Overview of customer and stakeholder groups and issues

Group and engagement approach	Issues
End-user customers	
Residential customers – focus groups, survey, Customer Consultative Committee (CCC), peak consumer bodies described below	• Affordability and price • Connection process • Gas usage patterns (i.e., what gas appliances are used? Will they continue to use/install gas in the home?) • Perceptions of a gas as a fuel (i.e., clean vs. dirty) • Safety and reliability of the network • Perceptions on the value proposition for gas
Small to medium enterprises – focus groups, survey, CCC, Council of Small Business of Australia, Victorian Farmers Federation, Dairy Australia	• Position in the business lifecycle • Interest in the network • What incentives can they offer AusNet Services to build more gas capacity? Are they interested in greater capacity? • Reasons for leaving/staying on the gas network • Pricing tariffs
Customer and community representatives	
Customer advocacy groups – CUAC, ECA, COTA *Vulnerable customers* – VCOSS, CALC, Brotherhood of St Laurence, Kildonan Uniting Care *Environmental groups* - NAGA	• Generational costs • Lives of the assets • Affordability and price • Tariff structures • Gas marketing • Perceptions of gas and extension policies
Retailers	
Large and small retailers – bilateral meetings, BAU engagement	• Issues affecting services, prices, as well as policy and regulatory changes that may impact them • Timing of the annual changes to the network pricing • Fixed charges as a barrier to gas connection and efficiency • End-retail price to prevent retail price shocks • Simplicity of pricing
Other stakeholders	
Facilitators **-** *Councils, land developers, Master Builder Association, Master Plumber Association* **-** Focus groups and one-on-one meetings	• Interest in the work • Co-gen opportunities to work with us • Appliance schemes • Pioneering schemes • Gas marketing – how could we shift vulnerable customers to gas from electricity? • Works planning and how to better coordinate with councils

These findings were used to inform the development of AusNet Services' Customer and Stakeholder Engagement Strategy.

The list of issues presented in Table 5-1 represents a broad range of topics. Given that AusNet Services intended to develop a customer priority-driven engagement approach (as opposed to a business priority-driven engagement approach) these lists were used to *guide* the themes/topics discussed at each component of the Research Phase.

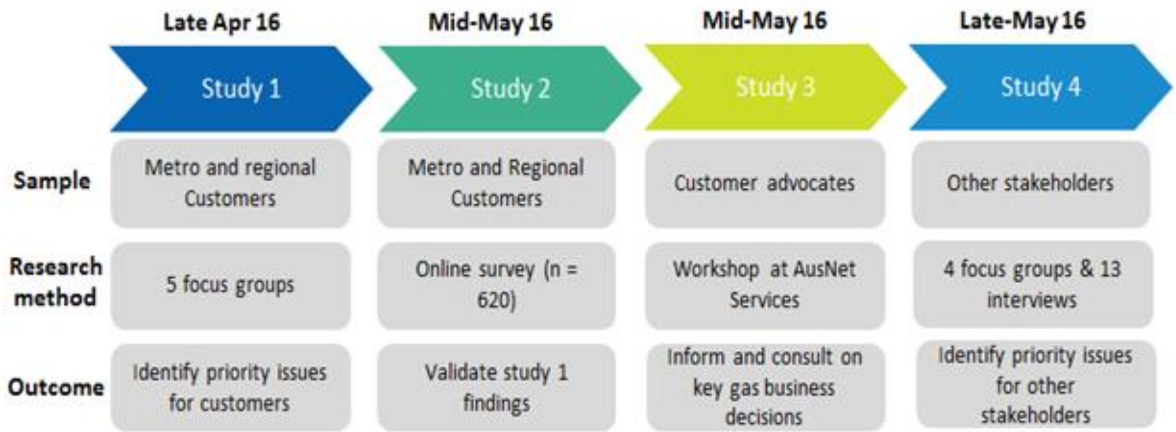
5.4.2 Research Phase

The Research Phase adopted a mixed methods approach to garner insights on customer and stakeholders' gas-related needs, wants and preferences. Specifically, AusNet Services developed a purpose-built research design that consisted of four studies. This research approach has established a foundation for business-as-usual customer and stakeholder research within AusNet Services' gas business.

To ensure independence, AusNet Services engaged an external marketing research agency, Colmar Brunton, for the development of the research materials, participant recruitment and study facilitation. AusNet Services worked alongside Colmar Brunton to ensure the questions asked at each of the studies were relevant and technically accurate. AusNet Services was responsible for material development and participant recruitment for Study 3. However, to ensure independence, the company employed an external consultant to facilitate the study.

Each of these studies have been summarised in Figure 5-2 and are discussed in more detail below.

Figure 5-2: Overview of research studies



Study 1: Customer Focus Groups

Given the lack of academic literature regarding customer preferences and behaviours relating to natural gas, Study 1 was designed to be exploratory in nature.

The objectives of this study were to:

i. garner a greater understanding of the attitudes and perceptions of customers towards the gas network, and investigate customer preferences in relation to service delivery and communications; and

ii. understand customer views on the trade-offs that are most important to them in the context of gas network services.

Five focus groups were conducted with customers in regional and metropolitan areas within AusNet Services' gas network (see Table 5-2). The sample of participants was structured to ensure representation across a range of age groups (18 – 50+ years) and life stages. An advantage of focus groups is that they allow complex concepts and industry language to be clarified through the use of two way dialogue and stimulus boards. This ensured that participants were able to provide meaningful feedback.

Table 5-2: Socio-demographic profile of the Study 1 participants

Group	Life stage	Specifications	Location
1	Pre-family	• 18-34 years • Mix of gender, bill size, income, own/rent • No children	**Metro** South Melbourne
2	Family	• 30-49 years • Mix of gender, bill size, income, own/rent • Children at home	**Metro** South Melbourne
3	Post family	• 50+ years • Mix of gender, bill size, income, own/rent, working vs. retired • No children at home	**Metro** South Melbourne
4	Family	• 30-49 years • Mix of gender, bill size, income, own/rent • Children at home	**Regional** Bendigo
5	Post family	• 50+ years • Mix of gender, bill size, income, own/rent, working vs. retired • No children at home	**Regional** Bendigo

The themes that were the focus of these discussions and the types of questions that were asked are presented in Table 5-3.

Table 5-3: Major themes and example questions for Study 1

Theme	Example questions
The role and value of gas in customers' lives	• What are your perceptions of gas as an energy source? Why? • Do you have a preference for gas compared to other energy source? What do you like/dislike about gas? Why? • How important is gas as an energy source to you?
Awareness and understanding of the gas supply chain and the role of AusNet Services in this context	• Can you name as many companies as you can that are involved in the supply of gas to your home? • Are there any differences between the roles each of these companies play? What are the main differences between the roles of these different companies? • AusNet Services changed their name from SP AusNet to AusNet Services; can anyone tell us about AusNet Services, where do they fit in when it comes to the supply of gas? What do they do? When or where have we seen or heard from them? • Have we received or seen any communication from AusNet Services in the last year? What type of communications or notifications? • What is our preferred way of receiving notifications? Are there any circumstances in which we would always want to be notified? • Would we like to receive more or less communication from AusNet Services?
Customer attitudes and perceptions in relation to safety, reliability and affordability	• What are our current perceptions of gas safety? What are your main concerns when it comes to gas safety in and around your home? • Is there anything about gas that concerns us? Why do these things concern us? • How satisfied are you with the current reliability of the gas supply? What are the main things that we value when it comes to the supply of gas to our homes? • Has anyone experienced gas outages? Were these planned or unplanned outages?

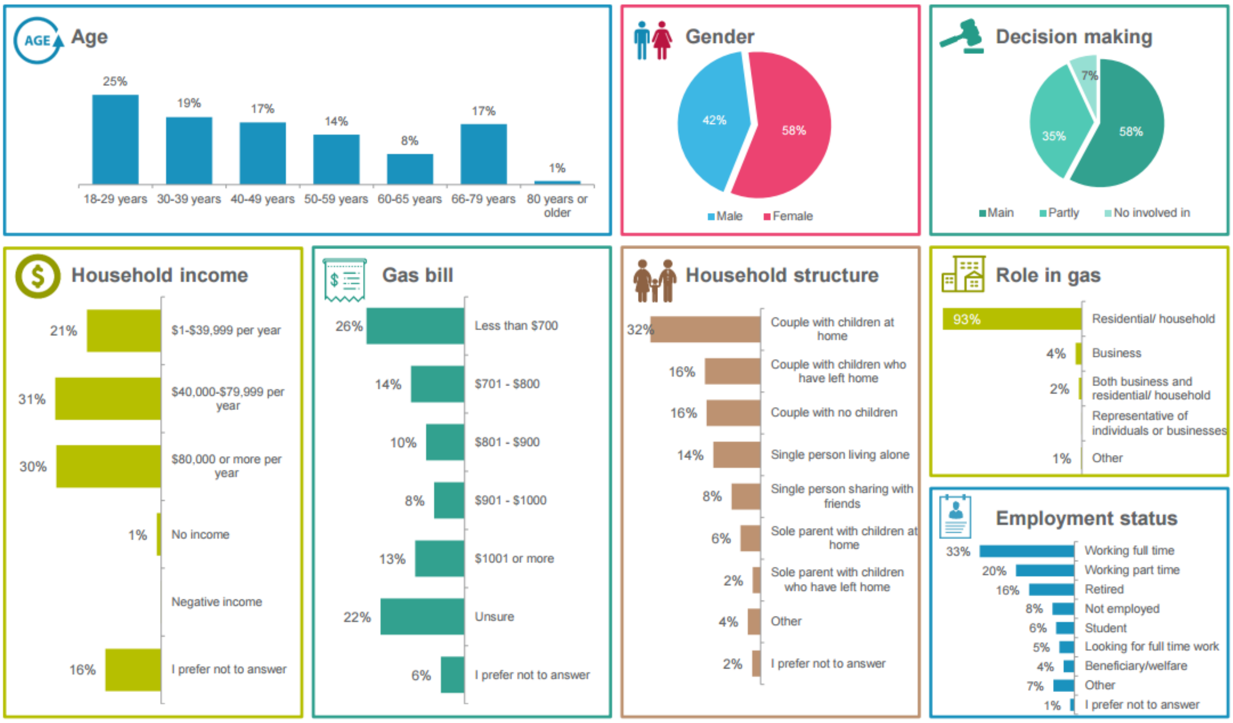
Theme	Example questions
	• Do we feel that they current balance between cost and reliability of supply is right? Why/why not?
Perceptions of current gas prices	• What are your views on the current gas prices? Do you believe that gas is more/less expensive than electricity? How have you come to this conclusion? • What are our biggest concerns when it comes to gas prices? What do you do to manage these concerns? Does this have an impact on our gas usage? How?
Expectations around the future consumption of gas	• Do you see yourselves using gas in your home in the future? What kinds of gas appliances do you expect to use? What role does gas play in your energy future? • Has anyone actively sought to reduce their gas consumption in recent years? If so, how have you done this? Do you intend to continue to change your gas consumption behaviours? How so?

Study 2: Online survey

Study 2 used a cross sectional design to assist AusNet Services in better understanding gas customer perceptions. The purpose of this study was to empirically test and validate the findings from Study 1. To do this, a 15 minute online survey was conducted with customers from the AusNet Services' gas network. Individuals were eligible to participate in this study if they lived/worked in central and western parts of Victoria (i.e., AusNet Services' gas network), were connected to the gas network, aged 18 years or older and were the primary decision maker when it came to gas bills.

A total of 620 participants were recruited for the study. Of these, 212 (34%) lived in the regional areas of AusNet Services' gas network and 408 (66%) lived in metro areas of the gas network. The demographic characteristics of the sample are presented below.

Figure 5-3: Demographic characteristics of sample in study 2



Source: Colmar Brunton (2016)

The nature and types of questions included in the survey were similar to those covered in Study 1 (see for more details).

Study 3: Workshop with customer advocates

The third study in AusNet Services' Customer and Stakeholder Engagement Program was a customer advocate workshop. The purpose of the workshop was to:

i. inform and seek validation from customer advocates on the insights gleaned from Studies 1 and 2; and

ii. gather customer advocates' thoughts on how these customer insights could be used to inform AusNet Services' key business decisions for the gas network.

A workshop was conducted with customer advocates representing a range of customer and stakeholder groups. The workshop was run by an external facilitator to maintain independence with a number of AusNet Services' subject matter experts present to assist in explaining theoretical concepts and to answer any questions raised during the workshop.

Study 4: Interviews with other stakeholders

The final study was designed to engage with stakeholders operating within the gas network area who are not necessarily end-users (i.e., residential customers) of the service. AusNet Services considered it was important that it capture these stakeholders' gas-related needs, wants and perceptions.

The specific objectives of Study 4 were to:

(i) garner a greater understanding of the attitudes and perceptions of Small to Medium businesses, as well as investigating stakeholder preferences in relation to service delivery and communications; and

(ii) understand views on trade-offs that are most important to stakeholders in the context of the gas network.

Two research approaches were adopted in Study 4.

(i) Four focus groups were conducted with small to medium business owners operating in metro and regional areas within AusNet Services' gas network. The sample of participants was structured to ensure representation across a range of business types and sizes. External research agency, Colmar Brunton, assisted in the design, recruitment and delivery of these focus groups. Representatives from AusNet Services attended each of the focus groups to ensure that technical questions could be answered. The themes that were the focus of discussion with small to medium businesses were consistent with those discussed in Study 1 (see Table 5-2 for further details).

(ii) A series of one-on-one discussions were also conducted in Study 4 to engage with large business customers, local councils and land developers operating within AusNet Services' gas network. Four local council representatives and eight land developers were recruited for these discussions. Only one big business customer accepted the invitation to engage in this consultation process, which is a common challenge in research of this nature. However, as this customer was AusNet Services' largest commercial user of gas they were able to provide sophisticated and comprehensive feedback on the gas-related issues facing businesses. More information regarding the characteristics of each of these stakeholders is presented in Table 5-4.

Table 5-4: Characteristics of stakeholders involved in 1:1 discussions

N	Description	Specifications	Location
1	Big Business	• Large manufacturing industry	Geelong

4	Local Councils	• Mix of metro and regional Councils	Melbourne, Ballarat, Grampians
8	Land Developers	• Commercial and/or residential developers • Mix of metro and regional customers	Melbourne and Ballarat

5.4.3 Overview of findings

Five major themes were identified from customers and stakeholders during the Research Phase. These themes, sub-themes and insights are summarised in Table 5-5.

Table 5-5: Summary of research insights by customer and stakeholder groups

RC = Residential customers, SME = Small to Medium Enterprise, LC = Local councils, BB = Big business, LD = Land developers, CA = Customer advocates

Major theme	Sub-theme	RC	SME	LC	BB	LD	CA	Insights
Educate and communicate	Supply chain awareness	✓	✓					• Customers are more likely to identify gas retailers as opposed to distributors
			✓					• Due to the high reliability of the gas supply there is little impetus for customers to consider the supply chain or to interact with AusNet Services
		✓						• 43% of customers feel that they know nothing at all about gas distribution companies
				✓	✓	✓		• Able to identify the key players in the gas supply chain
	Awareness of AusNet Services	✓	✓					• Little awareness of AusNet Services as an organisation associated with gas supply
				✓	✓	✓		• Generally familiar with AusNet Services and its role in the gas supply chain
	Perceptions of gas as a fuel	✓						• Customers are unclear as to whether gas is a clean energy source and do not appear to have given this much thought
			✓	✓	✓	✓		• Gas is typically viewed as clean, low emission and reliable energy source
				✓		✓		• Believe that it is the fuel of choice for many end-users
		✓						• There is some expectation that gas will run out in the future
		✓	✓					• Gas is regarded as an essential service, with an accompanying expectation that it will be uninterruptable under all but the most extreme events
	Communication preferences	✓						• As the gas supply is reliable, there is little perceived need for communication between AusNet Services and customers
		✓	✓			✓		• Many customers are satisfied with the level of contact they have with AusNet Services
		✓						• Residential customers are aware of an emergency phone number for outages on their bills, however, are not aware that AusNet Services is this contact
		✓						• Prefer communication via email, SMS, letters or through the website
		✓						• Would like to receive more information from AusNet Services regarding gas issues. Customers would prefer contact to be every one to three months
		✓						• The ideal timing for a planned outage is during the middle of the weekday (e.g., from 10am to 3pm) or during the night. Summer outages are also preferred.
				✓	✓			• Are keen to have more frequent and customised communication with AusNet Services
Focus on safety	Gas safety	✓	✓	✓	✓	✓		• Safety is a major concern due to the potential seriousness of the outcome of safety breach: explosion or death from inhalation
		✓	✓	✓	✓	✓		• Gas leaks are taken seriously due to the potential for fatal outcomes
					✓			• It is expected that AusNet Services has a robust risk framework in place for identifying potential areas of safety concern and that resources are applied according to this framework
	Affordability, safety and reliability trade-off	✓	✓	✓		✓		• Not willing to compromise on reliability for a reduction in gas bills
		✓						• Safety is prioritised more highly than other factors such as reliability of supply or minimising costs to the customer
		✓					✓	• Customers view safety and reliability as two of the most important factors when it comes to the gas supply
					✓			• It is expected that AusNet Services' prices reflect the costs required to maintain the network in line with global best practice
Maintain services	Valued attributes	✓	✓		✓			• Gas is valued as an instantaneous and reasonably priced fuel
		✓	✓		✓			• The responsiveness and immediate nature of gas is a key benefit for heating and cooking
		✓						• If the supply was to be interrupted the main concern would be the loss of hot water
		✓				✓		• Including gas in new builds is a requirement for land developers given customer demand
		✓	✓	✓	✓	✓		• Homes and businesses without gas are perceived as being less desirable
		✓		✓				• Areas without access to mains gas are limited in terms of the economic and social growth of the

Major theme	Sub-theme	RC	SME	LC	BB	LD	CA	Insights
								community
	Gas reliability	✓						• Unplanned outages are perceived to be rare with a majority having never experienced one
			✓		✓			• Unplanned outages are unacceptable and have a significant long-term impact
		✓	✓	✓	✓	✓		• Gas supply is perceived to be highly reliable and this is a highly valued feature
		✓	✓					• Gas is seen to be far more reliable than electricity
		✓						• To a large extent the reliability of gas is taken for granted
				✓				• For customers located at the outer edge of the network in regional areas, reliability is a concern as supply is intermittently interrupted during the winter months
Be transparent	Gas price	✓		✓		✓		• Gas is perceived to be a reasonably priced fuel
		✓		✓		✓		• Gas is believed to be cheaper than electricity. However, customers recognise that this may be because they use less gas relative to electricity
		✓						• Wary of scenarios whereby gas prices may increase
		✓	✓					• Not aware that a proportion of their bill goes to AusNet Services
		✓						• Price stability and consistent prices are highly important
			✓		✓			• The price of gas is seen as unreasonable, particularly in light of recent cost increases
						✓		• Perceptions of current contribution levels are variable. Given that they are unable to choose contractors, they are conscious that there is no scope to negotiate costs
	Rate of depreciation	✓	✓	✓	✓	✓		• The cost of gas infrastructure should be spread evenly over the lifetime of an asset, regardless of the level of usage at a particular point
		✓					✓	• The notion of accelerated depreciation was not well supported by participants due to a lack of an evidential case for future utilisation risk
			✓					• It is expected that population growth will offset the impact of declining usage and lead to net growth in demand
						✓		• It was also argued that any increase in the price of gas now will have the unintended consequence of accelerating customer adoption of renewable technologies
Future trends	Demand management	✓						• Heating is the major area where measures may be taken to reduce consumption. Strategies include turning down the temperature, limiting the number of rooms heated, wearing warmer clothes and turning the heating off when the house is not occupied.
		✓	✓					• Tracking bill spend over time is the most common method for monitoring gas consumption
					✓			• Implement considerable strategies to be more efficient in their gas usage behaviours
				✓				• The perception of gas as a clean energy source, and the relatively small number of appliances that run on gas compared to electricity, limits the pressure users feel to reduce their consumption
						✓		• Preferences for appliances that help to reduce consumption are common
	Future demand	✓	✓	✓				• Gas is a valued energy source which customers envisage using into the future
		✓						• 80% of customers have no plans to disconnect from the gas network in the future
		✓						• A majority (66%) of customers expect their gas consumption levels to remain the same over the next 5 years
		✓	✓					• Gas consumption is expected to decrease over time as new technologies are further developed and adopted
					✓		✓	• The costs associated with implementing alternative energy solutions are seen as prohibitive
					✓			• It is expected that overall demand for gas would increase in the coming years regardless of the efficiencies put in place
						✓		• Some actively encouraging buyers to consider renewable technologies alongside or instead of traditional energy sources
						✓		• Gas is not often connected to developments of small apartments because electricity appliances are often deemed acceptable for small spaces

While there were some instances where customer and stakeholder sentiment and understanding on certain issues differed significantly (e.g., awareness of AusNet Services and its role in the gas supply chain), there were a number of instances where a common theme was evident across each of the participant groupings.

For example, all customer and stakeholder groups agreed that gas safety is a major concern due to the potential seriousness of a safety breach. In almost all discussions on the matter, participants tended to focus on the potential for explosions and death from inhalation and the need for gas leaks to be taken seriously.

Gas was also perceived to be a highly reliable energy source by most participants. Many participants had never experienced an unplanned outage. As such, reliability was a commonly noted and valued attribute associated with gas supply.

With regard to the rate of depreciation there was agreement across all customer and stakeholder groups that infrastructure costs should be spread evenly over the lifetime of an asset, regardless of utilisation at a particular point. This response reflects the level of uncertainty regarding future energy consumption behaviours and the need for a strong evidential case for future utilisation risk.

Another finding that needs to be highlighted is the seemingly contradictory findings, particularly from residential customers, around communication preferences. As outlined in Table 5-5, there were some customers who voiced that they were satisfied with the current levels of contact that they receive from AusNet Services. However, there were also some who would like to hear from AusNet Services more regularly on gas-related issues, such as how to better manage their consumption levels. It is interesting to note that this differing sentiment was often voiced by the same participant(s) at different points in the discussion. What this suggests is that customers' are not necessarily clear on exactly what and when they want to hear from AusNet Services. In fact, it seems that customers' communication preferences may actually vary on an issue-by-issue basis. As such, further research is needed to better understand the specific nature of these differing communication needs and how AusNet Services can best meet customers' preferences.

5.4.4 Implementation Phase

The objective of the Implementation Phase was to incorporate the feedback received during the Research Phase into AusNet Services' GAAR proposal and broader business plans. This phase was critical in ensuring that AusNet Services' operations are aligned with the long term interests of their customers and stakeholders.

Methods of engagement

In contrast to the earlier phases, there was a significant focus on internal and stakeholder engagement (as opposed to residential customers) during the Implementation Phase. This reflected the need for AusNet Services to have a full and complete understanding of the feedback from the Research Phase and to disseminate the feedback throughout the business and to stakeholders. Engagement efforts included:

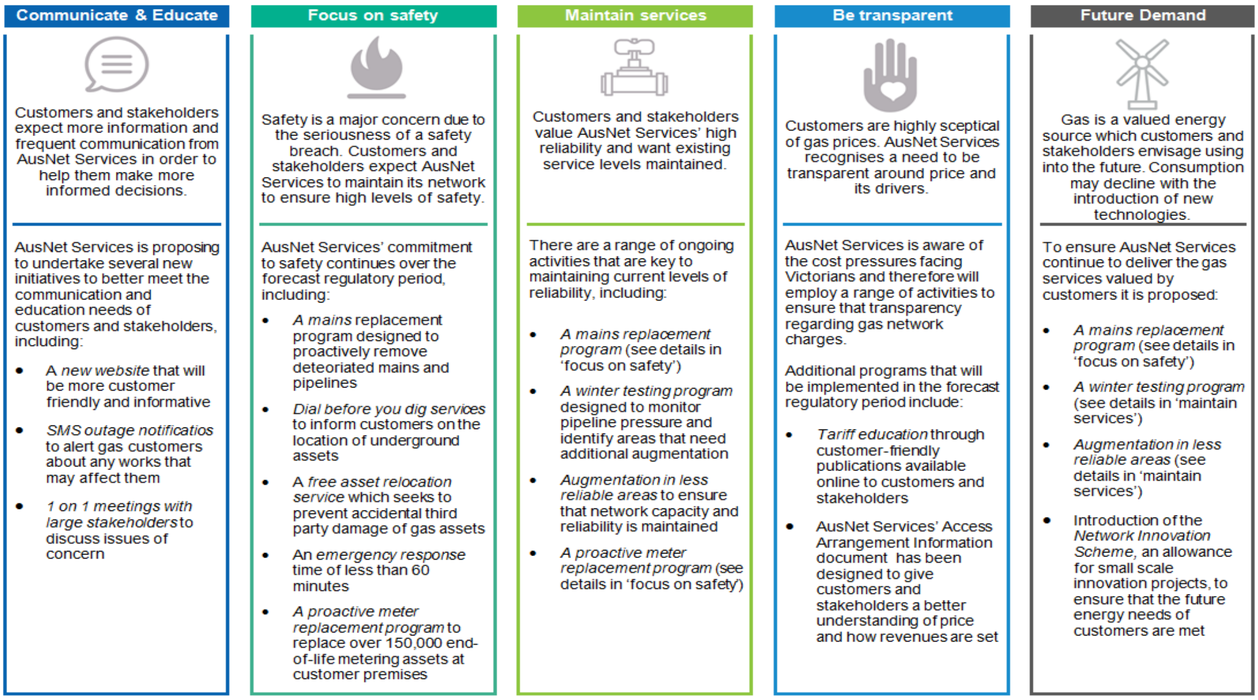
- *Publishing customer and stakeholder insights reports*. AusNet Service made the reports from each of the research stages available online for validation and feedback. The reports were also sent to customer advocates.
- *Presenting insights at AusNet Services' Customer Consultative Committee (CCC)*. In June 2016, AusNet Services launched its first CCC meeting. These quarterly meetings are designed to consult, inform and collaborate with members on salient issues facing AusNet Services and the industry more generally.
- *Internal implementation and insights workshop*. AusNet Services ran an internal workshop with key executives and decision makers to discuss how the insights learned from the Research Phase impacted on business decisions and planning for the gas network. As a part of this workshop, the team collaborated to identify key customer and stakeholder

values, which gave rise to a series of overarching themes. The team then identified a range of (current and potential) activities to address each theme. These themes and related activities are summarised below.

Implementation initiatives

While five key themes emerged from the customer and stakeholder research, four of these themes (outlined in Figure 5-4) were targeted and operationalised during the Implementation Phase. It is expected that these themes will assist AusNet Services in making planning decisions that reflect the long term interests of customers.

Figure 5-4: Operationalised themes and implications from the Research Phase



Source: AusNet Services

Communicate and educate

While there was some ambiguity from customers' when it came to communication preferences (see Table 5-5), a number of customers wanted to receive more information from AusNet Services in regards to gas-related issues, such as better managing gas consumption. They also expect that AusNet Services will keep them up to date and educated on renewable technologies. Customers believed this this will help them make more informed decisions.

Customers want to receive more information from AusNet Services in regards to gas related issues, such as better managing gas consumption. They also expect that AusNet Services will keep them up to date and educated on renewable technologies. Customers believed this this will help them make more informed decisions.

Stakeholders are also interested in receiving more frequent communication and information from AusNet Services. Commercial and industrial customers are particularly interested in developing a more personalised relationship with AusNet Services. For high volume customers, it is expected that both parties share plans for short and long term asset maintenance as well as potential supply issues.

How AusNet Services is listening

Historically, AusNet Services has employed various techniques for communicating and educating customers and stakeholders. This includes maintaining a website, multiple call centres and using letters to notify customers and stakeholders of planned outages.

While these efforts have been sufficient in the past, AusNet Services is proposing to undertake several initiatives during the upcoming access arrangement period to better meet the communication and education needs and wants of its customers and stakeholders. These include:

- *Website development.* AusNet Services will redesign its corporate website to be more customer-friendly and informative. As part of this process, AusNet Services will provide a range of information resources to educate consumers on various aspects of gas.
- *SMS outage notification*. AusNet Services will develop an SMS program to alert gas customers and stakeholders about works that may affect them. (This service is currently available to AusNet Services electricity customers).
- *1 on 1 meetings with large stakeholders*. As a result of the Study 4 findings, AusNet Services has initiated one-on-one discussions with large businesses, to discuss issues of concern. AusNet Services will meet with these customers annually, or more frequently if needed. So far, these efforts have been successful in establishing better relationships with this customer group.

Focus on safety

Customers prioritised safety above factors such as reliability or minimising costs. It is expected that AusNet Services will maintain its gas network to ensure high levels of safety.

<u>How AusNet Services is listening</u>

AusNet Services remains committed to maintaining the safety of the gas network. AusNet Services undertakes a range of safety related initiatives, which will continue over the coming access arrangement period. Key safety projects include:

- *Mains replacement program*. The mains replacement program is a program to proactively remove and replace mains at the end of their useful lives. The program manages the leakage incident rate on the network through targeted replacement of low and medium pressure mains. This delivers both public safety and reliability benefits.
- *Dial before you dig services*. Dial-before-you-dig (DBYD) is a free referral service offered by all utilities which responds to customer enquiries regarding underground asset locations. Geospatial information showing the location of AusNet Services' underground pipes, as well as the relevant condition of works is sent to the customer to prevent third party damage to underground assets. It also aims to prevent a potential safety-related incident from occurring.
- *Free asset relocation services*. Plans supplied through the DBYD process do not show gas service lines on private property and do not show any gas assets of authorities other than AusNet Services which may exist on site. AusNet Services provides a free service whereby a representative from Downer (AusNet Services' preferred maintenance provider) will physically prove on site the location of underground gas service lines on private property. This is a safety initiative and aims to prevent accidental third party damage to gas service lines.
- *Emergency response time < 60 minutes.* AusNet Services is required to respond efficiently and effectively in the event of an emergency on the gas network. In particular, AusNet Services is required to meet or exceed minimum response time benchmarks set by Energy Safe Victoria (ESV), which require:
  - field response within 60 minutes for Priority A (major leaks/emergencies) incidents; and
  - field response within 4 hours for Priority B (minor) gas escape repairs.

AusNet Services provides quarterly performance reports to ESV for all Priority A emergencies.

AusNet Services recognises that it could improve the effectiveness of the way it promotes its asset relocation and dial before you dig services to customers and stakeholders. Given the potential seriousness of an outcome associated with not utilising these services when needed, AusNet Services is considering initiatives to promote these services during the forthcoming access arrangement period. It is intended that such efforts will form a part of AusNet Services gas marketing efforts.

Maintain services

Customers and stakeholders value the reliability of AusNet Services' gas network and expect that it will continue to maintain existing service levels.

How AusNet Services is listening

Where necessary, AusNet Services undertakes investments to maintain current levels of reliability. For example, augmenting the network where gas supply pressures are inadequate and replacing assets at the end of their useful life represent common investment.

There are a range of ongoing activities that are key to maintaining current levels of reliability, including:

- *Mains replacement program*. See above for more details about this program.
- *Winter testing program*. The winter testing program is an annual detailed pressure monitoring program to gather field data at selected locations across the network, during times of high utilisation (i.e. winter). Winter testing data is analysed and used to update computer models of individual gas networks, and therefore identify areas which require future augmentation.
- *Augmentation in less reliable areas*. The results of the winter testing program identify areas of the gas network which require augmentation to maintain network capacity and reliability. This takes into account expected growth across the network, especially key urban growth zones in Melbourne's west and across the Surf Coast/Geelong. This may involve creating new assets or upgrading the capacity of existing assets to achieve appropriate outcomes for customers.

AusNet Services intends to maintain these programs to safeguard the high levels of reliability that are currently enjoyed by customers and stakeholders. AusNet Services also understands that it can significantly improve the way it communicates outages and planned works to customers. As outlined above, AusNet Services plans to launch an SMS service to notify gas customers prior to any planned works and to provide updates about the progress of restoration works in the event of an unplanned outage.

Be transparent

Customers and stakeholders are concerned with the rising cost of gas and therefore want greater transparency about reasons for any price increases. This includes understanding the components of the gas bill. Customers and stakeholders also expect that AusNet Services' prices reflect the cost required to maintain the network in line with global best practice.

How AusNet Services is listening

AusNet Services is aware of the cost pressures facing Victorians and therefore employs a range of activities to ensure that it is transparent in how it sets its prices. Such efforts include an annual tariff report, public forums for the GAAR and an industry benchmarking report which is available online.

There are, however, additional activities that AusNet Services intends to undertake in the upcoming access arrangement period to improve transparency around pricing, such as:

- Tariff education. AusNet Services will rewrite the tariff report to be more customer-friendly. In doing so, AusNet Services hopes that customers and stakeholders will gain a better understanding of the various tariffs that are currently available. This document will be made available in an easily accessible location on the new AusNet Services' website.

- Release a plain language summary of the 2018-22 access arrangement proposal. This plain language document will be published in December 2016. The purpose of this document is to assist customer and stakeholders understand the various components of AusNet Services' access arrangement proposal.

Communicating implementation initiatives

Having identified how it will incorporate feedback received during the Research Phase into current and future business decisions, it is important that AusNet Services communicates these decisions with customers and stakeholders.

As mentioned, AusNet Services published a plain language summary of the access arrangement proposal at it submitted the proposal to the AER.

5.4.5 Ongoing engagement

The objectives of the Ongoing Engagement Phase are to evaluate the effectiveness of previous engagement activities and to continually engage with customers and stakeholders who are interact with AusNet Services' gas business.

Ongoing monitoring of customer interactions including contractor performance

As part of its ongoing engagement, AusNet Services monitors its performance against the following customer interactions on its gas network on a monthly or quarterly basis:

- the timeliness of response to an emergency on its gas network;
- the average outage duration time for each customer (USAIDI);
- the number of unplanned outages including minor and major events (USAIFI);
- the average time taken for supply to be restored to a customer when an unplanned interruption has occurred (USAIDI/USAIFI);
- the volume of customer complaints including:
  - complaints related to connections;
  - complaints related to augmentation;
  - complaints regarding the quality of supply (reliability); and
  - other complaints;
- the total number of calls to AusNet Services' call centre fault line;
- customer appointment attendance times against agreed milestones; and
- customer connection times against agreed milestones.

Further details on AusNet Services' performance against these key customer indicators is provided in Chapter 3.

AusNet Services also has a range of performance indicators in place to ensure that contractors, responsible for the carrying out of works on our gas network, meet their standards across a range of customer interactions. One of these performance indicators is linked to customer engagement and carries a 10% weighting. Specifically, AusNet Services regularly conducts a client satisfaction survey whereby internal employees who have interaction with AusNet Services' contractors are asked to evaluate their performance. Internal employees are asked to rate their satisfaction with the contractors across a range of customer-related issues, including:

- Issues management: the timeliness of works executed, ability to self-manage projects, level of pro-activity when faced with issues.
- Improvement opportunities: how innovative they are, ability to develop various options/solutions.

- Stakeholder and customer management: ability to effectively manage customers, authorities and other service providers.
- Communications: how responsive and courteous their communications are.

Contractors who perform poorly on this survey are faced with potential financial repercussions. This therefore serves as an effective motivation for contractors to meet AusNet Services' customer engagement related requirements.

Feedback on the Customer and Stakeholder Engagement Program

Tracking and reporting on the performance of the Customer and Stakeholder Engagement Program is an important part of AusNet Services' strategy. As such, a follow-up survey was sent to participants in the Research Phase. The survey was designed with the '*evaluation recommendations*' outlined in the ENA's Consumer Engagement Handbook in mind. The results of this survey are outlined in Table 5-6.

Table 5-6: Questions and results of customer and stakeholder feedback survey

Question	Results (n = 3)
Q1. The purpose of the research was appropriate, clearly communicated and understood	100% agreed
Q2. The facilitation of the research was appropriate	100% agreed
Q3. The topics discussed during the research were relevant and clearly articulated	100% agreed
Q4. The research addressed questions appropriately and there was adequate time for questions to be asked	100% agreed
Q5. The role that AusNet Services plays in the supply of gas to homes and businesses was clearly explained	100% agreed
Q6. By the end of the research, I has a better understanding of AusNet Services' role in the supply of gas to homes and businesses	100% agreed
Q7. Overall, the research was an effective way to engage with AusNet Services and achieved	70% agreed 30% were neutral
Q8. What was the main benefit for you participating in the research	"Money offered" "Gained new knowledge"
Q9. Do you have any comments or suggestions about how the research was facilitated?	"No"
Q10. Do you have any comments about the information presented during the research? In particular, were there any key information gaps or unanswered questions?	"No"
Q11. Do you have any other suggestions or comments?	"No"

Ongoing engagement activities

The following ongoing engagement activity are either underway, or being planned.

- Improve the information that is available and easily accessible to customers and stakeholders. As outlined above, AusNet Services is launching a new website that is more customer friendly and informative.

- Review key learnings from the program with key decision makers. AusNet Services will conduct an internal workshop with AusNet Services' staff involved in the program to evaluate the efforts described in this chapter and discuss areas of improvement for future engagement.
- Share insights and learnings with other gas distributors. AusNet Services plans to share its customer and stakeholder experience with other businesses to allow service providers to benefit from its experience and findings. It is hoped that sharing this information will assist the industry to improve its standards of customer and stakeholder engagement more generally.
- Develop a corporate customer and stakeholder engagement strategy. AusNet Services will develop a corporate Customer and Stakeholder Engagement Strategy to ensure that it interacts with customers and stakeholders in a consistent manner across its regulated and unregulated businesses. AusNet Services intends to consult with other gas and electricity distributors and customer advocates as part of the development of its strategy.

5.5 Conclusion

AusNet Services undertook a robust Customer and Stakeholder Engagement Program to inform many of the initiatives set out in its access arrangement proposal. The key components of the strategy are that:

- it was informed by considerable internal evaluation and stakeholder feedback to identify and validate key customer and stakeholders groups and issues to be included in the engagement efforts;
- it was supported by key executives and decision makers within AusNet Services;
- it engaged a broad range of customers and stakeholders during the research phase using a sound research methodology;
- an independent advisor captured and reported customer and stakeholder perceptions;
- customer and stakeholder feedback was received and transparently reported internally by AusNet Services; and
- feedback on AusNet Services engagement performance was captured to ensure that they can improve their engagement efforts in the future.

Our engagement efforts have led to a series of coordinated decisions that stabilise prices for customers while still delivering the desired improvements in community safety. Key matters influenced by engagement are summarised below in Figure 5-5.

Figure 5-5: Actions in response to customer and stakeholder feedback

Focus on safety	Strengthening incentives	Accelerated Depreciation
Customers and stakeholders told us that gas safety was their top priority. We will continue our commitment to maintain the safety on the network by completing the mains replacement program.	Customer supported the strengthening of incentives but highlighted that the incentives should be balanced in respect to expenditure efficiency and service performance. Our proposed incentives framework provides this balance.	Customers were concerned with potential price increases in the near term. A strong evidential case for future utilisation risk is needed to be made. In response, we decided not to propose any form of accelerated depreciation in the next five years.

Source: AusNet Services

AusNet Services is confident that its access arrangement proposal has been strengthen by incorporating the insights gleaned from its customers and stakeholders during the engagement program. Importantly, many of the initiatives described in this submission recognise and promote the long-term interests of AusNet Services' consumers.

IAP2'S PUBLIC PARTICIPATION SPECTRUM

iap2 international association for public participation

The IAP2 Federation has developed the Spectrum to help groups define the public's role in any public participation process. The IAP2 Spectrum is quickly becoming an international standard.

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

5.6 Appendices

The following documents provide further information on AusNet Services' customer and stakeholder engagement:

- Colmar Brunton, Energy Research Summary Report (Appendix 5A);
- Colmar Brunton, Energy Research Study 1 Report (Appendix 5B);
- Colmar Brunton, Energy Research Study 2 Report (Appendix 5C);
- AusNet Services, Energy Research Study 3 Report (Appendix 5D);
- Colmar Brunton, Energy Research Study 4 Report (Appendix 5E).

6 Capital Expenditure

6.1 Key points

- AusNet Services is forecasting total gross capex of $513.1 million (real 2017) for the 2018-22 period, which is in line with capex in the 2013-17 period. The forecast capex program features:
  1. New customer connections capex of $198.7 million. This reflects the projected on-going growth in new residential connections at the network fringes. It is forecast that we will connect 83,000 customers during the next access arrangement period.
  2. Safety-driven mains replacement program expenditure of $132.9 million. AusNet Services' re-affirmed commitment to completing low pressure mains replacement by 2025 aligns with its network objective of maintaining network safety and its Gas Safety Case obligations. The worst performing medium pressure mains, which exhibit leakage rates similar to that of the low pressure network, are included in the proposed mains replacement program.
  3. ICT capex of $57.8 million to consolidate systems and replace infrastructure at end-of-life to enable continued support of the gas network.
  4. Metering capex of $32.8 million to meet our Gas Distribution System Code obligations at minimum efficient cost.
- Actual gross expenditure during the current access arrangement period is expected to be 10% lower than the regulatory allowance. Independent benchmarking confirms AusNet Services' overall capital efficiency.
- Our stakeholder engagement activities confirmed that customers value safety as the top priority. Our forecast expenditure is consistent with meeting these expectations and fulfilling our safety obligations, in line with the Gas Safety Case.
- The total capex forecast has been developed using prudent asset management practices and expenditure forecasting processes. The resulting forecast constitutes conforming capital expenditure for the purpose of Rule 79(1) and is line with the AER's Expenditure Forecast Assessment Guideline.
- Cost estimates are based principally on recently completed projects and, therefore, reflect up-to-date information and efficient costs. Project and program delivery employs an efficient mix of internal and competitively tendered resources to ensure the forecasts reflect the lowest sustainable cost of providing services.

6.2 Overview

Introduction

This chapter sets out AusNet Services' capex plans for the five-year access arrangement period commencing 1 January 2018. It includes investment in network assets such as distribution mains, meters and regulators, and non-network assets such as ICT and property.

The capex forecast has been prepared in accordance with the requirements of the National Gas Rules (NGR). AusNet Services' forecast total capex is conforming capital expenditure because it is justifiable, prudent and efficient, consistent with accepted good industry practice and

AusNet Services' Gas Safety Case, and it will achieve the lowest sustainable cost of providing network services.[44]

Drivers of capital expenditure

The principal capex drivers for the 2018-22 access arrangement period are:

- meeting forecast growth in the connection of new customers; and
- complying with all regulatory obligations, including those relating to safety.

AusNet Services' approach to capital expenditure planning and forecasting

AusNet Services' overarching approach to capex planning and forecasting is to:

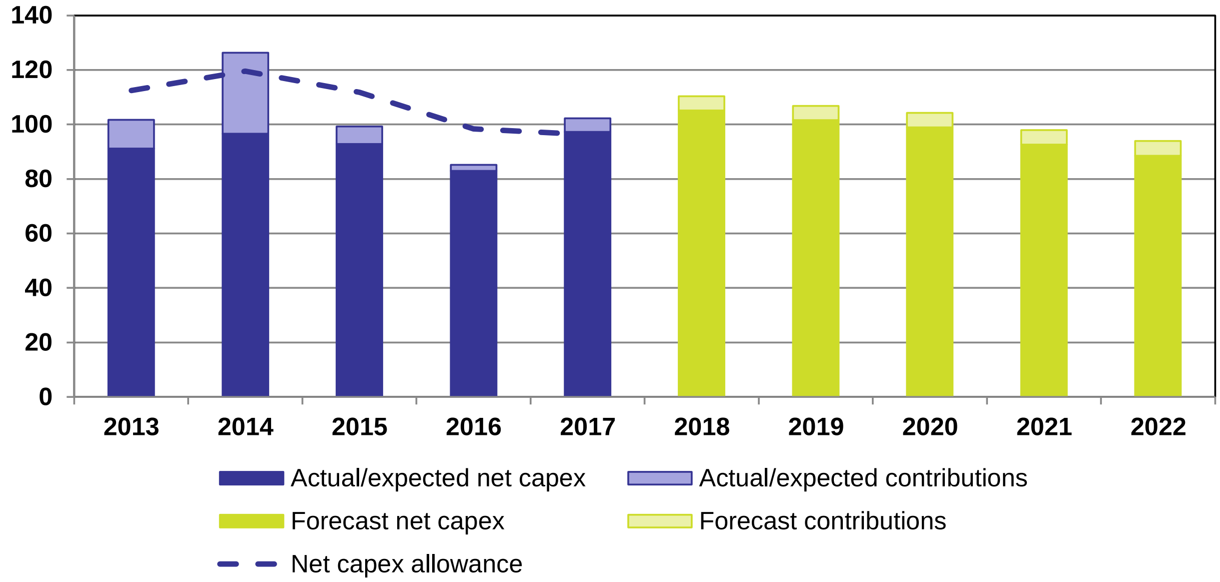
- ensure that expenditure is consistent with the network objectives and strategy, including AusNet Services' longer term network vision for the gas network;
- determine prudent expenditure in accordance with a rigorous, analytical and externally certified[45] asset management approach, which incorporates a cost benefit assessment of the proposed expenditure using a risk-based approach to leakage management;
- employ the latest available information to ensure that all input data and assumptions are as accurate and reasonable as possible; and
- reflect and address, where possible, feedback obtained through customer engagement activities.

Expenditure overview

- AusNet Services is forecasting gross capex of $513.1 million (real 2017) for the next access arrangement period and, after deducting customer contributions, net capex of $486.7 million.
- This is line with total (gross) capex in the current access arrangement period. The forecast includes a number of committed capex projects that are due for completion in 2018 and 2019.

44 NGR, rule 79(1) and (2).
45 ISO 55001

Figure 6-1: Gross capex, actual/expected and forecast ($m, real 2017)



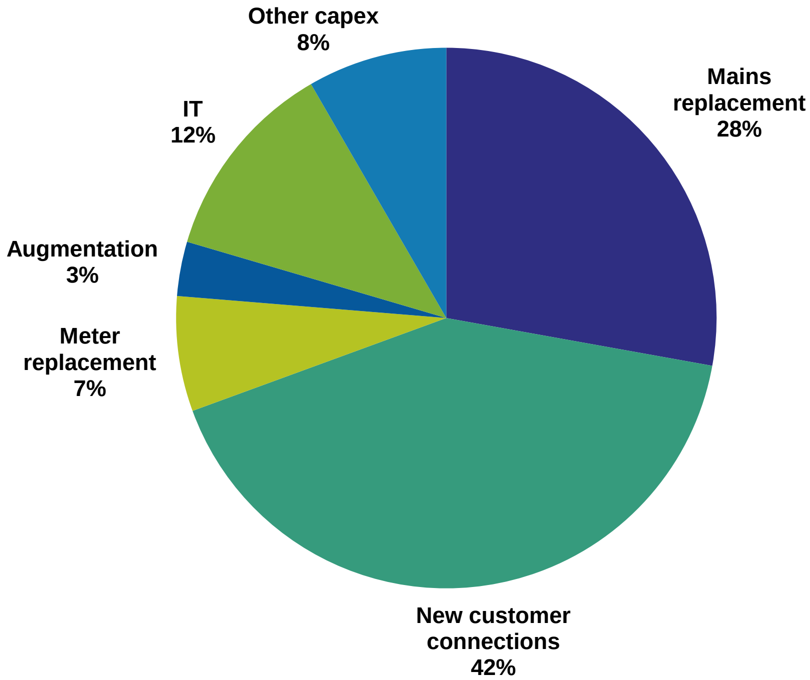
Source: AusNet Service

The largest components of the capex program are:

- new customer connections (42% of the capex forecast), which is necessary for AusNet Services to comply with its regulatory obligations to connect an estimated 83,000 customers to the distribution network on fair and reasonable terms; and
- the mains replacement program (28%), which is driven by safety considerations. The low pressure mains replacement program is on track for completion by 2025.

The capex forecast is broken into its various components in the figure below.

Figure 6-2: Forecast capex by expenditure driver, 2018-22



Source: AusNet Service

Note: Direct capex only

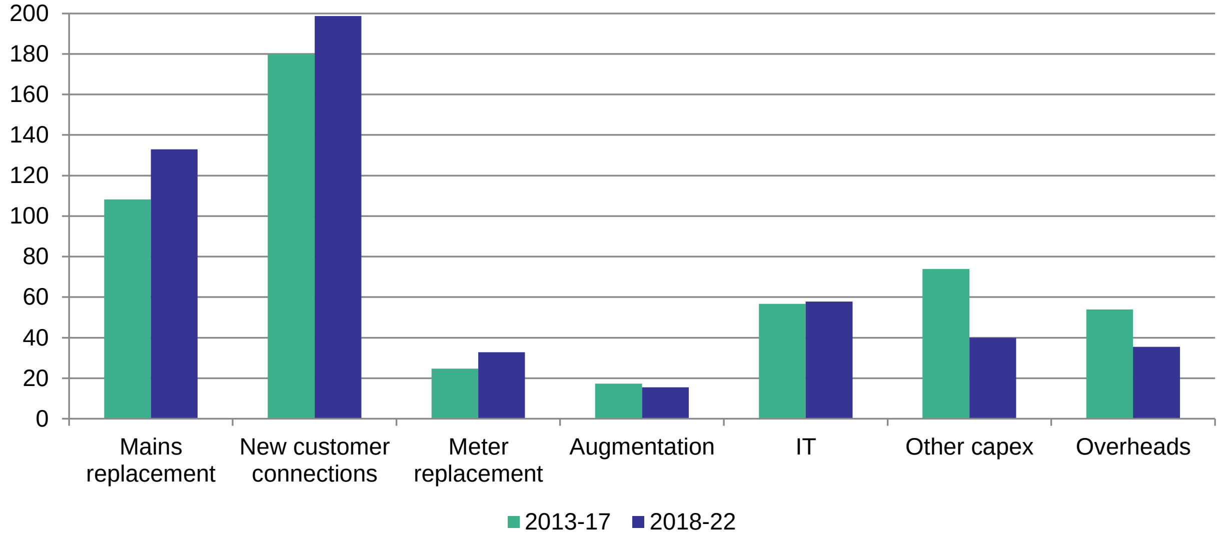
Benefits of the capital expenditure program

The proposed capex program meets the needs of the network and customers in an efficient manner. It is proposed that during the 2018-22 access arrangement period AusNet Services will:

- replace 465 kilometres of low pressure and medium pressure mains to deliver network safety benefits;
- maintain network risk in accordance with AusNet Services' safety obligations, including the Gas Safety Case to be approved by Energy Safe Victoria;
- connect 83,000 new customers to the network;
- reinforce 27 kilometres of mains to improve quality of supply;
- replace large end-of-life regulators to improve reliability and quality of supply;
- replace 150,000 end-of-life gas meters and regulators at customer premises;
- improve data capturing processes to optimise performance of the gas network; and
- maintain minimum pressure standards, consistent with its obligations under the Victorian Gas Distribution System Code.

While AusNet Services' forecast gross capex for the forthcoming access arrangement period is in line with capex in the current period, some changes are forecast at the category level. These changes are discussed in section 6.5.

Figure 6-3: Actual/expected and forecast capex, 2013-17 and 2018-22 periods ($m, real 2017)



Source: AusNet Service

The forecast capex is conforming capital expenditure

Forecast capex which complies with the new capital expenditure criteria in Rule 79 is conforming capital expenditure and is included in the forecast capital base for the forthcoming access arrangement period.

Rule 79(1) states:

> *"Conforming capital expenditure is capital expenditure that conforms with the following criteria:*

> *(a) the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services;*
>
> *(b) the capital expenditure must be justifiable on a ground stated in subrule (2).”*

Rule 79(2) sets out an exhaustive list of grounds. Only one ground must be satisfied in order for the expenditure to be justifiable:

> *“Capital expenditure is justifiable if:*
>
> *(a) the overall economic value of the expenditure is positive; or*
>
> *(b) the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or*
>
> *(c) the capital expenditure is necessary:*
>
> *(i) to maintain and improve the safety of services; or*
>
> *(ii) to maintain the integrity of services; or*
>
> *(iii) to comply with a regulatory obligation or requirement; or*
>
> *(iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or*
>
> *(d) the capital expenditure is an aggregate amount divisible into 2 parts, one referable to incremental services and the other referable to a purpose referred to in paragraph (c), and the former is justifiable under paragraph (b) and the latter under paragraph (c).”*

Each category of forecast capex which AusNet Services proposes to undertake in the 2018-22 access arrangement satisfies the requirements of rule 79(1) and is therefore conforming capital expenditure. The analysis of each capex category against the new capital expenditure criteria is contained in section 6.5 of this access arrangement proposal.

The forecast conforming capex also contributes to the achievement of the NGO

AusNet Services’ forecast capital expenditure will deliver a program that best serves the long-term interests of consumers because it maintains network safety and achieves regulatory compliance at the lowest sustainable cost. The forecast also reflects expenditure that would promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas. Finally, the forecast also reflects customers’ preferences that existing levels of safety, service and reliability be maintained.

In the forthcoming access arrangement period, the forecast capex is necessary to:

- meet expected demand for gas network services, which is principally driven by 83,000 new customer connections;
- maintain current levels of network safety by continuing the replacement of low and medium pressure distribution mains;
- maintain the integrity of services by replacing assets in accordance with the asset management strategies; and
- comply with the applicable regulatory obligations and requirements, which include augmentation works necessary to maintain minimum pressures and the meter replacement programs.

The forecast capex is built up principally from unit rates which reflect the up-to-date efficient costs of delivering similar projects in AusNet Services' network area. This is the best basis for a forecast which delivers the capital programs in the forthcoming period at the lowest sustainable cost.

AusNet Services also analysed the efficiency of its proposed capex program from the perspective of its customers, using information obtained through its customer engagement program. Customers' views on pricing, reliability and safety were taken into account in designing AusNet Services' proposed investment program where it was feasible to do so. By taking this approach, the resulting forecast capex reflects the lowest sustainable cost necessary to meet customer expectations and is, therefore, considered to be in the long-term interest of consumers.

AusNet Services' forecast total capex is conforming capital expenditure in accordance with rule 79(1). The total forecast reflects the impact of key drivers on capex expenditure, such as the maintenance of network safety, changes in demand forecasts and cost inputs. As such, AusNet Services is confident that its total capex forecast is expenditure which would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

Structure of this chapter

The remainder of this chapter is structured as follows:

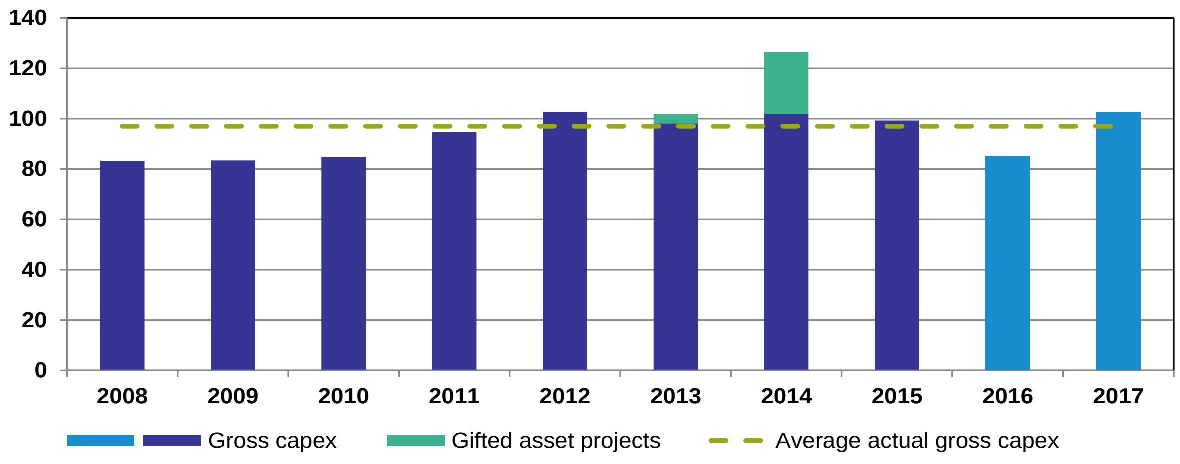
- Section 6.3 discusses historical capex and benchmarking analysis undertaken by Economic Insights;
- Section 6.4 describes how the capex forecast was developed;
- Section 6.5 sets out AusNet Services' capex forecast;
- Section 6.6 presents the total capex forecast; and
- Section 6.7 lists supporting documentation relevant to this chapter.

6.3 Historical performance

6.3.1 Historical capex trends

Since 2008, gross capex has been largely flat, reflecting the steady rate of growth in new customer connections and mains replacement volumes. In 2014, gross capex increased sharply due to projects with substantial gifted assets as a result of the Regional Rail link and Rees Road projects, before falling back in line with the historical average of $97 million (real 2017).

Figure 6-4: Total gross capex ($m, real 2017)



Source: AusNet Services

Note: Figures for 2016 and 2017 are estimates.

The mains replacement program is a significant capex program, second only in forecast expenditure to new customer connections. This critical program will have a material positive impact on gas network safety because it will reduce the number and severity of gas leaks in the network.

The replacement of the low pressure mains network had its origins in the 2003-07 Access Arrangement review process. In this review process, the Essential Services Commission of Victoria (ESC) noted in its Final Decision that:

> *While the distributors have not experienced any major incidents due to gas leaks, the commission accepts that it is prudent for the distributor to develop and implement a long-term program to progressively replace the cast iron parts of the network and thereby minimise the possibility of any major incidents (page 117).*

AusNet Services' commitment to completing the mains replacement program by 2025 reflects the serious consequences that major gas leaks can have for public safety. The end date is a critical factor in determining what the efficient and prudent volume of replacement mains is under Rule 79(1) of the NGR, along with AusNet Service's obligation to maintain safety in accordance with its Gas Safety Case.

6.3.2 Performance in the current access arrangement period

In its 2013-17 determination, the AER provided capex allowances based on replacing 415km of the Low Pressure (LP) network and 82km of Medium Pressure (MP) network.[46] In September 2016, the AER approved a cost pass through application to extend the LP replacement program by 85km, increasing the current period capex allowance by $16.2 million (real $2017). In approving the increased replacement volume, the AER recognised that the additional expenditure satisfies the NGR requirements relating to 'conforming capex'.[47]

The figures below show AusNet Services' actual and expected gross and net capex against the AER's allowances, inclusive of the additional LP mains approved by the AER in response to the 2016 pass through application. Gross capex reflects the total expenditure on capital, while net capex reflects the portion of expenditure funded through distribution prices, that is, after upfront customer contributions and gifted assets.

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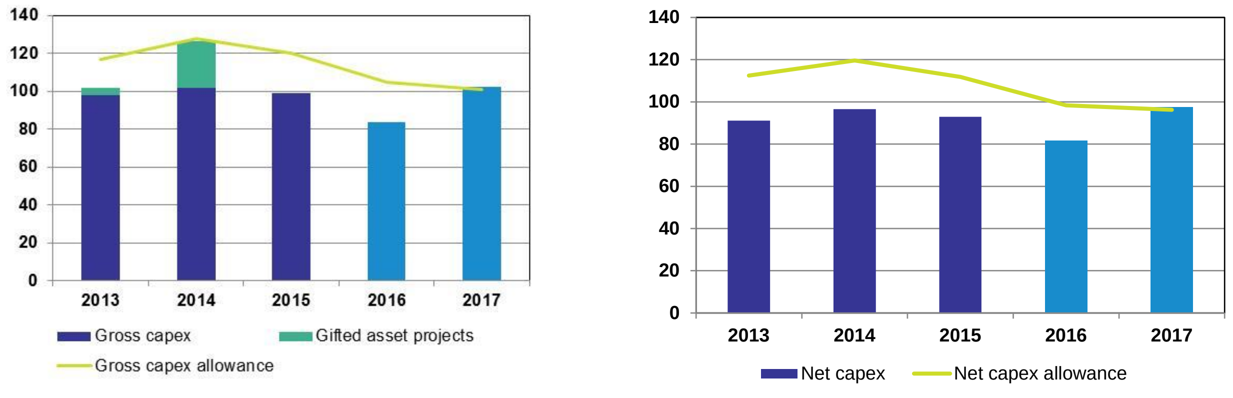
46 AER, *Access arrangement final decision – SPI Networks (Gas) Pty Ltd 2013-17 – Part 2: Attachments*, March 2013, pp. 31, 47

47 AER, *AusNet Services gas mains replacement cost pass through – AER decision*, September 2016.

Figure 6-5: Total Gross and Net Capex ($m, real 2017)



Source: AusNet Services

Note: Values for 2016 and 2017 are estimates.

As explained in Chapter 3, AusNet Services expects to outperform the gross and net capex allowances by $55.6 million (10%) and $77.3 million (14%), respectively, in the current access arrangement period.

This underspend is expected even as volumes have been delivered largely to forecast. 325km of low pressure mains have been replaced between 2013 and 2015, in line with the approved volume of 329km. Similarly, 48,400 new customers have been connected against an approved volume of 50,600.

Significant savings have been achieved in relation to new connections and mains replacement, which are largely attributable to AusNet Services achieving lower unit costs than those approved at the last review. These efficiency gains flow through to capex forecast for the next access arrangement period, which relies on unit rates which are typically based on historical averages.

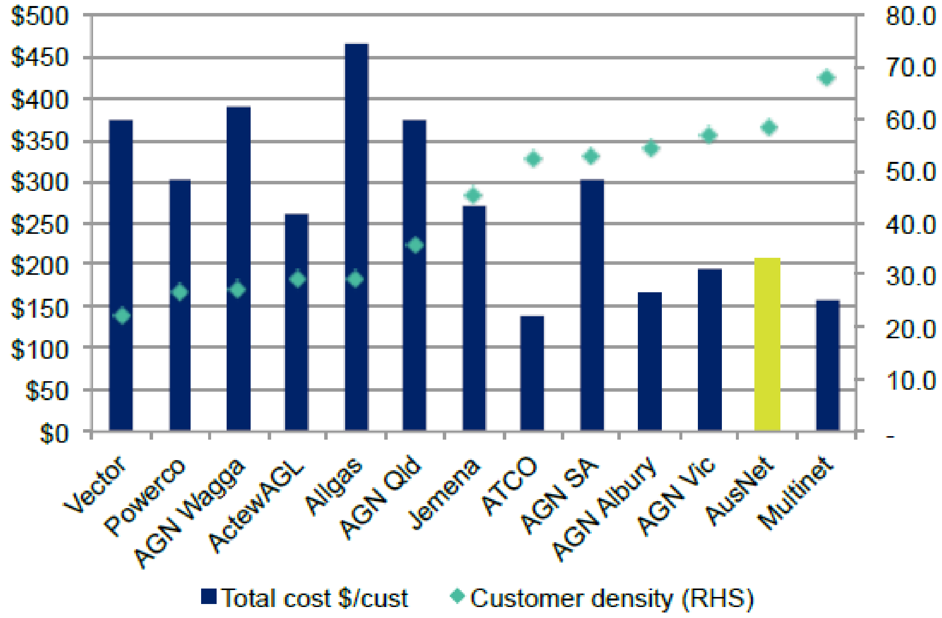
In summary, the actual capex incurred during the current access arrangement period reflects efficient performance that outperforms the allowances set by the AER.

6.3.3 Benchmarking analysis

Benchmarking can be used to assess capex efficiency, with partial indicators providing a useful measure of relative capex efficiency between service providers. The Victorian gas distributors engaged Economic Insights to conduct a benchmarking study to examine the efficiency of the businesses.

In relation to capex, Economic Insights benchmarked gas distributors' asset costs per customer against customer density. The figure below shows that asset cost per customer falls as customer density increases, reflecting the efficiencies that higher density networks are able to achieve.

Figure 6-6: Asset cost per customer relative to customer density (avg. 2011–2015)



Source: Economic Insights, Benchmarking the Victorian Gas Distribution Businesses' Operating and Capital Costs Using Partial Productivity Indicators, 15 June 2016

Note: Asset cost is real revenue less real opex; customer density is the total number of customers per kilometre of mains

AusNet Services has low asset costs per customer compared to other gas distributors, and benchmarks comparatively to networks of similar density. For example, AGN Victoria and AusNet Services both have asset cost per customer of approximately $200 and customer density of around 60 customers per kilometre. Multinet's lower asset cost per customer of approximately $150 may be explained by its higher customer density of around 70.

Economic Insights points to other influencing factors which indicate that capex benchmarking must be treated cautiously:

> *These comparisons are influenced among other things by asset age, original network asset valuations, and various factors not controlled for which influence the quantity of assets per customer, and hence asset cost per customer. Thus, only qualified conclusions can be drawn from this chart. It suggests that the Victorian GDBs are amongst the more efficient in terms of asset use.* [48]

AusNet Services concurs with the views expressed by Economic Insights, particularly the concluding sentence. AusNet Services agrees that while capex benchmarking has its limitations and should be used alongside a range of other assessment techniques to determine overall capex efficiency, the analysis supports other indications that AusNet Services' overall capex is efficient.

Economic Insights' conclusions are also consistent with the information presented in section 0, which shows that AusNet Services has delivered capex savings compared to the regulatory allowance in the current access arrangement period.

[48] Economic Insight, Benchmarking the Victorian Gas Distribution Businesses' Operating and Capital Costs Using Partial Productivity Indicators, June 2015, pages 10 and 11.

6.4 Development of the Capital Expenditure Program

This section provides an overview of AusNet Services' approach to determining its capex requirements for the 2018-22 access arrangement period, including information on:

- alignment with AusNet Services' long-term network strategy and objectives;
- asset management process and drivers;
- assumptions and inputs;
- interactions with other building blocks; and
- the expectations and preferences of consumers.

Further detail on the forecasting methodology used to determine the capex requirement for AusNet Services' distribution network can be found in Appendix 2C – Asset Management Strategy and in the Plant Strategies.

6.4.1 Alignment with AusNet Services' vision and objectives

As explained in Chapter 2, AusNet Services' purpose is:

> **"To empower communities and their energy future."**

Our purpose places customers at the forefront of why we move energy and acknowledges the relationship between individual customers and communities.

The figure below summarises AusNet Services' vision for its gas network, the objectives that will allow us to achieve that vision, and the company values we uphold.

Figure 6-7: AusNet Services' gas network vision, objectives and value

Source: AusNet Services

AusNet Services' vision, objectives and values have guided its development of its capital expenditure program for the forthcoming access arrangement period.

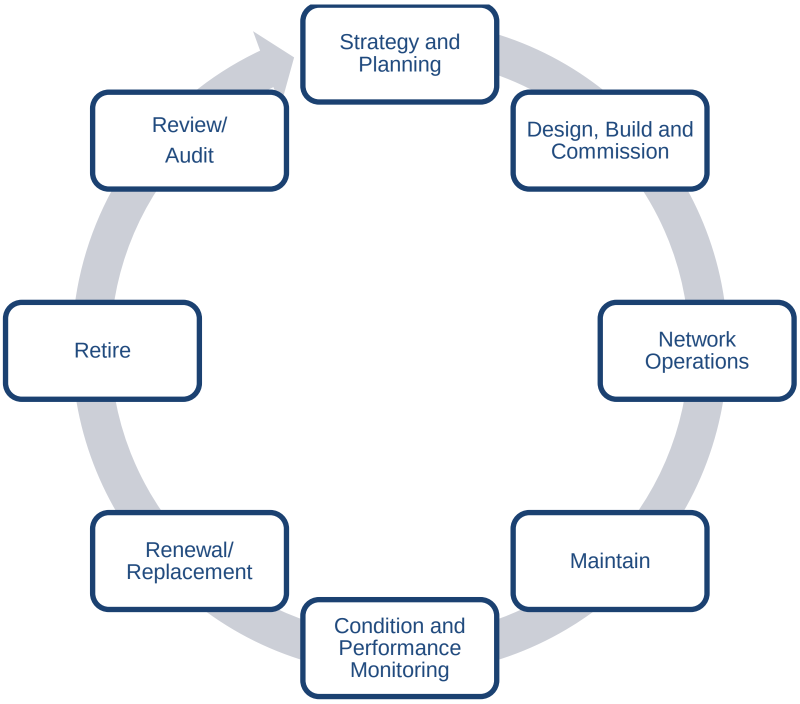
6.4.2 Asset management process and drivers

Effective asset management is critical to delivering efficient capex in accordance with Rule 79 which:

- requires that capex must be consistent with the amount incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)); and
- states that capex is justified if it is necessary to:
  1. maintain and improve the safety of services; or
  2. maintain the integrity of services; or
  3. comply with a regulatory obligation or requirement; or
  4. maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (rule 79(2)(c)).

Asset management involves the development of a plan for the management of one or more infrastructure assets that combines technical, financial and other drivers to minimise life cycle costs while delivering a target level of service. The figure below shows the asset lifecycle process.

Figure 6-8: Asset lifecycle



Source: AusNet Services

AusNet Services' asset management approach focusses on delivering optimal distribution network performance at efficient costs. Except where outputs are mandated, the approach requires an explicit cost benefit analysis to be undertaken in order to assess whether the overall economic value from the proposed capex is positive. In other words, AusNet Services only proceeds with capex if the incremental benefit exceeds the incremental cost.

As per Rule 79(3) of the NGR, deciding whether the overall "economic value of capital expenditure is positive" requires consideration to be given only to economic value directly accruing to the service provider, gas producers, users and end users. Consistent with this requirement, in assessing the incremental costs AusNet Services has regard to:

- AusNet Services' direct costs; plus

- allocation of AusNet Services' capitalised overheads; plus
- imposed costs stemming from the program, which accrue to gas producers, users and end users.

The incremental benefits encompass full societal benefits realised by the proposed capex, which include:

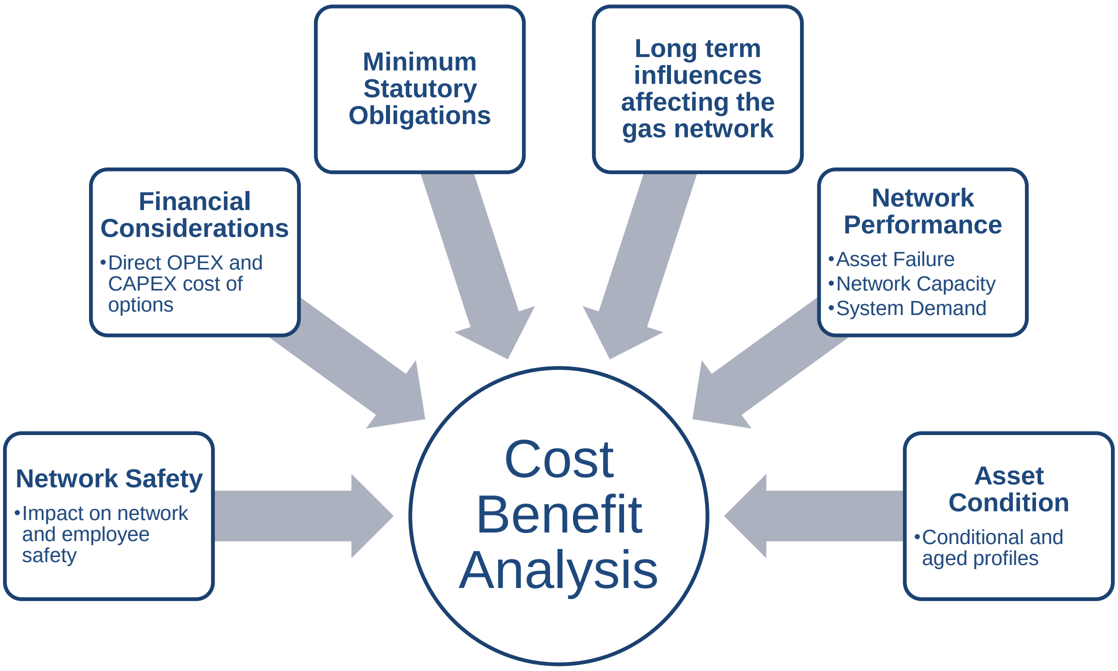
- direct benefits to AusNet Services' customers; plus
- additional benefits stemming from the program, which accrue to gas producers, users and end users.

Where the delivery of certain outputs is mandated by an external obligation, AusNet Services adopts a cost effectiveness (least cost) analysis to ensure that the output is delivered at least cost. The obligations may arise from one or more of the following regulatory instruments:

- AusNet Services' gas distribution licence;
- Gas Industry Act/Gas Safety Act;
- Gas Distribution System Code;
- National Gas Law and Rules;
- Victorian Occupational Health and Safety Act 1985;
- Pipeline Regulations 2007; or
- Australian and International Standards.

Regardless of the expenditure driver, cost benefit analysis is central to AusNet Services' asset management approach. The various drivers that are brought to bear when undertaking a cost benefit analysis are summarised in the figure below. This approach ensures that all decisions to augment, replace or maintain network assets are justified on economic grounds.

Figure 6-9: Cost benefit analysis drivers

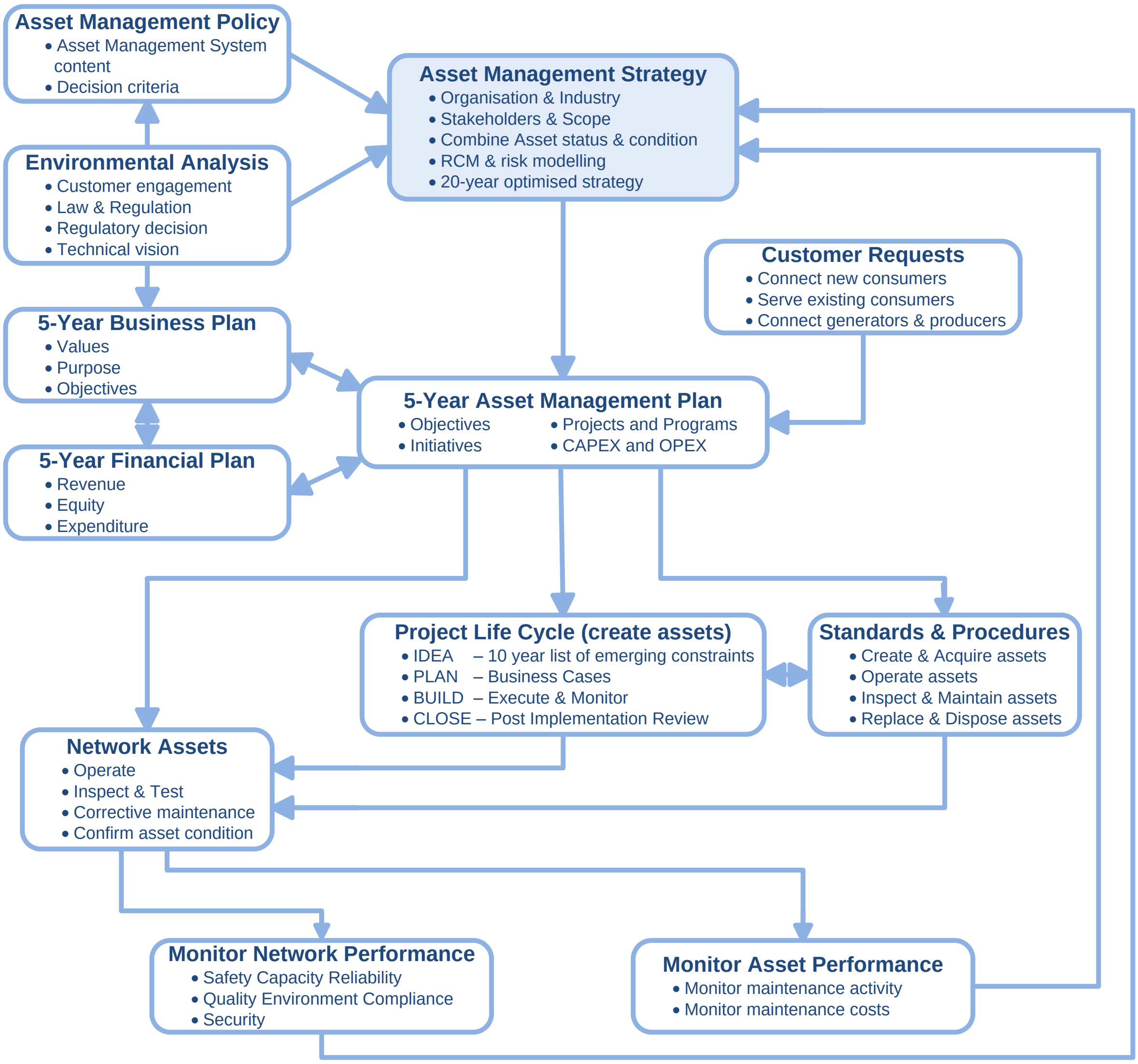


Source: AusNet Services

AusNet Services has an Asset Management Strategy for the gas distribution network which gives effect to the Asset Management Vision and serves as a key input to the development of the Detailed Plant and Network Strategies. The Detailed Plant and Network Strategies are given effect through the Asset Management Plan for the next access arrangement period.

AusNet Services' overall asset management process is illustrated below. The figures show how external influences, investment drivers, business values, asset management directions and the selected strategies are bought together to deliver rigorous asset management processes.

Figure 6-10: Asset Management Process



Source: AusNet Services

The above asset management processes occur in the context of the Gas Safety Case (GSC). The Gas Safety Case is a statutory requirement under the Gas Safety Act 1997 and the Gas Safety (Safety Case) Regulations 2009 No. 6. This safety legislation requires gas network businesses to lodge a GSC Management System with Energy Safe Victoria (ESV).

The objectives of the regulations is to make provision for safety cases in relation to facilities, gas installations and appliances, and to provide for the reporting of gas incidents. AusNet Services' GSC for the forthcoming access arrangement period is expected to be approved by the ESV in March 2017. The GSC identifies the mitigation controls required to manage risks associated with the gas network, to ensure that safety and integrity are maintained and improved. The GSC is an important driver of many of AusNet Services' capital and operational programs.

To ensure the ongoing development of its Asset Management System in line with international good practice, AusNet Services' three energy networks are accredited to ISO 55001, the international standard for Asset Management. Accreditation requires the demonstration of robust and transparent asset management policies, processes, procedures and practices, and a sustainable performance framework.

Accreditation is recognised as an indicator of best practice asset management, and the adoption of this standard ensures that AusNet Services achieves its network objectives by managing its assets effectively and efficiently.

6.4.3 Assumptions and inputs

The key assumptions and inputs underpinning AusNet Services' capex forecast are:

- demand forecasts;
- project cost estimates and unit rates;
- asset condition and risk assessments;
- overheads; and
- cost escalators.

The capex forecast is consistent with the service classification in AusNet Services' Cost Allocation Methodology. There are no related party margins in the capex forecast.

Demand forecasts

AusNet Services plans its network to ensure there is sufficient capacity to meet expected demand over the next access arrangement period.

Continued growth in customer numbers is forecast for the next period, which is the key driver of the new customer connections capex forecast. Similarly, augmentation projects are driven by the gas throughput forecast.

Details of the demand forecasts that underpin the capex forecast are provided in Chapter 4.

Project cost estimates and unit rates

Project cost estimates are prepared as part of a standardised approach to developing, managing and reporting projects and programs of works.

Estimates are prepared in accordance with defined project execution procedures and practices and are subject to reviews and a sign-off process. Clear accountabilities are in place to ensure costing standards and controls are applied to any estimate released.

Cost estimates used to determine forecast capex have been prepared on a P50 basis, which is an estimate that has a 50% confidence factor that the estimate will not be exceeded. While AusNet Services' standard estimating procedures generate both P50 and P90 estimates for projects, only P50s are used in this proposal.

Unit rates used to develop forecast expenditure are primarily based on the rates incurred in recently completed work. These unit rates reflect the up-to-date efficient costs of delivering similar projects in AusNet Services' network area, and are the best forecast of the lowest sustainable cost of delivering the capital programs in the forthcoming period.

In some instances, the unit rates on which the forecast for the next period is based differ from the rates incurred in the current period. For example, a higher unit rate applies to the MP mains replacement program because the proposed program features substantially different and more complex projects to those delivered in the current period in terms of scope and location. Specifically, the current period MP mains replacement program has involved the decommissioning and upgrading of a number of MP mains which can be delivered at lower cost than the replacement projects being proposed for the next period. This is discussed further in section 6.5.2 and Appendix 6E – Mains and Services Strategy (AMS 30-52).

Projects and programs are delivered utilising an efficient combination of competitively tendered and internal resources. AusNet Services has established pre-qualified panels of design and installation service providers to undertake design and installation works for major projects such as mains replacement and augmentation works. These panels were established by competitive tender and ensure that providers have the necessary skills and resources to undertake the required work in a safe and competent manner, and can comply with AusNet Services' works management processes. Forecast unit rates and their bases are described in the Plant Strategies.

Asset condition and risk assessments

AusNet Services manages the condition of its assets through:

- real-time data acquisition and recording (via SCADA);
- leakage surveys, leak reports, and UAfG monitoring;
- asset inspection programs and corrosion surveys; and
- gas quality monitoring, including management of oil-in-gas issues.

These condition monitoring activities are key inputs to AusNet Services' capex plans.

More broadly, AusNet Services operates a corporate Risk Management Framework[49] that utilises the principles of Australian Standard AS/NZ 4360:2004 and AS/NZ ISO 31000 Risk management – Principles and Guidelines, 2009.

As part of the AusNet Services' Gas Safety Case, a Formal Safety Assessment (FSA) is carried out every five years and reviewed annually in accordance with the Gas Safety Act 1997 and the Gas Safety (Safety Case) Regulations 2008 in order to assess risks associated with AusNet Services' gas distribution network.

All identified risks relating to the gas distribution network are contained within acceptable limits. However, action plans to mitigate the highest risks are in place or are planned to commence during the next access arrangement period. For example, the risk associated with leakage from cast iron and unprotected steel mains is being addressed through the low and medium pressure mains replacement programs.

Overheads

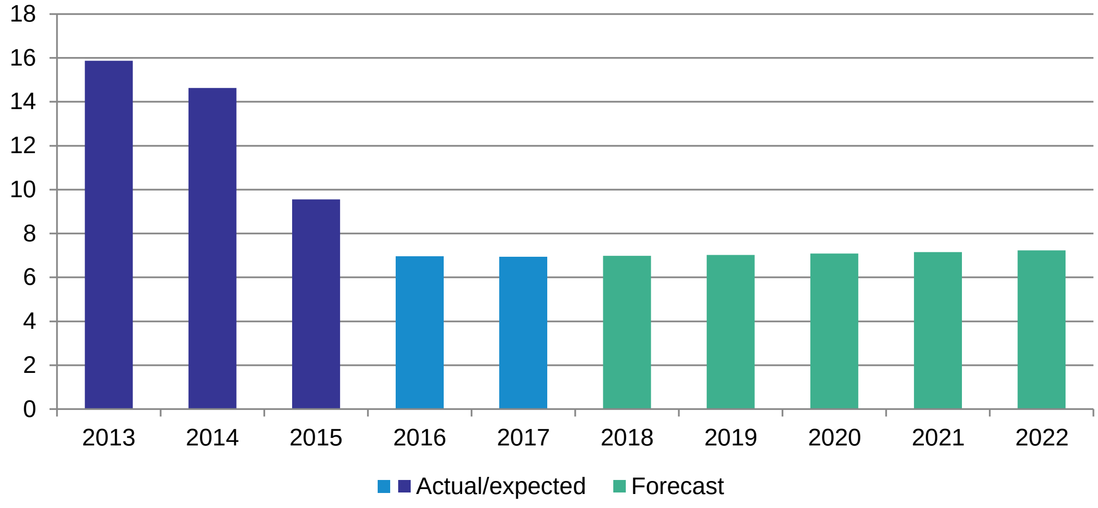
AusNet Services has forecast fixed capitalised overheads amounts for network and IT capex based on the average overheads it incurred from 2013-16. These amounts have been converted into network and IT overhead rates using the forecasts of network and IT capex, which have then been applied to the respective direct capex forecasts.

In line with the approach applied by the AER in its recent decisions for other gas distributors and in AusNet Services' electricity distribution determination, the fixed (75%) and variable (25%) components of the overheads pool have been estimated. Real cost escalation has been applied to overheads using the cost escalators discussed in the next section.

This approach has resulted in an overheads forecast of $35.5 million per annum (real $2017). As demonstrated by the figure below, the overheads forecast is significantly lower than reported overheads in the current period.

[49] RM 001-2006 Risk Management Framework, 2007, AusNet Services.

Figure 6-11: Actual/expected and forecast overheads ($m, real 2017)



Source: AusNet Services

Note: 2016 and 2017 are estimates

In April 2015, AusNet Services deployed a new Enterprise Resource Planning (ERP) system. Prior to that time, AusNet Services' allocated contractor support costs (i.e. contractor overheads) to overheads. From May, AusNet Services has more appropriately classified these costs as direct costs, in keeping with the requirements of the AER's annual RIN. The reduction in overheads in 2015 observed in the figure above reflects this reclassification.

Therefore, our forecast of contractor support costs is captured in the direct capex forecast, rather than in the overheads forecast. This approach will ensure consistency between the direct capex and overheads reported in AusNet Services' regulatory accounts and the forecasts set out in this Proposal.

The category of capex affected by this change is new connections, which is discussed in section 6.5.3.

Cost escalators

The price of inputs (material and labour) impacts the total expenditure that will be required to deliver the capital work program forecast for the next access arrangement period.

AusNet Services is a 'price taker' for most of the inputs it uses in the delivery of its capex program. That is, the price AusNet Services pays for materials such as meters, regulators and HDPE pipe and the wages it pays for labour are determined in competitive national and international markets.

The current outlook for inputs costs is for moderate growth. Labour costs are expected to grow at rates slightly above the long term average, while growth in material costs is expected to reflect the general rate of inflation.

Cost escalation is heavily influenced by macroeconomic factors and AusNet Services expects it will update its forecasts of cost escalators using up to date information in it revised access arrangement proposal.

The impact on capex attributable to cost escalation is approximately 2.1% (or about $10.7 million) of the total over the forthcoming access arrangement period.

Labour prices

AusNet Services engaged BIS Shrapnel to develop forecasts of the Electricity, Gas, Water and Waste Services (EGWWS) and Construction Wage Price Indices (WPI) for the forthcoming period. BIS Shrapnel's report has been provided as Appendix 7E.

AusNet Services has applied EGWWS and Construction WPI forecasts to internal and external labour, respectively, using an average of the BIS Shrapnel forecasts, and Deloitte Access Economics' (DAE) most recent EGWWS and Construction WPI forecasts. These forecasts are shown below.

Table 6-1: Real labour price escalators applied to the capex forecast

Labour type	2017	2018	2019	2020	2021	2022
Internal (EGWWS WPI)	0.28%	0.80%	0.92%	1.13%	1.38%	1.54%
External (Construction WPI)	-0.07%	0.73%	0.92%	1.18%	1.54%	1.65%

Source: *BIS Shrapnel, Utilities sector and construction industry wage forecasts to 2022 – Australia and Victoria, October 2016, p. ii; Deloitte Access Economics, Forecast growth in labour costs in NEM regions of Australia, February 2016, p. 54.*

Further details of AusNet Services' labour price escalators are provided in Chapter 7.

Materials prices

Consistent with AusNet Services' recent submissions for its electricity distribution and transmission price reviews, zero real escalation has been applied to materials costs over the 2018-22 period.

While real cost escalators for materials have not been applied in developing this proposal, AusNet Services considers there is merit in exploring this further in future reviews.

6.4.4 Inter-relationships with other building blocks

AusNet Services' capex forecast is intrinsically linked to the other aspects of its revenue proposal. Any adjustments to related aspects of the proposal may require consequential alternations to the capex forecast.

Operating expenditure

As detailed in Chapter 7 – Operating and Maintenance Expenditure, opex is forecast on a top-down basis, on the implicit assumption that the net effect of the capex program is captured by the output growth component of the 'rate of change' methodology. This approach relies critically on the assumption that the forecast capex program is sufficient to maintain the condition of network assets to a level that does not significantly alter the required maintenance activity.

Incentive schemes

The incentive schemes proposed in Chapter 11 provide incentives to deliver cost efficiencies while maintaining or improving customer service. Implicitly, these schemes assume the approved expenditure allowances reflect the efficient costs of providing network services. The effective operation of these schemes is therefore contingent upon the AER approving the capex forecasts presented in this Chapter.

Rate of return

The capex forecast has been developed assuming a rate of return is secured which allows AusNet Services to finance the forecast program. If the AER's estimated rate of return is not sufficient to finance the capex forecast, this will present risks to AusNet Services' ability to continue to provide safe and reliable gas services.

Consumer expectations and preferences

AusNet Services has undertaken a comprehensive consumer engagement process to better understand the needs of its customers. From a network planning perspective, the aim of the consumer engagement process is to understand our customers' preferences, particularly in relation to the trade-offs between network risk and costs.

The consumer engagement process is not a substitute for detailed cost-benefit analysis and risk modelling (e.g. leakage rate analysis). Rather, it provides valuable insights into customers' service expectations and priorities which supplement AusNet Services' analysis. A detailed description of the consumer engagement process and AusNet Services' response to the feedback received is provided in Chapter 5. However, it is worth noting the following feedback that is particularly relevant to AusNet Services' capex plans:

- Customers prioritised safety above factors such as reliability or minimising costs. They AusNet Services to maintain its gas network to ensure ongoing high levels of safety.
- Customers and stakeholders value the reliability of AusNet Services' gas network and expect that it will continue to maintain existing service levels.

As explained in the remainder of this section, AusNet Services' approach to developing its capex program, and the subsequent expenditure forecast, is consistent with customers' preferences as reflected in the feedback relating to safety and reliability. In particular, we have been cognisant that customers have not expressed a preference for higher reliability.

In the remainder of this Chapter, we explain the key driver for each capex category, recognising that customers place the highest value on safety.

6.5 Capital Expenditure Forecast

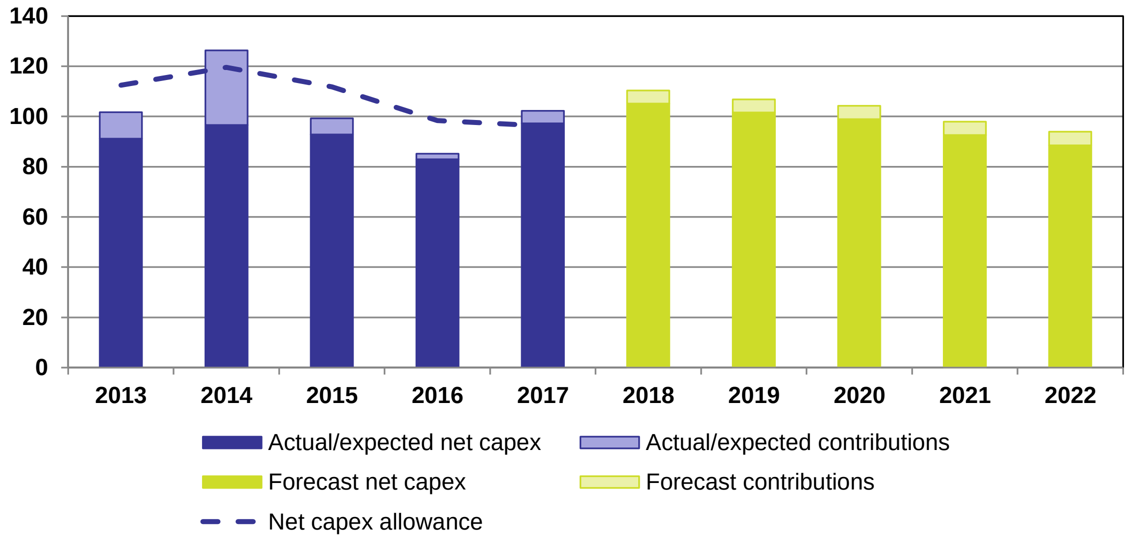
6.5.1 Overview

AusNet Services is forecasting total gross capex of $513.1 million (real $2017) for the 2018-22 period, which equates to net expenditure of $486.7 million after customer contributions.

The forecast is a 0.4%, or $2 million, reduction on total (gross) capex expected in the current access arrangement period. This forecast reflects the expenditure that would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

As shown in the figure below, annual expenditure is expected to decline from 2018, with expenditure higher than average in 2018 due to a number of committed augmentation projects (discussed in section 6.5.5).

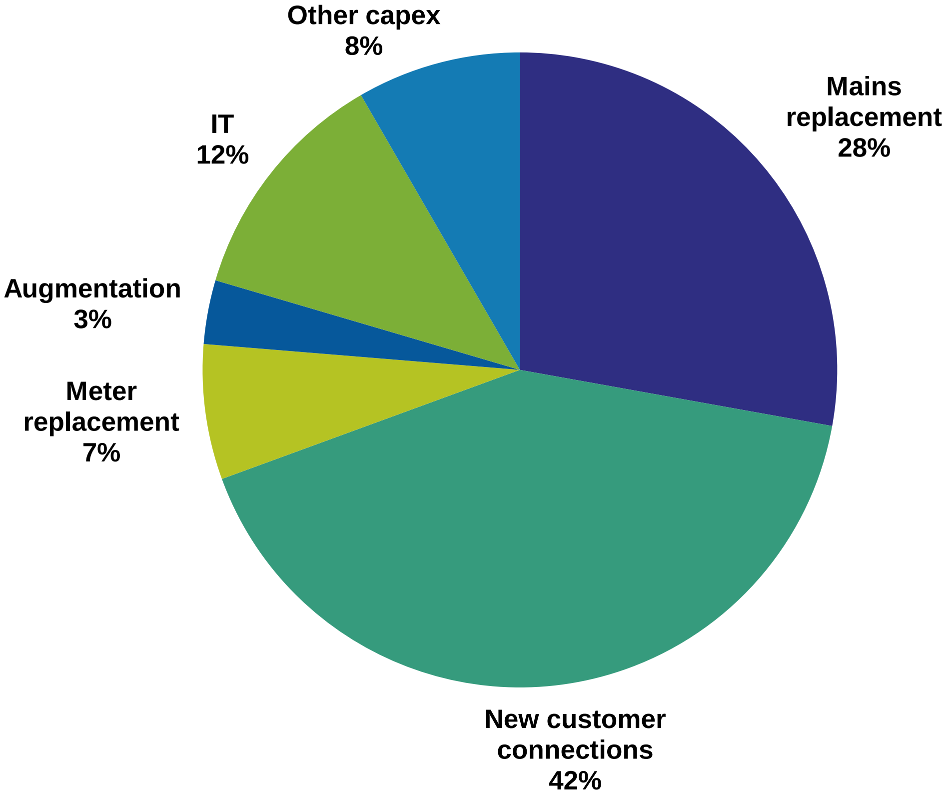
Figure 6-12: Gross capex, actual/expected and forecast ($m, real 2017)



Source: AusNet Service

The figure below shows the composition of the capex forecast by primary expenditure driver. New customer connections, augmentation and meter replacement expenditures, which are driven by compliance obligations, collectively account for over half of the capex forecast. Proactive mains replacement programs aimed at maintaining network safety account for 28% of the forecast, with the remaining expenditure attributable to IT and other capex.

Figure 6-13: Forecast capex by expenditure driver, 2018-22



Source: AusNet Service

The table below provides the annual and total capex forecast by driver categories.

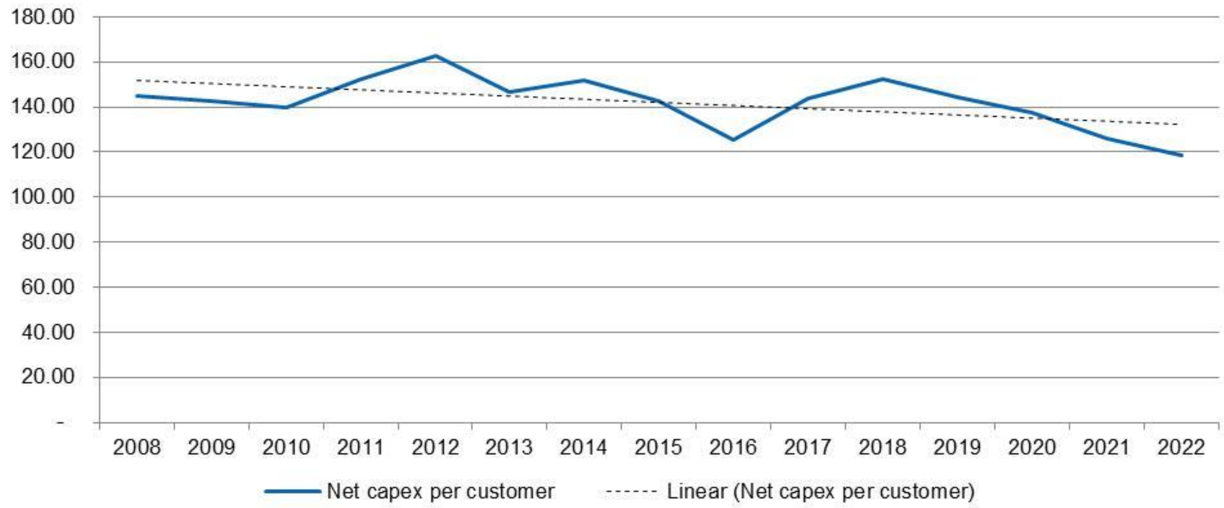
Table 6-2: Annual and total capex forecast, driver categories ($m, real 2017)

Driver	2018	2019	2020	2021	2022	2018-22 total
Mains replacement	31.1	28.6	30.2	22.0	21.0	**132.9**
New customer connections	38.1	38.9	39.9	41.2	40.6	**198.7**
Meter replacement	6.2	6.8	6.4	6.7	6.7	**32.8**
Augmentation	6.7	2.9	0.6	2.0	3.3	**15.5**
IT	13.3	14.5	12.5	10.7	6.8	**57.8**
Other capex	7.8	8.1	7.5	8.2	8.3	**39.9**
Overheads	7.0	7.0	7.1	7.2	7.2	**35.5**
Total gross capex	**110.3**	**106.8**	**104.2**	**97.9**	**93.9**	**513.1**
Contributions	-5.1	-5.2	-5.3	-5.4	-5.4	**-26.4**
Total net capex	**105.2**	**101.6**	**98.9**	**92.5**	**88.4**	**486.7**

Source: AusNet Services

As shown by the figure below, the capex forecast continues the decline in real capex per customer of the current and previous access arrangement periods. Specifically, net capex per customer of $135 in the next period is forecast to be 7% lower than average 2008-17 capex per customer of $145, indicating the ongoing efficiency improvements reflected in AusNet Services' proposed capex program.

Figure 6-14: Net capex per customer ($m, real 2017)



Source: AusNet Services

The following sections provide details on the capex forecast for each expenditure driver.

6.5.2 Mains replacement

Overview

AusNet Services assesses the safety of its assets with regard to the leak incidence per kilometre of mains and services. The proactive replacement of ageing/deteriorating gas distribution mains to reduce or maintain leakage rates is central to the provision of safe and reliable network services. The primary driver of the mains replacement programs is, therefore, to reduce or maintain the safety risk of the network.

There are two components of AusNet Services' mains replacement program:

- the LP replacement program; and
- the MP replacement program.

Each leak in a distribution main represents a real and present risk to safety, as each leak has the potential to cause death or injury should leaking gas build up to sufficient levels to become explosive. Although this risk can never be entirely eradicated, AusNet Services is required to minimise these risks as far as practicable.[50]

The mains replacement program is designed to fulfil AusNet Services' Gas Safety Case (GSC) obligations by appropriately mitigating the existing safety risk to the public and employees. The program is also necessary to ensure that AusNet Services' assets contribute to achieving the safety aspects of the NGO.

[50] Gas Safety Act 1997, section 32.

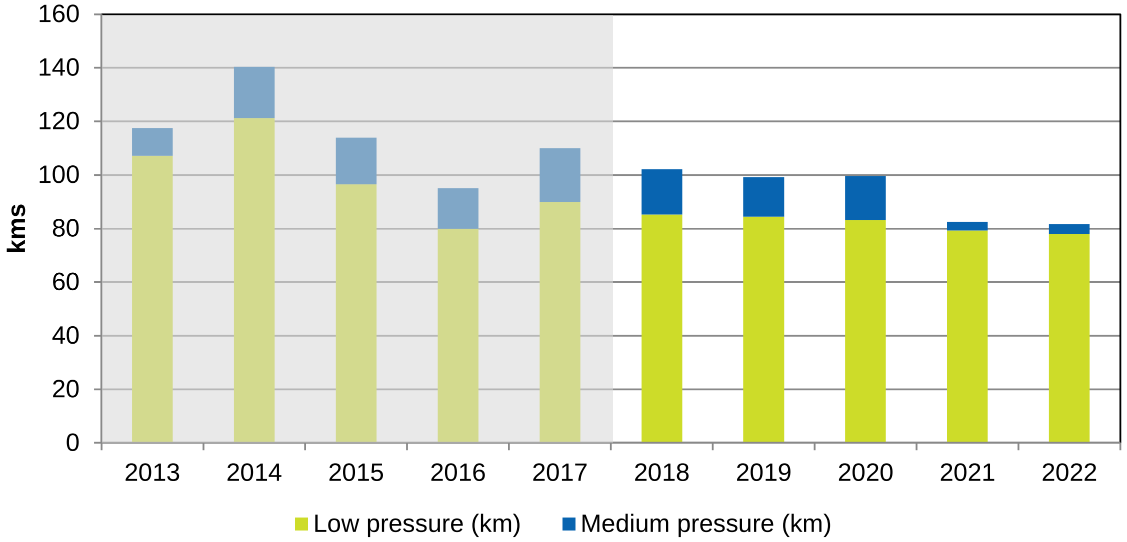
The mains replacement program satisfies the requirements of conforming capital expenditure in that it is expenditure which:

- a prudent service provider acting efficiently would undertake, in accordance with good industry practice, to achieve the lowest sustainable cost of providing services;
- is required to reduce the frequency and severity of leaks, which in turn improves the safety of services provided using the pipeline; and
- is necessary to comply with AusNet Services' regulatory obligations under the Gas Safety Act, the Gas Safety Regulations and its Gas Safety Case.

The forecast mains replacement program expenditure reflects plans to replace 82kms per annum of LP mains, down from an annual average of 99kms during the 2013-17 period, and 11kms per annum of MP mains compared with 16kms per annum in the 2013-17 period. As discussed further below, AusNet Services has derived the proposed volumes through a risk-based approach to leakage management aimed at maintaining current levels of network risk.

Delivered volumes in the current period and forecast volumes for the next period are shown below.

Figure 6-15: Actual and proposed mains replacement program (km)



Source: AusNet Services

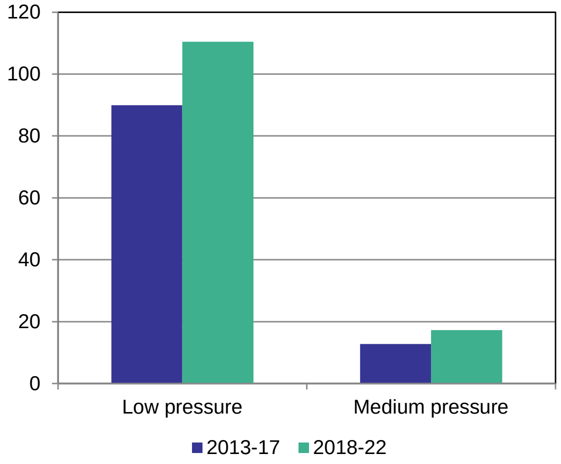
Note: Excludes ad-hoc replacement; 2016 and 2017 values are estimates.

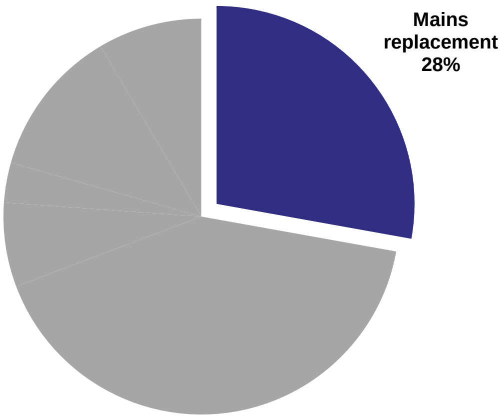
Despite the proposed reduction in volume, a higher unit rate is forecast for the next access arrangement period. This reflects the need to undertake investment in inner suburban areas and the Geelong CBD which involve more complex project delivery. The unit rates underpinning the proposed LP mains replacement program are discussed further in the following section.

Therefore, AusNet Services' forecast mains replacement expenditure for the 2018-22 period of $132.9 million is 23% higher than actual/expected capex in the current period of $108.3 million. Actual and forecast mains replacement expenditure is shown below. The LP and MP mains replacement programs account for 96% of the proposed mains replacement expenditure, with ad-hoc replacement of various pressure tiers accounting for the remaining 4%.

Mains replacement capex is the second largest category of capex, comprising 28% of the direct capex forecast.

Figure 6-16: Actual/expected and forecast mains replacement capex ($m, real 2017)





Source: AusNet Services

Note: Column chart excludes ad-hoc replacement; includes real cost escalation; direct capex only; 2016 and 2017 values are estimates

Discussion

This section sets out:

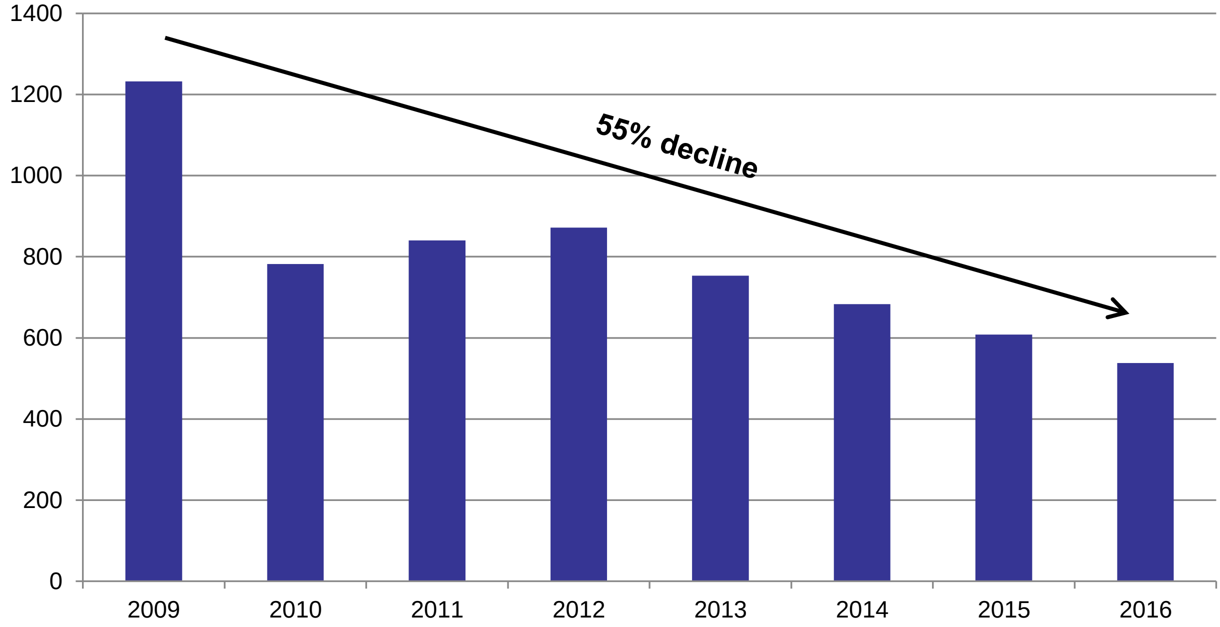
- a summary of the mains replacement conducted in the current access arrangement period;
- the drivers of the proposed mains replacement programs;
- the methodology employed to determine forecast replacement volumes; and
- the approach used to forecast unit rates.

As noted above, mains replacement capex is justified on the basis that it conforms with rule 79(1)(a) and rules 79(2)(i) and (ii). In summary, the proposed mains replacement program is consistent with the NGR and the NGO because it is essential in order to mitigate the safety risks posed associated with deteriorating assets. The scope and cost of the proposed program in the forthcoming access arrangement period is both prudent and efficient.

AusNet Services' current program of replacing LP mains with HP mains dates back to 2003. During the current period, AusNet Services is on track to replace around 500kms of LP mains, in line with the approved volume of replacement following AusNet Services' pass through application.

The benefits of AusNet Services' LP mains replacement program are apparent from the figure below. Total leaks on the LP network are expected to decline by 55% from over 1,200 in 2009 to around 540 in 2016.

Figure 6-17: Total LP leaks (actual/expected)



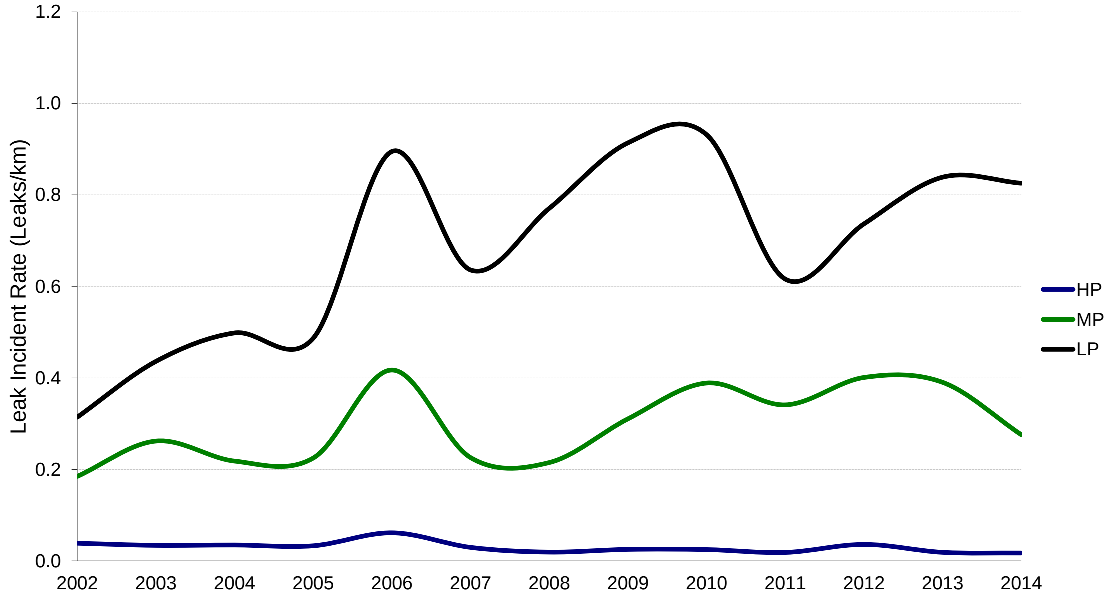
Source: AusNet Services

Note: 2015 and 2016 values are estimates; a leak is defined as a failure of a main or service such that the release of gas to the external environment occurs and which must be repaired in order to prevent further gas escape.

Despite the decline in total leaks, the leakage rate (leaks per kilometre) on the LP network has not reduced materially since 2009, and has demonstrated substantial fluctuation. This is because as LP mains are removed from the network, the remaining mains continue to experience leaks, leaving the leakage rate unchanged (or higher in cases where the remaining mains have deteriorated further).

LP leaks present a high risk to the public and employees, especially as they can go undetected for periods of time, creating the potential for gas to build up to explosive quantities. In contrast, HP mains both exhibit substantially lower leakage rates that are less likely to go undetected. The figure below compares leakage rates across the various pressure tiers, demonstrating the substantially higher leakage rate and, therefore, risk, that LP mains present.

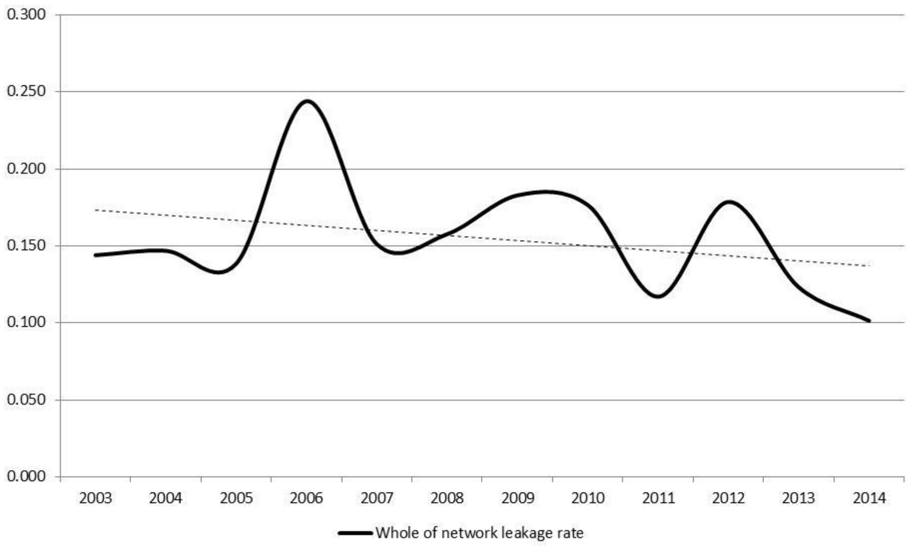
Figure 6-18: Mains leakage rate by pressure tier (leaks per kilometre)



Source: AusNet Services

Due to the risks presented by LP mains and consistent with AusNet Services' safety obligations, AusNet Services considers the replacement of the entire LP network is required and intends to continue this program 2025, at the end of which the LP network will be fully replaced. As shown by the figure below, the whole-of-network leakage rate has trended downward since the LP replacement program commenced in 2003.

Figure 6-19: Mains leakage rate, whole network (leaks per kilometre)



Source: AusNet Services

The current period MP mains replacement program was the first of its kind approved for AusNet Services. The AER approved expenditure to replace 82.5km of MP mains during the 2013-17 access arrangement period. AusNet Services is on track to replace this amount of MP mains by the end of 2017.

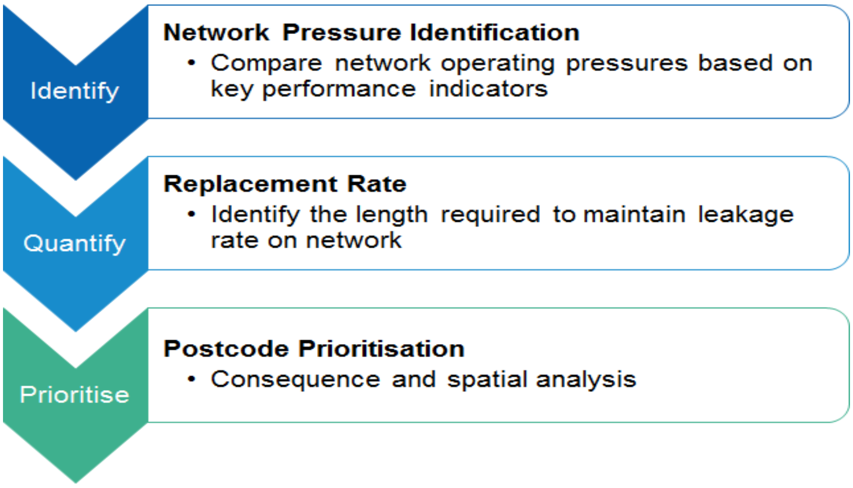
While the leakage rate of the MP network is substantially lower than the LP network, MP leaks present a substantial risk to customers and staff because of the relatively high volume of gas that escapes during an MP leak, which could give rise to potentially catastrophic outcomes. Hence, it is prudent and efficient for AusNet Services to commence a MP replacement program targeted at the worst performing MP mains during the forthcoming access arrangement period.

The MP mains identified for replacement in the proposed mains replacement program pose the greatest risk to customers, employees and the general public. The methodology used to identify these mains is discussed further below.

Mains replacement program prioritisation methodology

The proposed LP and MP mains replacement program has been developed through a three-stage prioritisation methodology aimed at maintaining network risk at the lowest sustainable cost, as shown in the figure below.

Figure 6-20: Mains replacement prioritisation methodology



Source: AusNet Services

Step 1: Network pressure identification

Leakage rate modelling has indicated that continued replacement of the LP network and targeted replacement specific material types on the MP network will maintain network risk and reliability by reducing incidence of leaks and outages. This analysis shows the relative risk associated with different main material types at different pressures.

Table 6-3: Risk weighting analysis

Pressure Tier	Material	Length (km)	Ave Annual LIR (leaks / km)	Gas Flow Ratio	Risk Weighting
High Pressure	Steel Protected	2289	0.02	11.95	0.24
	PE	7055	0.02	11.95	0.24
Medium Pressure	Steel Protected	305	0.09	4.01	0.36
	Steel Unprotected	147	0.76	4.01	3.05
	PE	204	0.05	4.01	0.20
	Class 250 PE (P4)	39	0.95	4.01	3.81
Low Pressure	Steel Unprotected	70	0.46	1.00	0.46
	Cast Iron	266	1.07	1.00	1.07
	PVC	420	0.14	1.00	0.14
	PE	18	0.07	1.00	0.07

Source: AusNet Services

Based on typical operating pressures, the above risk weighting indicates that leaks on a cast iron, unprotected steel or PE (Class 250) present significantly higher risks based on leak incidence and gas flow ratio analysis:

- **Cast Iron**. These assets are susceptible to cracking and have the highest leakage incidence per km of all the medium pressure mains categories. AusNet Services is on track to replace all cast iron MP mains by the end of 2017.
- **PE CL250.** This was the original grade of high density polyethylene pipe which began to be laid in gas distribution networks in the 1970s. At the time this was state of the art technology; however, it was quickly superseded and phased out in the early 1980s. This grade of pipe has low strength, low ductility and rapid crack propagation properties. The material has been found to be susceptible to cracking during and after the squeeze off process. AusNet Services has experienced many failures on class 250 pipe originating from a location where the pipe had previously been squeezed off. The operation of this pipe poses a risk to the occupational health and safety of maintenance crews who may inadvertently cause a major gas leak while undertaking squeeze off procedures.
- **Unprotected steel.** These assets, which are not protected by cathodic protection, have the potential to deteriorate quickly under certain ground conditions. In some circumstances, mains fail with many leaks in the same area creating significant occupational health and safety issues during the repair process. The cost of reactive replacement of these assets is often over 10 times higher than the cost of proactive risk assessment-based replacement activities. In targeting these asset types within the medium pressure systems AusNet Services can deliver significant safety improvements to both the public and employees working on the gas distribution network.

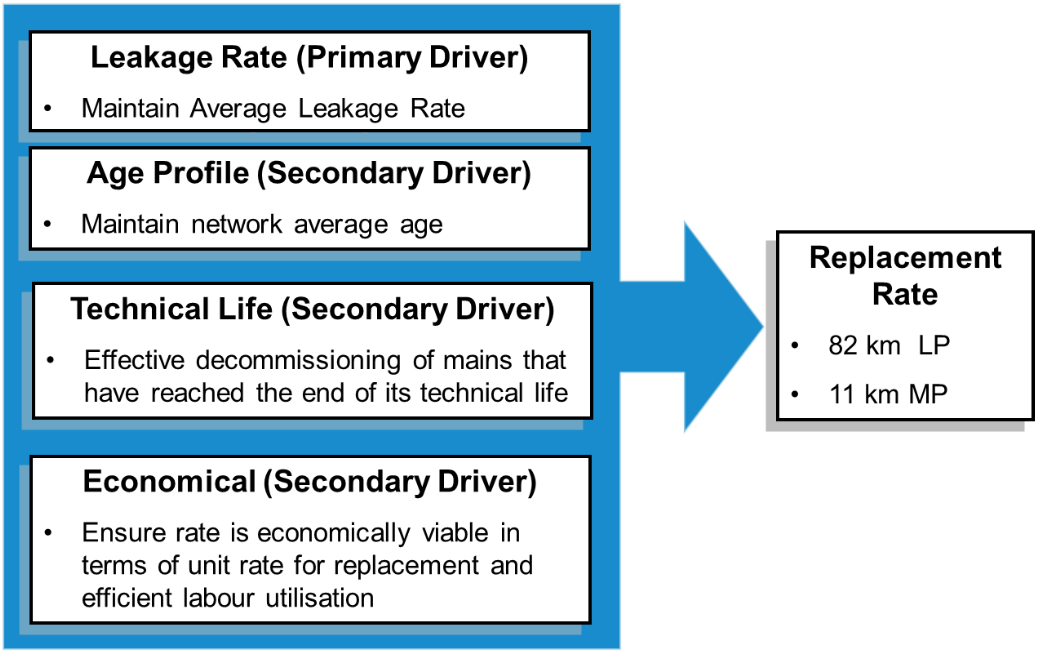
These material types are specific to the MP and LP network and are the focus of the proposed mains replacement program for the 2018-22 period. In targeting these asset types, AusNet Services will deliver safety improvements to both the public and employees working on the gas distribution network.

Table 6-3 demonstrates that the MP network has the highest risk mains (un-protected steel and Class 250 PE) due to both the high volume release of gas on a medium pressure leak and the high leakage rates of these material types. Accordingly, while the volume of MP mains proposed for replacement is lower than LP (discussed in the next section), the MP mains replacement program is as relevant to maintaining network safety as the LP program.

Step 2: Replacement rate

The key determinant of the replacement rate, or volume, is the maintenance of leakage rates to acceptable and sustainable levels. Secondary drivers are age profile, technical life, and economic assessment.

Figure 6-21: Replacement rate drivers

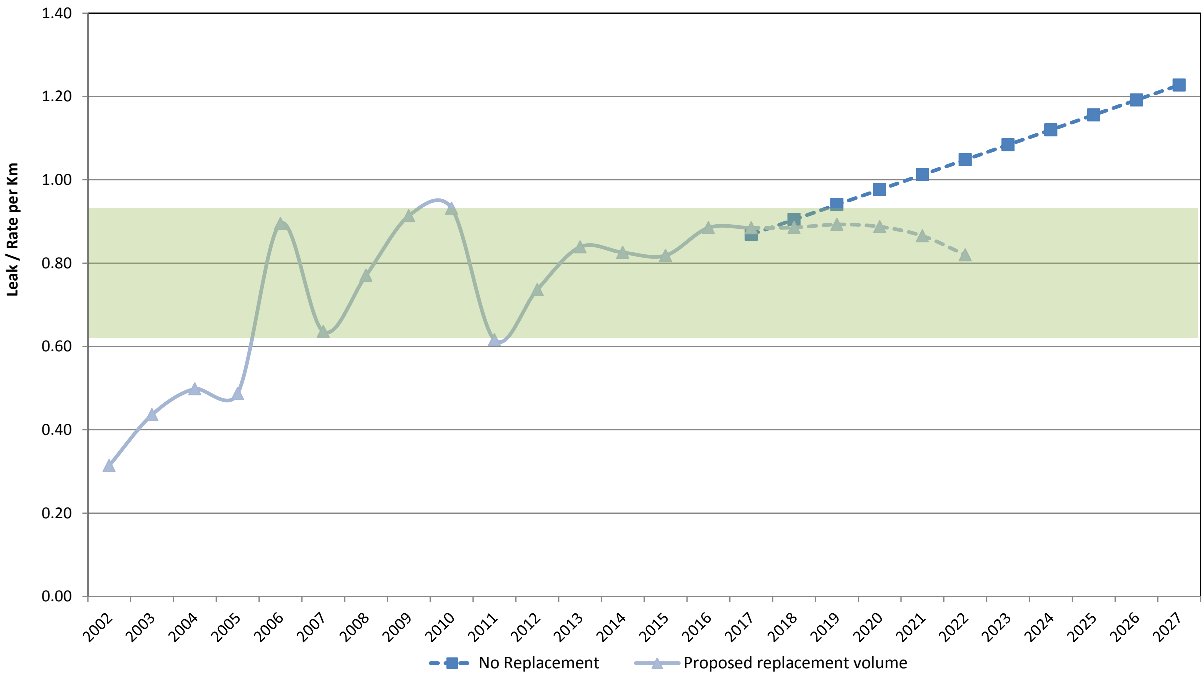


Source: AusNet Services

<u>Low pressure replacement rate</u>

The figure below demonstrates that a replacement rate of 82km p.a. of LP mains keeps existing leakage rates within a band that reflects the minimum and maximum leakage rates over recent years. This replacement rates reflects a “maintain” safety case. It is shown by the dotted line in the chart below, which projects flat leakage rates during the 2018-22 period, followed by declining rates until program completion in 2025.

Figure 6-22: Forecast LP leakage rates under proposed replacement program



Source: AusNet Services

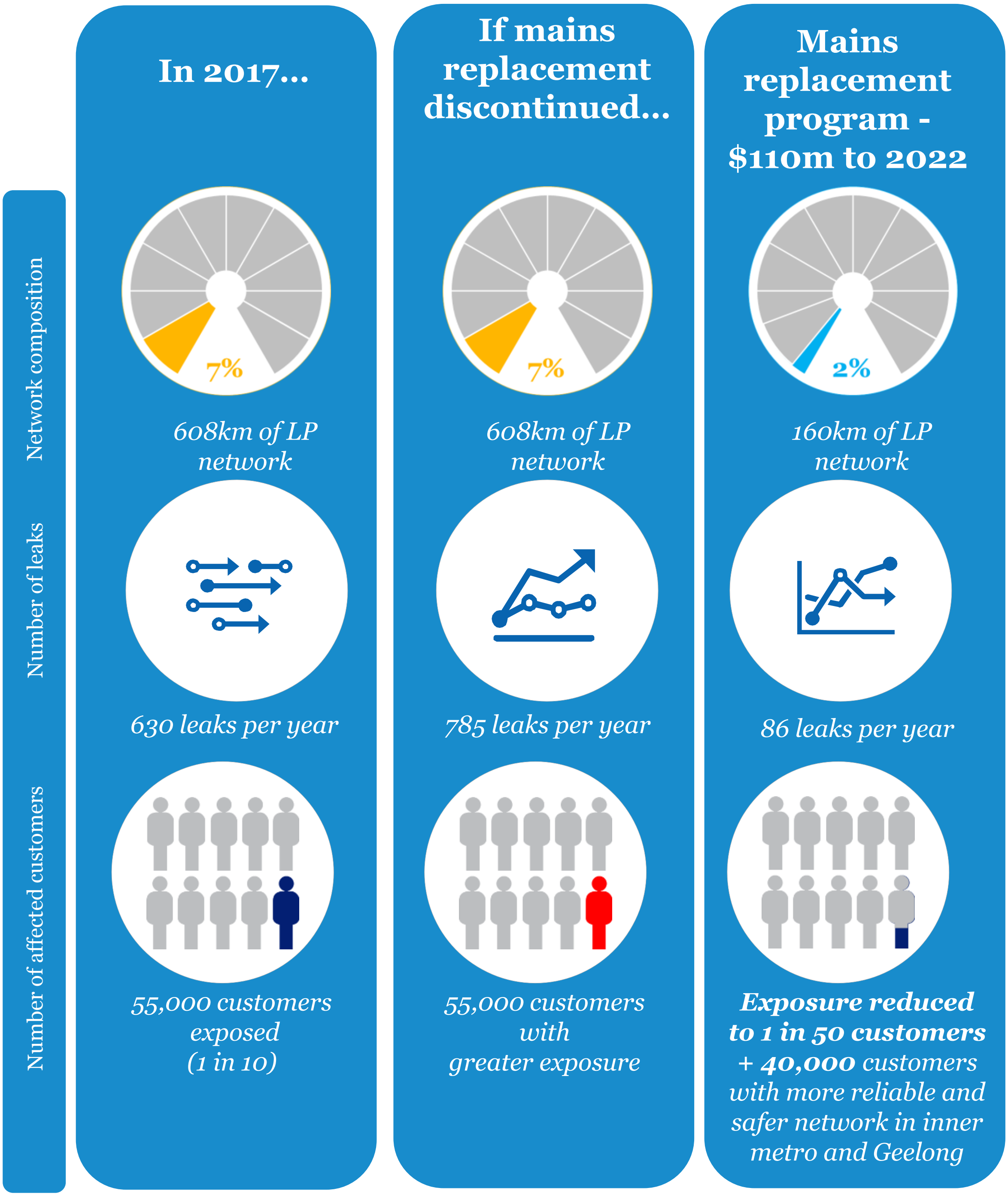
If the LP replacement program is discontinued, leakage rates will increase substantially over the next decade (as demonstrated by the “no replacement” line above), compromising AusNet Services’ safety obligations and its commitment to replace the LP network by 2025. Not only does this represent an unacceptable deterioration in network safety, it will create a bow wave of required asset replacements in the future.

The proposed LP program aims to maintain leakage rates on the LP network through targeted replacement of the worst performing mains. Should replacement not continue at the proposed rate, it is expected that leakage rates would increase, alongside with network risk. This is inconsistent with AusNet Services’ network objective of maintaining safety levels.

Although the leakage rate may remain within the identified band if the replacement rate is reduced, this has implications with the delivery of the replacement at efficient unit rates. A smooth replacement profile helps maintain consistency of work and the skilled workforce delivering the program, allowing for contractor efficiencies and, ultimately, lower unit rates, which is in the long-term interests of consumers. A reduced replacement rate would also compromise AusNet Services’ commitment to replacing the LP network by 2025.

The safety benefits of delivering the proposed LP mains replacement program are depicted in the figure below.

Figure 6-23: Safety benefits of proposed LP replacement



Source: AusNet Services

<u>Medium pressure replacement rate</u>

The MP mains identified for replacement in the next period exhibit a leakage rate of two leaks per section of main in a four-year period. This is the same methodology as was accepted by the AER at the last access arrangement review.[51]

[51] AER, *Access arrangement final decision for SPI Networks (Gas) Pty Ltd 2013-17 – Part 2: Attachments*, March 2013, p. 47

To validate this approach, AusNet Services has undertaken a detailed review of the worst performing material types on its MP network. Around 73% of the MP network demonstrates low and stable leakage rates and presents minimal risk. The remaining 27% of the MP network exhibits leakage rates that are similar to that of the LP network. As demonstrated by the figure below, the mains comprising this 27% are un-protected steel and poly class 250 PE mains.

Figure 6-24: Risk analysis of MP network

Network Indicators	Steel Protected	Steel un-Protected	Poly Class 250	Polyethylene (PE)
Leakage Rate	0.09 Leaks/km	0.76 Leaks/km	0.95 Leaks/km	0.05 Leaks/km
Network composition	44%	21%	6%	29%
Percentage identified as Highest risk for replacement (2 leaks in 4 years)	2.4km (10%) 2km L for L 0.4km Block	13.1km (54%) 13.1km L for L	7.6km (31%) 0.8 km L for L 6.7km Block	1.6km (6%) 1.5km L for L 0.1km Block
Percentage identified for Block replacement	7.9km (23%) 5.6km of uncoated steel	1km (3%)	23km (70%)	0.2km (1%)

Source: AusNet Services

Un-protected steel and poly class 250 PE mains are, therefore, the focus of the proposed MP mains replacement program. Given the additional risk of energy released on an MP leak compared to an LP leak, it is critical that these assets are replaced in order to maintain safety.

The total length of MP proposed to be replaced over the 2018-22 period is 55km. In line with the current period's MP mains replacement program, this comprises both like-for-like replacement and block renewal. These two approaches are described as follows:

- **Block replacement.** Block mains replacement involves the replacement of sizeable areas of mains where network characteristics are suitable i.e. close proximity to HP network and proximity to other mains identified for replacement. The aim of block renewals is to replace a significant proportion of deteriorated, aged and high-risk mains through the open cut and/or insertion methods. The high volume of mains that are replaced under the block replacement approach results in substantial unit rate efficiencies.[52] Using this approach, 37.5km of poor performing mains will be replaced.

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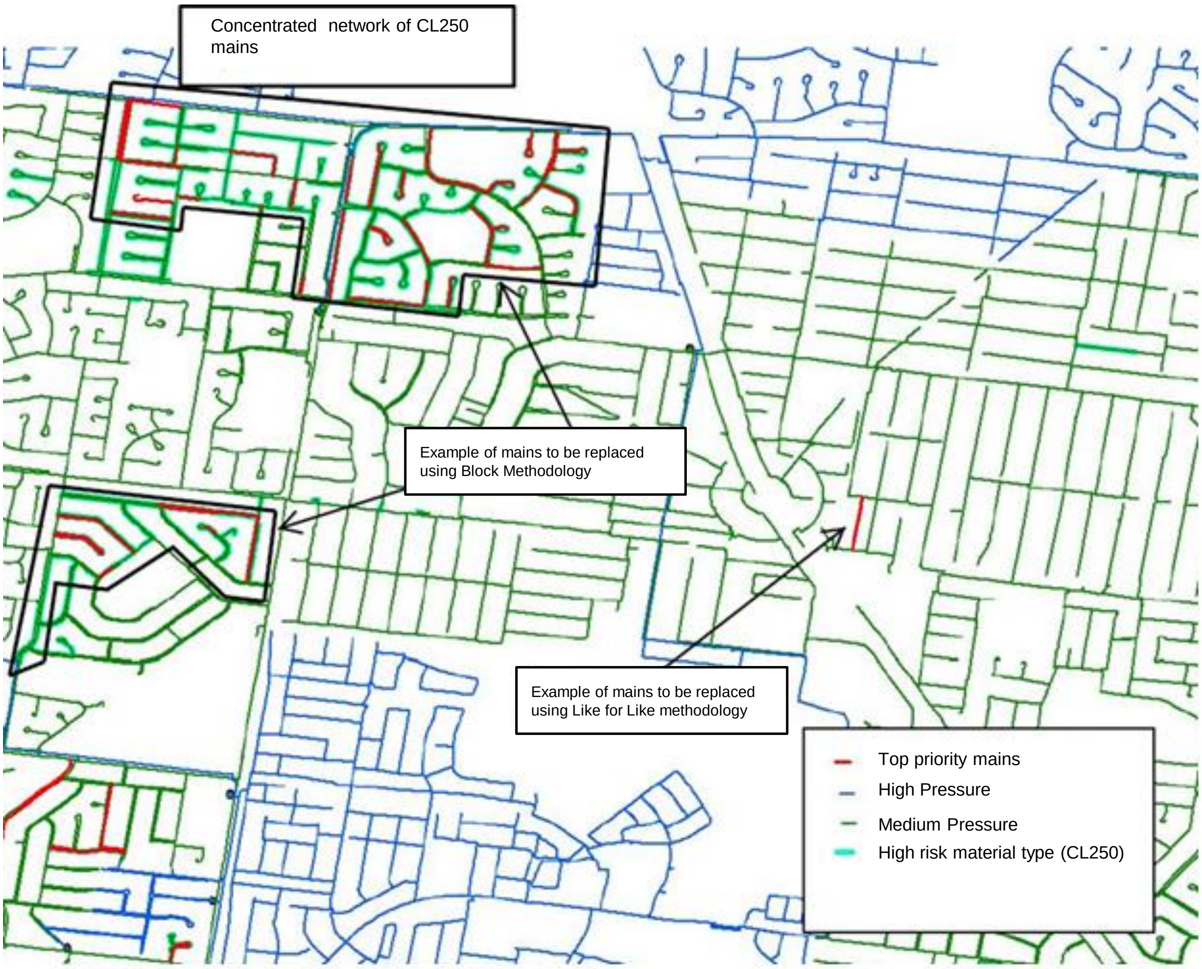
52 For 7.2km of the mains meeting the replacement criteria, the close proximity of a HP feed and the concentration of poor performing MP mains means that block renewal is the most efficient approach for these mains.

- **Like-for-like replacement.** Like-for-like replacement involves replacing existing mains with polyethylene or steel mains of similar capacity. Like-for-like replacement is employed where HP supply is not immediately available and other nearby mains have not been identified as a high priority for replacement. The replacement mains are laid to HP standard (to enable future upgrade of entire network pressure once high pressure is available) but operated at the existing network pressure. Under this approach, 17.5km of mains will be replaced.

The figure below demonstrates, for an individual postcode, the sections of MP main where either block replacement or like-for-like replacement is most efficient.

Figure 6-25: MP replacement approaches



Source: AusNet Services

Step 3: Postcode prioritisation

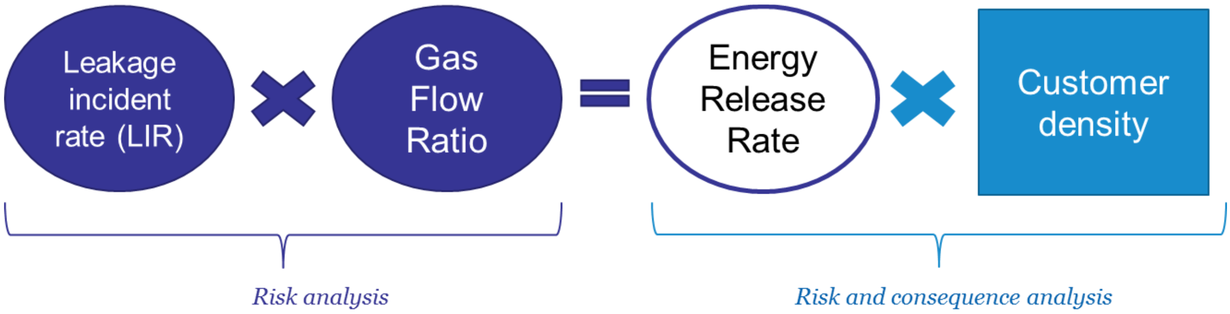
To prioritise the postcodes to deliver the replacement volumes identified above and ensure the greatest safety benefit is achieved at lowest cost, AusNet Services employs a prioritisation methodology that considers both risk and consequence.

Risk is defined for the LP and MP mains in each postcode by determining LP and MP energy release factors. Similar to the risk weighting shown in Table 6-3 above, the energy release factors are equal to the leakage rates multiplied by gas flow ratios of the LP and MP mains in each postcode. For example, a postcode containing MP mains with a leakage rate of 1.5 leaks per kilometre and a gas flow ratio of 2 is assigned an energy release factor of 3 (= 1.5 * 2).

Consequence is set at the population density of each postcode and is intended to measure the number of people that are potentially exposed to harm in the event of a gas leak.

The figure below sets out the components of the postcode prioritisation methodology.

Figure 6-26: Postcode prioritisation methodology



Source: AusNet Services

Once the highest priority postcodes are identified based on risk and consequence, the relevant areas are spatially reviewed to ensure there is enough capacity remaining on the existing network to maintain supply.

The matrix below shows the results of the prioritisation methodology for the LP and MP mains replacement programs. All postcodes in the top right hand corner are the highest priority for replacement because they are of the highest risk and consequence and, therefore, are targeted first in the mains replacement programs.

Figure 6-27: Risk vs Consequence matrix – postcode prioritisation methodology

Source: AusNet Services

LP unit rates

AusNet Services has performed a detailed review of LP mains replacement unit rates, at the individual postcode level. Unit rate analysis has been carried out at the postcode level to ensure the varying costs associated with location specific conditions (e.g. traffic, ground conditions, vegetation) are captured.

The unit rate analysis is broken up into two parts:

- Postcodes where mains replacement has been undertaken in recent years and historical cost data exists; and
- Postcodes where no mains replacement has been undertaken and, therefore, no historical cost data exists.

The methodology to develop unit rates for each of these scenarios is described below.

Historical Unit Rates Exist

Historical project expenditure has been analysed for all postcodes where mains replacement will continue during the next access arrangement period.

From the analysis, a classification system was developed based around the characteristics and complexities of the streets with mains to be replaced. The complexity scaling system ranged from a simple street being given a score of one, to a complex street being assigned a score of five. Complex streets are characterised by heavy traffic, multiple shops, hard surfaces and/or restrictions from local council and other authorities.

To derive a postcode unit rate, the streets from each postcode, together with the associated complexity scores, were assigned a unit rate based on the characteristics of historical projects with equivalent complexity.

No Historical Cost Data Available

Within postcodes with no prior mains replacement, small mains replacement projects were developed for estimation. The estimation takes into account location specific complexities such as ground conditions, traffic management requirements and reinstatement costs. Two projects were developed for each postcode: one within a commercially zoned area and the other in a residential area. This approach results in two unit rates per postcode. Based on the length of the residential and commercial split, a weighted average has been used to derive the postcode specific unit rate.

The table below shows AusNet Services' forecast LP unit rates, which have been built up from postcode-specific unit rates calculated in accordance with the methodologies described above.

Table 6-4: LP mains replacement program unit rates ($/metre, real 2017)

Low pressure	2018	2019	2020	2021	2022
Unit rate	291	276	289	249	239

Source: AusNet Services

Note: Includes real cost escalation

The forecast profile of unit rates reflects the complexity of the underlying postcodes addressed in the proposed program. The unit rate is forecast to be highest in the first few years of the period. This is attributable to the completion of complex inner suburban postcodes in the earlier years, including Kensington, Flemington, Footscray, Yarraville and the Geelong CBB, where unit rates are forecast to exceed $400/metre in some cases. For example, inner metro regions account for 65% of the program in 2018, 31% in 2019 and 0% in 2022.

Once the complex postcodes above are complete, the unit rate is forecast to decrease as country towns are addressed, such as Hamilton and Stawell (unit rates of $160/metre).

Further information on forecast LP unit rates is provided in the Mains and Services Strategy (AMS 30-52) (Appendix 6E), including a detailed breakdown of the underlying unit rates and volumes in each postcode.

MP unit rates

As discussed above, the forecast MP mains replacement program of 55km comprises 37.5km of mains proposed for replacement using the block renewal approach, and 17.5km using the like-for-like approach.

Forecast unit rates for block renewal projects are substantially lower than like-for-like because of the efficiencies achieved by replacing a much larger volume of mains at once. These differences are reflected in the table below.

Table 6-5: MP mains replacement, unit rate comparison (real 2017)

	Block	Like-for-like	Total
Proposed length	37.5km	17.5km	55km
Average unit rate ($/metre)	247	454	314

Source: AusNet Services

The block unit rate of $247 is based on the average unit rate of three projects completed in 2016 with similar characteristics to the projects included in the forecast, where the unit rate ranged from $224 to $291 per metre.

The like-for-like unit rate of $454/m reflects recently completed projects of similar complexity. The unit rate was derived by assigning a complexity ranking of one to five to recently completed projects and applying the unit rates of these projects to proposed projects of the same complexity ranking. Further information on this approach is provided in the Mains and Services Strategy.

The table below shows forecast MP unit rates. The medium pressure unit rate is forecast to increase during the next period as the proportion of like-for-like replacement projects increases.

Table 6-6: MP mains replacement program unit rates ($/metre, real 2017)

Medium pressure	2018	2019	2020	2021	2022
Unit rate	311	293	312	382	362

Source: AusNet Services

Note: Includes real cost escalation

The large increase in the forecast MP unit rate relative to the current access arrangement period is a result of the different nature of the projects included in the forecast program. The historical data – particularly 2013 to 2015 – reflects the abandonment or upgrade of a large proportion of MP mains, which can be delivered at significantly lower unit cost than the mains replacement projects included in the forecast program.

Concluding comments

The forecast capex for replacing LP and MP mains reflects AusNet Services' best assessment of the rate of replacement that would be undertaken by a prudent service provider seeking to respond efficiently to the safety risk posed by aging infrastructure.

AusNet Services considers its proposed mains replacement program is justified on the basis that the capex is necessary to:

i. maintain the safety of services by averting leakage rate increases that would otherwise occur due to deteriorating LP mains;

ii. comply with AusNet Services' obligation under the Gas Safety Act to minimise as far as practicable hazards and risks to the property and safety of the public and of customers arising from gas.

In addition, as mentioned, failure to undertake the expenditure would undermine achievement of the safety elements of the NGO, as well as be inconsistent with AusNet Services' Gas Safety Case and its broader safety obligations.

The forecast capex complies with the requirements of rule 79(1) and is therefore conforming capital expenditure. The proposed capex is the amount that would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

6.5.3 New customer connections

Overview

The Gas Distribution System Code specifies the minimum standards for connection and disconnection of customers to AusNet Services' distribution network. AusNet Services must, upon request and within specified time periods, connect a customer to the distribution network on fair and reasonable terms. The major driver for new customer connections is, therefore, the number of new residential and industrial and commercial (I&C) connections to the network each year.

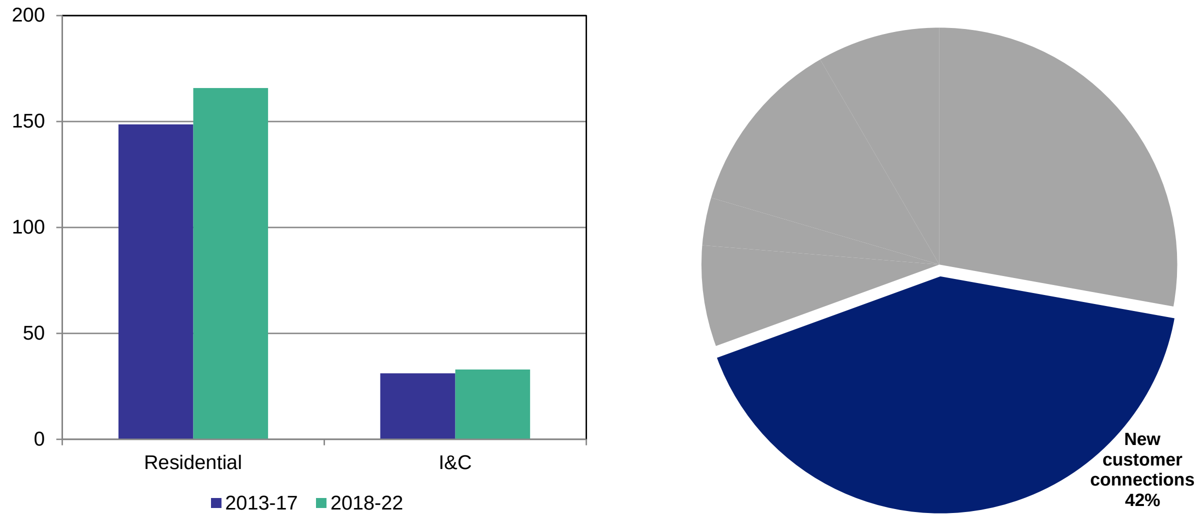
Net growth in customer numbers assists in lowering prices to existing customers by spreading the largely fixed costs of operating the network across a larger customer base. For this reason, residential connections typically do not require an upfront contribution from the customer.

Residential connections account for the majority (around 80%) of new customer connections expenditure. AusNet Services' network contains some of Melbourne's fastest developing urban growth areas. In recent years, the growth areas of Wyndham and Melton have both experienced growth rates exceeding 5% p.a., a trend that is expected to continue. Approximately 90% of new connections are located at network fringes within new estates in Western Victoria.

AusNet Services' actual and forecast new customer connection capex is shown in the figure below. New customer connections capex is forecast to be $198.7 million. This is 10% higher than actual/expected capex in the current period of $179.8 million and comprises 42% of the direct capex forecast. The forecast reflects a changed allocation of overheads which is explained further below. When this is accounted for, forecast new connections capex is 1.2% higher than in the current period, despite a 2.3% increase in the forecast volume of new connections in the next period.

All customer initiated capex forecasts are presented in gross terms. Customer contributions are discussed in Section 6.5.8.

Figure 6-28: New customer connections capex ($m, real 2017)



Source: AusNet Services

Note: Includes real cost escalation; direct capex only; 2016 and 2017 values are estimates.

An increase in new connections capex was experienced in 2016 reflecting the connection of a number of new estates with characteristics that have led to substantially higher than average unit rates. For example, a new estate in Rockbank required a large supply main constructed in steel in order to provide supply to the new estate network. Rock conditions in the area also increased the cost of supplying the estate.

AusNet Services' new customer connections capex is conforming capital expenditure because:

- the expenditure represents the capex a prudent service provider would incur to meet demand for new connections efficiently, and in such a way as to achieve the lowest sustainable cost of providing services;
- the expenditure is necessary to maintain the safety of services as it reflects expenditure required to carry out new connections in accordance with the relevant safety standards;
- the present value of the expected incremental revenue to be generated as a result of the new connections capex exceeds the present value of that capex; and
- the expenditure is necessary to comply with AusNet Services' obligation under the Gas Distribution System Code to offer to connect new customers.

As explained in further detail below, AusNet Services' approach to forecasting new customer connections capex is consistent with these NGR requirements. As explained in section 6.5.8, customer contributions are determined as the gap between the incremental revenue and the costs of connection. This approach is consistent with ensuring that the capex included in the capital base satisfies rule 79(2)(b).

Discussion

New customer connections capex is required to connect new customers to the distribution network. The capital works typically includes the installation of new mains, the gas service pipe from the main to the meter, and the meter itself. AusNet Services' methodology for determining the total capex for connections involves forecasting unit costs and volumes of new connections for both residential and I&C customers.

As explained in Chapter 4, forecast gross customer number growth for the forthcoming access arrangement period is 2.3% per annum, or approximately 83,000 new customers (including new regional town growth). This is attributable to strong household growth and recent trends in the proportion of new dwellings whose owners choose to connect to gas.

This represents a continued strong growth in the rate of new customer connections although slightly moderated from that observed from 2010-15, which has averaged 2.5 per cent per annum. The forecast customer numbers for the forthcoming access arrangement period are substantiated in a report from CIE, which is provided as Appendix 4A.

The forecast unit rates are an average of actual and expected unit rates from 2013-16.

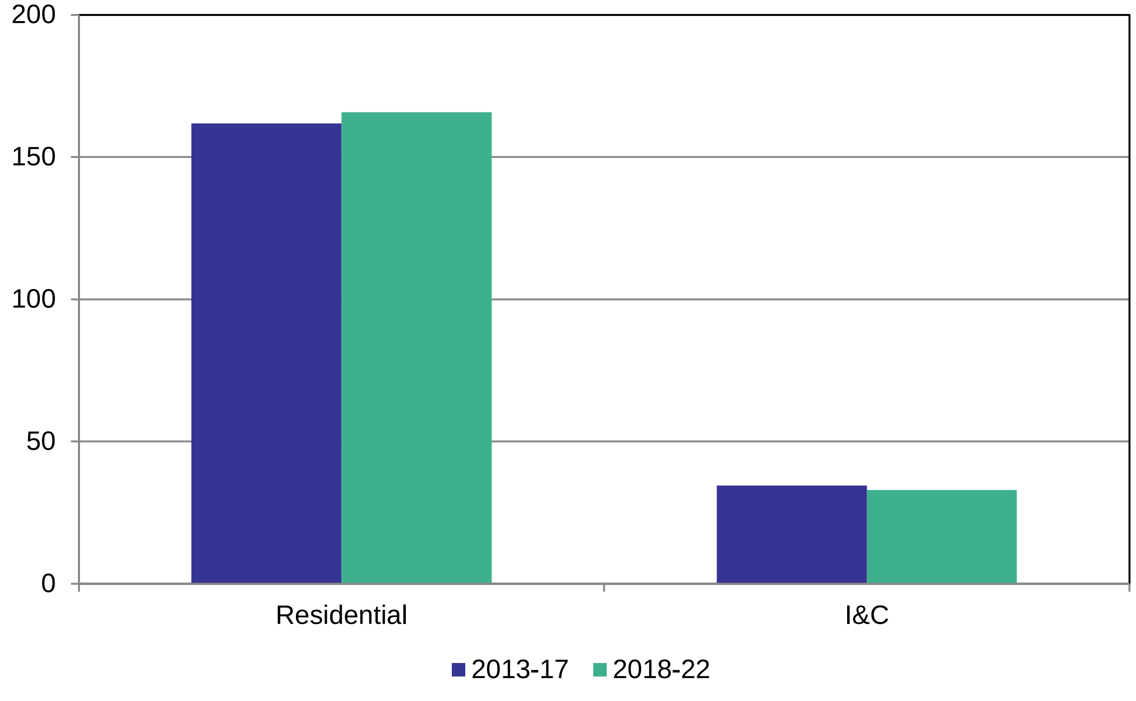
As discussed in section 6.4.4, prior to April 2015 contractor support costs were classified as overheads, rather than as direct costs. Since the deployment of AusNet Services' Enterprise Resource Planning (ERP) system in April 2015, these costs have been allocated to direct costs. This change is also reflected in the overheads forecast for the next access arrangement period, which is 34% lower than actual/expected overheads in the current period.

Accordingly, the 2013-16 cost data used to determine the forecast unit rate has been normalised by allocating support costs to direct capex, to ensure the forecast unit rate will reflect AusNet Services' reported costs going forward. However, the change means the forecast unit rates are higher than the unit rates observed from capex data reported prior to April 2015.

On a like-for-like basis (i.e. when 2013-16 unit rates have been normalised to include support costs as direct capex), the average forecast residential and I&C unit rates of $2,033 and $23,296 (including real cost escalation), respectively, are in line with average unit rates from 2013-16 of $2,029 and $23,509.

Importantly, when compared on a like-for-like basis, forecast new connections capex of $198.7 million is a 1.2% increase on actual/expected capex in the current period of $196.3 million, despite a 2.3% increase in the volume of gross new connections forecast for the next period. This is evidence of the efficiency improvements reflected in AusNet Services' forecast new connections capex, and indicates that the forecast reflects prudent and efficient expenditure.

Figure 6-29: Like-for-like comparison of new customer connections capex ($m, real 2017)



Source: AusNet Services

Note: Includes real cost escalation; direct capex only; 2016 and 2017 values are estimates; 2013-17 capex has been reclassified to include contractor overheads as direct costs.

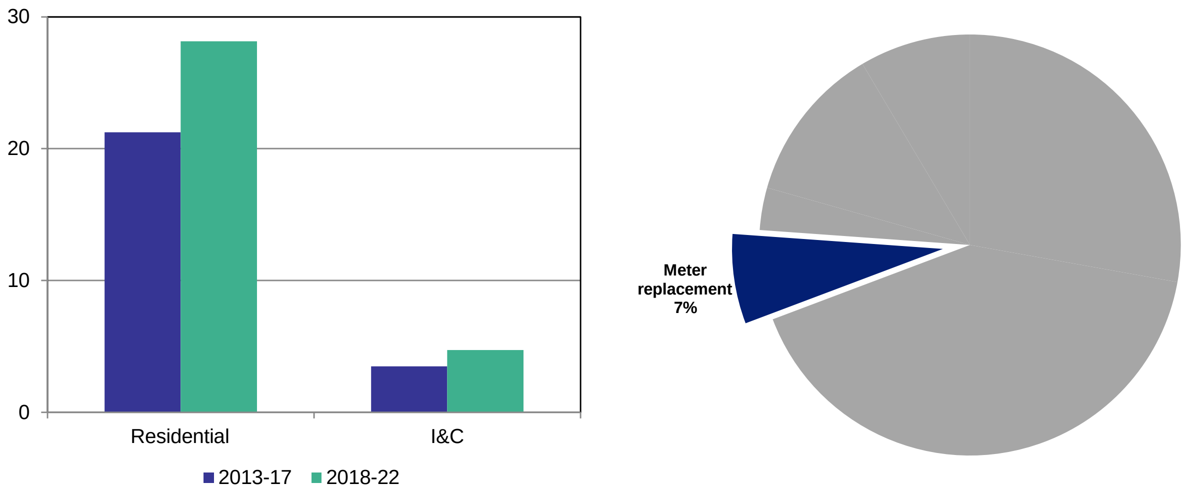
In accordance with rule 74(2), the forecasts and estimates used to establish the new customer connections capex forecast have been arrived at on a reasonable basis and are the best possible forecasts or estimates in the circumstances.

6.5.4 Meter replacement

Overview

AusNet Services' actual and forecast meter replacement capex is shown in the figure below. Forecast meter replacement capex of $32.8 million is higher than actual/expected capex in the current period of $24.7 million. The increase is primarily driven by the replacement, rather than refurbishment, of time expired residential meters to minimise replacement costs over multiple replacement cycles, and to prepare for the introduction of digital metering.

Figure 6-30: Meter replacement capex ($m, real 2017)



Source: AusNet Services

Note: Includes real cost escalation; direct capex only; 2016 and 2017 values are estimates.

As explained below, the meter replacement program is driven by compliance with the Gas Distribution System Code. Therefore, the capex is justified as it is necessary to:

i. maintain the safety of services by ensuring the removal of defective meters from the field to minimise the likelihood of gas meter leaks and, in turn, result in reduced hazards and risk to the public; and

ii. comply with metering obligations or requirements in the Gas Distribution System Code.

The proposed capex is consistent with the amount that would be incurred by a prudent service provider, acting efficiently, as required by rule 79(1). In addition, AusNet Services manages the profile of meter replacement to the extent possible to drive further cost efficiencies.

Discussion

Gas meters are used to measure the volumetric flow rate of gas passing through the device. The volume of energy that passes through the meter is dependent on both gas pressure and temperature at the time of measurement.

AusNet Services has a fleet of 655,602 meters installed, of which 98% are classed as residential meter types and 2% are I&C meter types.

AusNet Services is required by the Gas Distribution System Code to provide an appropriate metering installation at each supply point (i.e. connection) off the distribution network.

AusNet Services must also maintain these installations, replace meters when their field life has expired, and provide metering information to retailers for billing and market settlement purposes.

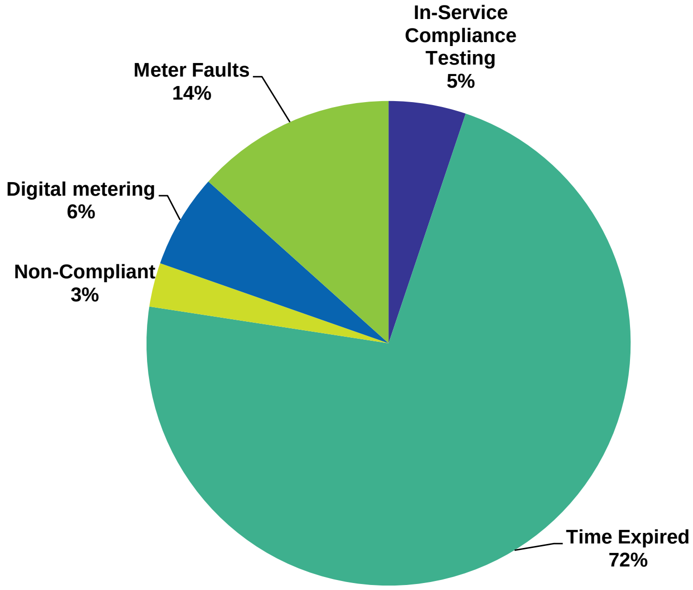
Accordingly, AusNet Services undertakes a range of annual meter testing and replacement programs to ensure ongoing compliance with the Gas Distribution System Code, as summarised below:

- **In-service compliance testing program.** Annual in-service compliance testing is completed on small capacity (<25m^3/hr) diaphragm meter families nearing the end of their in-service compliance periods. Testing follows the requirements of AS/NZS 4944:2006 where meters are tested through either the 'variables' or 'attributes' sampling methods. Outcomes of compliance testing leads to a field life extension (5, 3, or 1 year) or the meter family being removed from the field. The in-service compliance testing program does not extend to I&C meters, which are automatically removed from the field at the end of their in-service compliance periods.
- **Time expired meter replacement program.** Meters at the end of their in-service compliance periods (i.e. useful life) are removed from the field and replaced with new or, in the case of I&C meters, refurbished assets of similar capacity. The replacement, rather than refurbishment, of residential meters has been shown to minimise capital costs over multiple access arrangement periods and, therefore, is an approach that reflects the lowest sustainable cost of providing services. The analysis supporting this approach is presented in AusNet Services' Meter Management Strategy (AMS 30-52) – see Appendix 6G.

  The I&C meter replacement program includes meters at the end of their in-service compliance periods and those outstanding from previous programs. Typical program sizes vary from 300 to 500 meters per annum (around 1% of the I&C meter fleet).
- **Non-compliant meters.** Dedicated programs are established to target and replace meters that remain in the field beyond their in-service compliance periods. In total, non-compliant meters equate to approximately 0.15% of all commissioned meters.
- **Meter faults.** AusNet Services reactively replaces meters that fail in operation. Typically, approximately 1,500 to 1,800 failed meters are replaced annually, equating to approximately 0.3% of the meter fleet.
- **Digital metering investigation.** In light of the possibility that the metering market will shift exclusively to digital metering, AusNet Services has identified the need to investigate the potential implications and benefits of digital metering. In order to optimise performance and understand the full implications of introducing a digital metering fleet, an investigation is proposed to test the capability of the new metering technology. The findings from the investigation will inform AusNet Services of the best direction to support the shift in market and enable a smooth transition for its customers.

The figure below demonstrates that the majority of forecast meter replacement expenditure is attributable to the time expired meter replacement program.

Figure 6-31: Meter replacement capex by program, 2018-22



Source: AusNet Services

AusNet Services' proposed meter replacement program seeks to minimise the costs of meter replacement through:

- a continuation of in-service compliance testing programs;
- balancing meter refurbishment and replacement programs; and
- a 'smoothing' strategy that brings forward the replacement of meter families before the end of their deemed useful life. By avoiding volatility in the (high) volume of meters that are replaced under the time expired program, this approach ensures contractor efficiencies are achieved because it allows for unit rates to be competitively negotiated with meter manufacturers and labour contractors. This reduces unit rates compared to an alternative, 'lumpier' approach and, therefore, reflects the lowest sustainable cost of providing services.

The forecast capex for the next access arrangement period reflects AusNet Services' best estimate of the efficient and prudent capex required to undertake the meter replacement project, based on the available data on failure rates and the age profile of the domestic and I&C meter population. As noted at the beginning of this section, the expenditure is justifiable for the reason that it is required to comply with a regulatory obligation or requirement. Therefore, AusNet Services submits its meter replacement capex forecast is conforming capital expenditure in accordance with rule 79(1).

AusNet Services' Meter Management Strategy (AMS 30-54) – Appendix 6G provides further information on the proposed meter replacement expenditure.

6.5.5 Augmentation

Overview

Under the Gas Distribution System Code, AusNet Services is required to maintain minimum pressure in the gas distribution network remains above prescribed levels (e.g. 140kPa for high pressure networks) to the extent to which it is within AusNet Services' power.[53] One of the reasons for this obligation is to ensure loss of supply to customers is kept to a minimum on cold winter days (peak demand).

Meeting this obligation requires the augmentation of the network through projects such as:

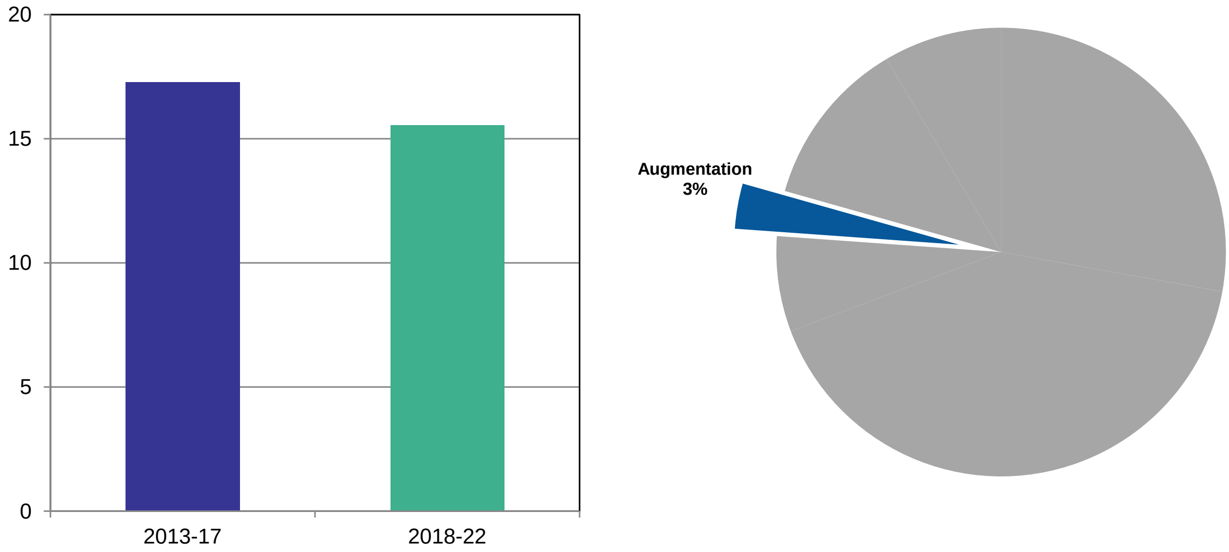
- installation of new supply and reticulation mains;
- upgrade of existing regulating and metering facilities, including auxiliary equipment;
- installation of new regulating and metering facilities, including auxiliary equipment; and
- installation of future supply mains as an enabler for network growth.

The augmentation capex forecast therefore reflects the expenditure required to create new assets or upgrade the capacity of existing assets to achieve appropriate service outcomes for customers. This type of expenditure is often lumpy as it is built up from a small number of discrete projects, such as the upgrade or construction of City Gates.

The program outlined for the forthcoming access arrangement period includes installing new City Gate and Field Regulator facilities, upgrades to existing facilities, and laying mains reinforcements in locations where, due to forecast demand and connection growth, network pressure would reduce below prescribed levels in the absence of these projects.

AusNet Services' actual and forecast augmentation capex is shown in the figure below. Forecast augmentation capex of $15.5 million represents a 10% decrease on actual/expected capex of $17.3 million in the current access arrangement period.

Figure 6-32: Augmentation capex ($m, real 2017)



Source: AusNet Services

Note: includes real cost escalation; direct capex only; 2016 and 2017 values are estimates.

[53] Gas Distribution System Code, clause 2.1(b).

Discussion

As explained in Chapter 4, AusNet Services' gas distribution network has experienced significant growth in demand and customer numbers. This is primarily due to continued strong residential development, particularly in Victoria's west. Specifically, it is expected that over the period to 2023, the network will continue to grow by approximately 2.1% p.a. (in terms of net connections). Some areas of the networks, however, are predicted to exceed this average rate of customer growth due to their position in the key urban growth zones.

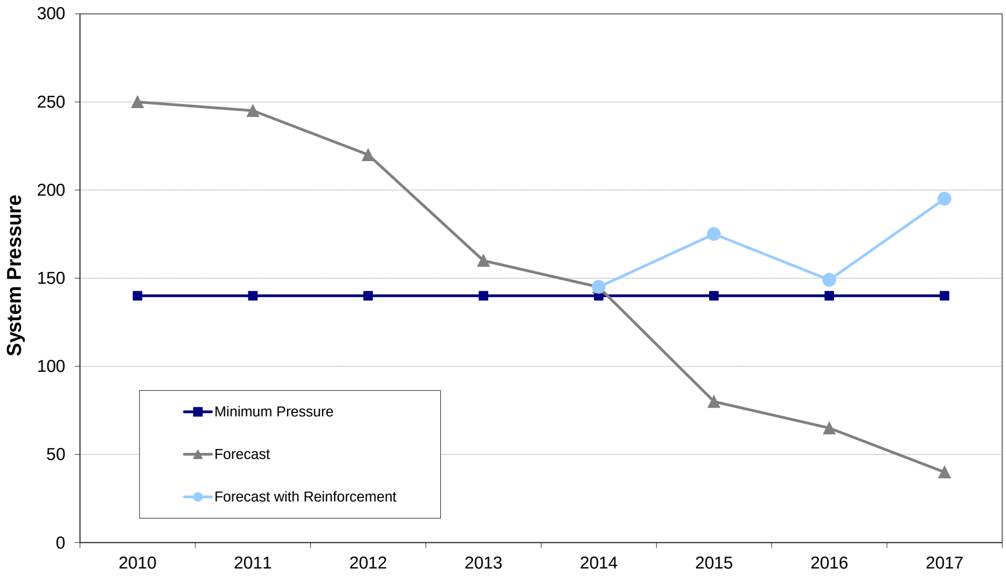
Modelling of forecast gas consumption indicates that augmentation is required to ensure the security of supply and maintenance of fringe pressures in accordance with the Gas Safety Case and the Gas Distribution Code.

AusNet Services identifies necessary augmentation work by simulating the impacts of forecast growth and demand on system pressures, which in turn determines the efficient timing of individual projects.

A major input to augmentation planning is the winter testing program, which is a detailed pressure monitoring program conducted at selected locations across the network during peak load conditions. Winter testing data is analysed and used to ensure the accuracy of network models and to identify the reinforcements required to ensure that network fringe pressures remain above required minimum levels even in peak load conditions. Network models are validated on a periodic basis or as required (i.e. following a major augmentation project on a network).

An example of a typical network analysis is presented in the figure below. It illustrates that failing to undertake planned augmentation work will cause network pressures to fall below 140kPa, which is the minimum pressure mandated by both the Gas Distribution System Code and AusNet Services' Gas Safety Case.

Figure 6-33: Typical performance of a high pressure network (illustrative only)



Source: AusNet Services

Based on the results of the analysis outlined above, AusNet Services' augmentation program for the forthcoming access arrangement period includes installing new City Gate and Field Regulator facilities, upgrading existing facilities, and laying mains reinforcements. Specifically, the program provides for the installation of approximately 27km of mains reinforcements, five new facility installations and seven capacity upgrades. Further details on these projects are set out in the Network Capacity Strategy (AMS 30-17) – Appendix 6J.

AusNet Services' forecast augmentation and reinforcement capex for the forthcoming access arrangement period reflects the outcomes of AusNet Services' detailed modelling and analysis. In particular, the unit rates used to develop the forecast are reflective of the efficient costs incurred in delivering similar projects during the current access arrangement period. Accordingly, the augmentation forecast reflects expenditure which a prudent service provider acting efficiently would undertake, in accordance with good industry practice, to achieve the lowest sustainable cost of providing services.

As already noted, augmentation and reinforcement capex is driven by mandated minimum pressure limits. The proposed capex is therefore justified with reference to rule 79(2)(c)(iii), as the expenditure is required in order to comply with a regulatory obligation or requirement.

6.5.6 Information and Communication Technology (ICT)

Overview

The focus of AusNet Services' Technology strategy, which sets out the information and technology (ICT) program for the forthcoming access arrangement period, is to support it in achieving its Gas Network Objectives, which include:

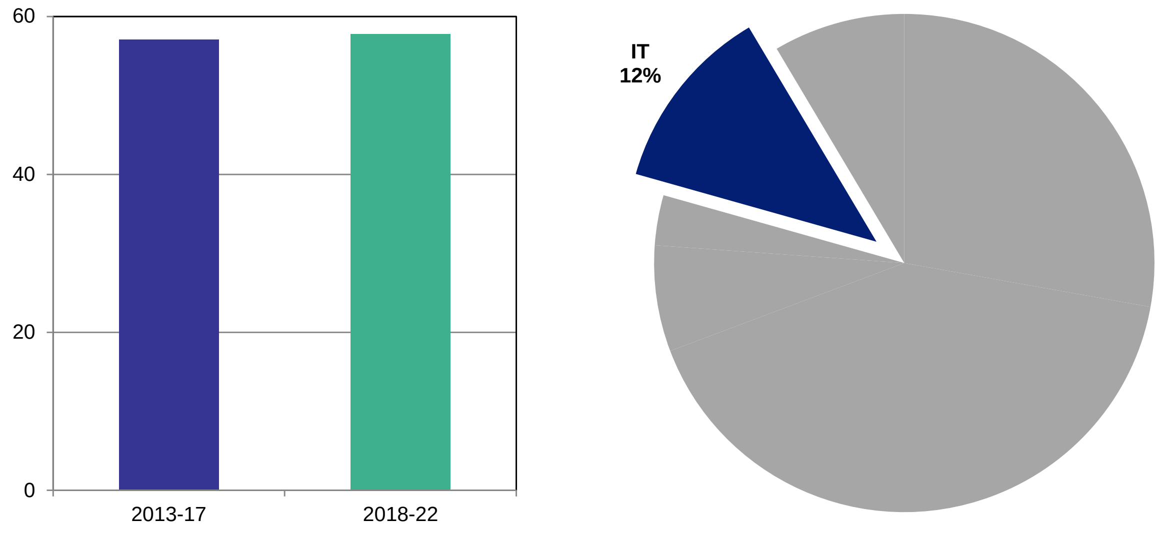
- maintaining network safety in accordance with the gas safety case;
- undertaking prudent and sustainable network investment; and
- delivering valued services to AusNet Services' customers.

The ICT capex forecast is based on the Technology Strategy (Appendix 6A) that has been developed for AusNet Services' electricity and gas distribution and electricity transmission networks. This is focused on lifecycle replacement to keep existing systems operating, rather than undertaking significant investment in new capabilities.

AusNet Services' actual and forecast ICT capex is shown in the figure below.

Forecast ICT capex of $57.8 million is a 1% increase on actual/expected capex of $57.1 million in the current period. ICT capex comprises 12% of the direct capex forecast.

Figure 6-34: ICT capex ($m, real 2017)



Source: AusNet Services

Note: Includes real cost escalation; direct capex only; 2016 and 2017 values are estimates

Discussion

Over the forthcoming access arrangement period, ICT capex will be focused on:

- consolidating business functions into the EAM/ERP solution to leverage the benefits of the enterprise foundation implemented in the current access arrangement period; and
- completing high priority lifecycle replacement projects.

There are seven domains under which key programs of work will be undertaken:

- **Network Management** – aims to maintain network reliability and performance through automation of monitoring and responses, and performance visualisation; data consolidation; and safety;
- **Information Management** – aims to ensure robust management of networks and assets through improved data and analytics capabilities;
- **Metering and Customer Services** – aims to meet customer demand for information and communication through a centralised customer relationship management solution and enhanced digital capabilities;
- **Works and Asset Management –** aims to maintain network reliability by leveraging the EAM/ERP investment to rationalise, consolidate and optimise business processes;
- **Information Security** – aims to protect the distribution network, and customer and business information through enhanced 'protect and detect' capabilities;
- **Corporate** – aims to fully leverage the EAM/ERP solution including providing a secure and consistent view of data throughout the organisation; and
- **Information Technology** – prudent lifecycle refreshes of storage, enterprise server, desktop and laptop fleets; corporate network and communications; and investments in storage and visualisation enablement.

ICT will continue to play an increasingly critical role in supporting the gas network. AusNet Services will invest in key programs of ICT capital works to leverage and extend the existing ICT capabilities and deliver high quality services to customers. For example, a substantial investment in data storage capabilities is being proposed aimed at efficiently meeting the increasing storage requirements of customer and regulatory data. Further investment is being proposed to conduct a lifecycle refresh of customer relationship management (CRM) applications to ensure they continue to be supported by vendors and receive the latest patches and bug fixes.

The benefits and outcomes expected from the proposed Technology programs of work are:

- Support the achievement of corporate, business, technology, network and asset strategies;
- A simplified IT landscape through consolidation of systems into the EAM/ERP solution; and
- Creation of a single source of truth and end-to-end process view.

The forecast ICT capex will provide AusNet Services with essential information management and analytical capability to enable it to:

- maintain the safety and integrity of services;
- comply with AusNet Services' applicable regulatory obligations; and
- maintain AusNet Services' capacity to meet customers' needs for pipeline services.

Accordingly, the ICT capex forecast is justified as it accords with the requirements of rule 79(2)(c). The forecast has been developed in accordance with AusNet Services' ICT costing methodology, which ensures that project cost estimates reflect prudent and efficient costs and, hence, satisfy the requirements of rule 79(1)(a). Further information is provided on this methodology in the Appendix 6A – Technology Strategy.

6.5.7 Other capex

Overview

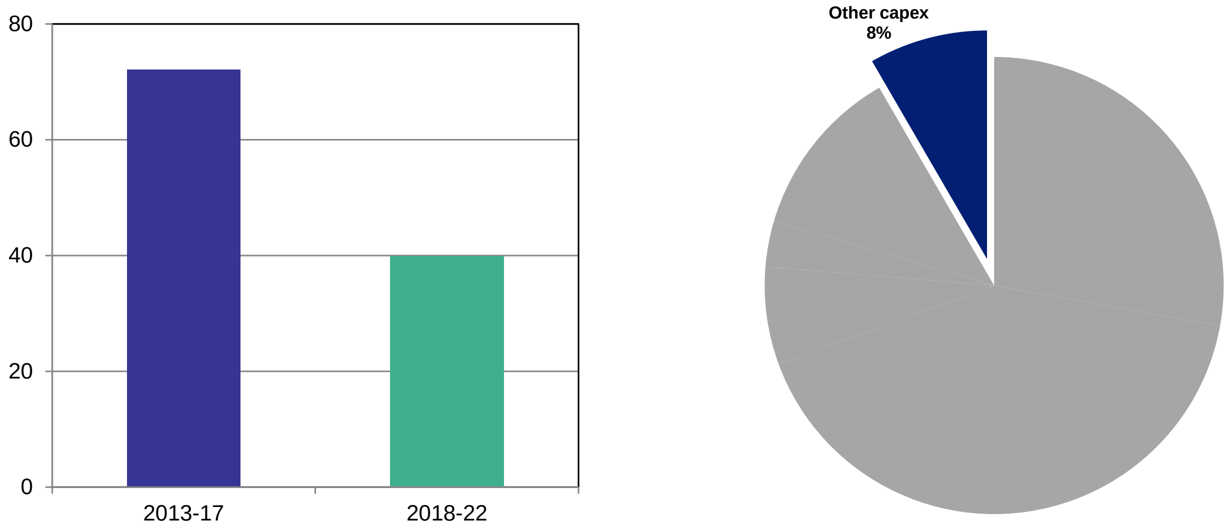
Forecast 'other' capex is $39.9 million, accounting for 8% of the capex forecast. This is a 46% reduction compared to the current access arrangement period, which is significantly higher than the approved allowance due to the delivery of customer-funded alteration projects in 2013 and 2014.

Other capex includes all capex that does not fall into the capex driver categorises discussed above (excluding overheads). This includes:

- major network alterations initiated by third parties;
- consumer regulator replacement programs;
- heater & network regulator replacement programs;
- SCADA and cathodic protection capital works;
- general non-network expenditure (e.g. motor vehicles, telecommunications equipment, etc.).

AusNet Services' actual and forecast other capex is shown in the figure below.

Figure 6-35: Other capex ($m, real 2017)

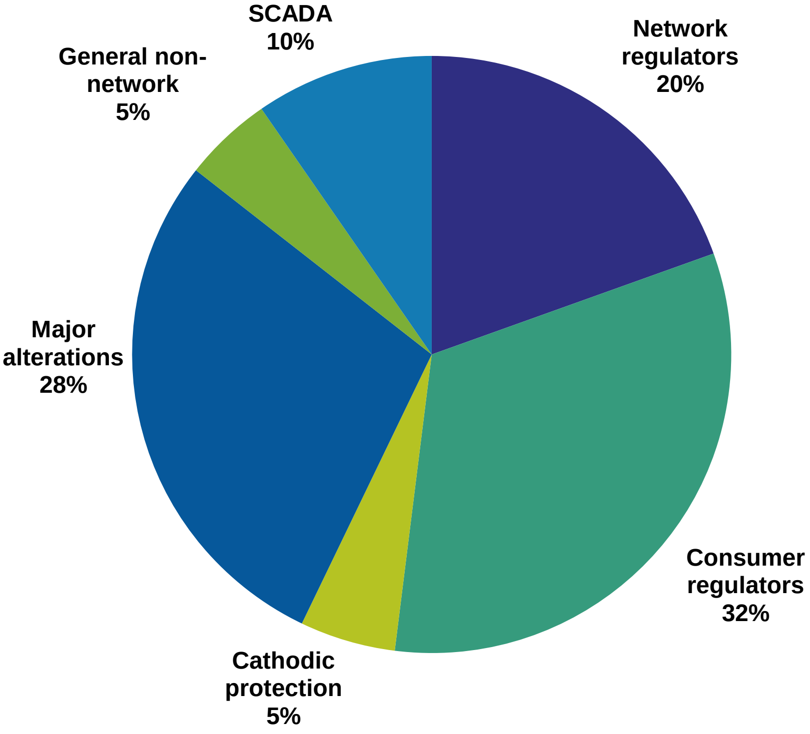


Source: AusNet Services

Note: Includes real cost escalation; direct capex only; 2016 and 2017 values are estimates.

The figure below, which provides a breakdown of the other capex forecast, shows the majority of other capex is attributable to major alterations and network and consumer regulators.

Figure 6-36: Breakdown of other capex forecast ($m, real 2017)



Source: AusNet Services

Note: Other capex comprises

Discussion

Major alterations

Customer-requested major alterations are alterations to gas assets requested by customers and other authorities. The alteration may be in the form of relocation, installation, reinforcement, enlargement, or replacement of gas assets. The most common reason for major alterations is major roadwork, such as freeways. Expenditure on major alterations has no consistent underlying economic driver, and typically fluctuates due to the random nature of activities such as road construction projects that affect gas network assets but which are generally not planned having regard to the impact on gas assets.

Forecast major alteration capex of $2.3 million per annum is equivalent to the long-term historical average, excluding major gifted asset projects that have occurred in 2013 and 2014. Should projects of this nature occur during the next access arrangement period, AusNet Services will seek to recover the full cost of these projects directly from the relevant customer.

For the purposes of forecasting major alterations capex, AusNet Services has assumed that the customer requesting the works will contribute 100% of the costs required to meet the specifications of the request. This ensures that the remainder of the customer base does not contribute to the cost of these projects in the form of higher tariffs.

Customer contributions are discussed in the following section.

Consumer regulators

Each customer supply point across the distribution network features a regulator that reduces the gas to a usable pressure as per the customer demand. AusNet Services has approximately 663,500 connection points (655,000 domestic & 16,000 Industrial and Commercial), each with a dedicated regulating facility.

Forecast capex to replace consumer regulators during the next access arrangement period is approximately $2.6 million per annum. This comprises the following replacement programs:

- **Industrial and commercial 'Fisher 298' type regulator replacement.** The Fisher 298 regulators are a higher capacity gas regulator usually included on Industrial and Commercial type installations. These regulators are now obsolete, and the spare parts required for 6-yearly maintenance are increasingly difficult and expensive to source. As such, their replacement with a modern equivalent is prudent expenditure as it will prevent maintenance costs increasing over the long-term.
- **Proactive domestic regulator replacement.** Historically, domestic regulators have only been replaced when they are faulty (i.e. on a reactive basis) or when a customer has reported weak or no gas supply. However, this approach is leading to increased safety risks on the network because the number of leaking regulators is increasing. Consequently, AusNet Services is proposing to proactively replace domestic regulators. This requires replacing domestic regulators concurrently with the replacement of certain meter families which are being proactively 'retired'. This approach significantly reduces the installation cost of new domestic regulators due to the efficiency achieved by simultaneously replacing both the regulator and meter and, therefore, is a more efficient solution than continued reactive replacement of regulators.
- **Reactive domestic regulator replacement.** The benefits of the proactive replacement program explained above are expected to take a number of years to flow through to a reduced need for reactive replacement. Consequently, the forecast capex for reactive domestic reactive replacement reflects historical failure and unit rates.

Network regulators

A pressure regulator is a valve that automatically opens or closes to match the flow of gas through the regulator to the demand for gas placed on the downstream network. The regulator does this by maintaining a predetermined set pressure downstream of the regulator. Pressure regulators are used throughout the network to maintain safe and useable pressures.

There are three broad classifications of network pressure regulating stations:

- City Gates that regulate gas into AusNet Services' high-pressure and transmission pressure networks from Victoria's transmission system.

Field Regulators that feed gas into AusNet Services' high-pressure and medium-pressure distribution networks. The facility is either supplied by AusNet Services' transmission or high-pressure distribution network.

- District Regulators that control the pressure levels in the low-pressure reticulation system by reducing either high or medium pressure to low-pressure.

Capital programs identified through maintenance or operational deficiencies are detailed within AusNet Services' Regulating Facilities (Network) Strategy (AMS 30-51) – Appendix 6D. Capital requirements (upgrade or replacement) due to capacity constraints are captured within AusNet Services' Network Capacity Strategy (AMS 30-17) – Appendix 6J.

Forecast capex for network regulators is around $1.6 million per annum. The following factors underpin this forecast:

- Asset Replacement: Proactive replacement of aged and/or obsolete regulators operating at high, medium and low pressures where parts are no longer manufactured by the Original Equipment Manufacturer (OEM);

- New Facilities: Installation of new regulating stations to improve downstream asset integrity; and
- Asset Safety: Programs to increase public and/or employee safety. Examples include the program to relocate regulating stations underground in response to urban growth encroachment.

SCADA

AusNet Services uses a Supervisory Control and Data Acquisition (SCADA) system to monitor and control assets across the network from the transmission system to the network fringe. The SCADA system provides data on the real-time performance of the assets, and data for the long-term evaluation of gas demand and network performance to identify potential system deficiencies.

The SCADA system comprises Remote Telemetry Units (RTUs), a radio and telephone communications system, and a host computer system supporting the Customer Energy Operations Team (CEOT), which operates 24 hours a day, 365 days a year. Three classes of site are covered by the SCADA system:

- Controlled regulator sites where the SCADA system maintains a set fringe pressure by altering gas outlet pressures, either automatically or via remote manual control from the control room;
- Monitored regulator sites where outlet pressures are adjusted by field personnel and SCADA is used to alert the control room operators if pre-determined pressure alarm limits are breached;
- Fringe sites where SCADA is used to monitor the pressure at the lowest-pressure extremity of the system, allowing control room operators to react to pre-determined alarm limits.

Alarm limits and conditions have been set on the SCADA system which, when triggered, indicate abnormal conditions within the network. The limits, conditions, and required responses are reviewed annually following each winter peak.

Asset replacements are also planned when existing equipment reliability or capability is presenting significant risks. The SCADA system has an effective life driven by factors such as functionality, environment, technological obsolescence and the initial quality of the hardware.

The overall key drivers of SCADA capex include network growth, improved consistency in network operation and fringe pressures, reduction in identified network risks, regulatory compliance and improved operating costs through greater automation.

Over the forthcoming access arrangement period AusNet Services' forecast SCADA capex is on, on average, $0.8 million per annum, and comprises the following:

- End-of-Life Replacement – replacement of obsolete equipment with current technology;
- Common Earthing Installation – all identified city gate sites to have common earthing installed;
- Slam Shut Indicator Installation – installation of slam shut indicators on B leg of identified sites;
- Cabinet Circuit Breaker Installation – installation of cabinet circuit breakers on identified RTU cabinets;
- Fringe RTU installation / relocation – as the size and flow characteristics of networks change, the fringe points of existing networks also change. Existing fringe points will be relocated to more accurately control and monitor the network; and
- Innovation – this work involves implementing remote pressure loggers in order to obtain greater data accuracy on network performance for input to network modelling.

The forecast capital expenditure for SCADA reflects AusNet Services' best assessment of the cost of delivering the above initiatives. AusNet Services considers that the work program and the resulting capital expenditure represent a prudent and efficient level of required expenditure.

The Gas SCADA Strategy (AMS 30-57) and Plant Strategy Communication Systems (AMS 30-59) provide further details of planned SCADA capex (Appendix 6I and 6L respectively) for the forthcoming access arrangement period.

The proposed SCADA capex is necessary to:

- maintain safety, by enabling AusNet Services to operate the system in a way that mitigates the hazards and risks to the safety of the public, and the risk of property damage associated with gas supply; and
- maintain the integrity of services by ensuring that we have the SCADA systems we require in order to operate the gas distribution network reliably, safely and efficiently.

Accordingly, the SCADA capex forecast is justified on the grounds set out in rules 79(2)(c)(i) and (ii). It represents expenditure that a prudent service provider would incur in, acting efficiently, in accordance with good industry practice, on its assets to ensure it can achieve the lowest sustainable cost of providing services.

Cathodic protection

AusNet Services utilises cathodic protection, and associated systems to actively defend against corrosion of its buried steel assets within its gas transmission and distribution networks.

The gas transmission and distribution system features 183 active cathodic protection units of various current outputs that protect 2,683 km of steel pipeline and mains from corrosion. All 183 km of AusNet Services' transmission network is fully cathodically protected. The steel mains of the distribution systems are also largely shielded; however, 398 km of isolated steel main is dispersed within the distribution network that cannot be effectively protected due to electrical isolation. Protection is also aided by approximately 851 magnesium sacrificial anode bed sites which provide low levels of cathodic protection current. Earthing and stray current drainage sites, which remove unwanted electrical interferences, are also integral to the cathodic protection system operations.

A necessary adjunct to the cathodic protection systems are the numerous electrical isolation and surge protection devices used throughout the network. These assets provide electrical isolation of the steel assets to allow for targeted cathodic protection. The systems also aid in providing protection for field personnel from electrical surges.

Cathodic protection capex requirements are primarily driven by the potential survey program used to monitor network performance. If the protection level for a specific area is found to be below the desired level, and operation of the local cathodic protection unit is confirmed, then rectification work will result.

Cathodic protection systems have a variable useful life that is dependent on factors such as the environment in which they are located, the condition of the main they are shielding, and other environmental factors. As such, the existing systems require routine capital investment to ensure their correct function.

The cathodic protection capex forecast for the next period is $0.4 million per annum. The underlying capital programs are detailed in AusNet Services' Gas Corrosion Protection Strategy AMS 30-56 (Appendix 6H) and align with the following principles:

- Corrosion Protection: The corrosion protection work program includes the installation of additional corrosion protections units (CPUs), upgrading of existing systems, installation of sacrificial anodes and replacing those that have been depleted. This program ensures cathodic protection levels are maintained in accordance with AusNet Services' Gas Safety Case, reducing corrosion rates and hence the safety risk of corrosion induced leakage.

- Surge Protection: The surge protection programs consist of installing surge protection to AusNet Services' below ground installations. This work mitigates the chances of electrical surges and hence the dangers of electrocution, equipment damage and ignition of fugitive emissions that are associated with them.

The proposed corrosion protection capex for the forthcoming access arrangement period satisfies the requirements of conforming capital expenditure.[54] It comprises prudent and efficient expenditure which is justified on the basis of rules 79(2)(c)(i) and (ii) because it:

- mitigates the hazards and risks to the safety of the public, and the risk of property damage associated with gas supply;
- contributes to AusNet Services' regulatory obligations and requirements under the Gas Safety Act and Gas Safety Case to minimise such risks as far as practicable; and
- is required to maintain the integrity and reliability of services.

6.5.8 Customer contributions

Customers contribute to the cost of works to connect to the network where the present value of the increased network revenue, resulting from the new connection, is less than the present value of the additional costs of that connection. It is, therefore, necessary to reduce the forecast capex by the forecast customer contributions. This standard approach ensures that the capital base only increases by the amount of capex that is funded by the business. It also means that most residential connections are carried out without requiring a contribution from the customer.

For the purposes of forecasting customer contributions for large customer-initiated projects (either connecting new Tariff D customers or carrying out major alterations to the existing network), AusNet Services has assumed that the customer requesting the works will contribute 100% of the costs required to meet the specifications of the request. Because these large customer projects are not added to the capital base, the remainder of the customer base does not contribute to the cost of these projects in the form of higher tariffs.

For the connection of other I&C customers, AusNet Services' forecast reflects the historical customer contributions as a percentage of total gross I&C connections capex. Specifically, for each project type, AusNet Services has adopted the average percentage from 2012 to 2015 (25%) and applied this percentage to the gross I&C connections capex for each year in the forthcoming access arrangement period.

The above methodology results in a forecast of customer contributions of $26.4 million, as shown by the table below.

Table 6-7: Forecast customer contributions ($m, real 2017)

	2018	2019	2020	2021	2022	2018-22 total
Customer contributions	5.1	5.2	5.3	5.4	5.4	**26.4**

Source: AusNet Services

AusNet Services considers that, given customer contributions are sought from customers where the present value of incremental costs is higher than the present value of incremental revenue, its forecast customer-initiated capex is conforming capital expenditure under rule 79(1).

[54] Rule 79(1).

6.6 Total capex forecast

The table below presents the total gross and net capex forecasts of $513.1 and $486.7 million, respectively, for each year of the forthcoming access arrangement period.

Table 6-8: Total capex forecast ($m, real 2017)

Driver	2018	2019	2020	2021	2022	2018-22 total
Mains replacement	31.1	28.6	30.2	22.0	21.0	**132.9**
New customer connections	38.1	38.9	39.9	41.2	40.6	**198.7**
Meter replacement	6.2	6.8	6.4	6.7	6.7	**32.8**
Augmentation	6.7	2.9	0.6	2.0	3.3	**15.5**
IT	13.3	14.5	12.5	10.7	6.8	**57.8**
Other capex	7.8	8.1	7.5	8.2	8.3	**39.9**
Overheads	7.0	7.0	7.1	7.2	7.2	**35.5**
Total gross capex	**110.3**	**106.8**	**104.2**	**97.9**	**93.9**	**513.1**
Contributions	-5.1	-5.2	-5.3	-5.4	-5.4	**-26.4**
Total net capex	**105.2**	**101.6**	**98.9**	**92.5**	**88.4**	**486.7**

Source: AusNet Services

6.7 Supporting documents

The following documents provide further information on AusNet Services' capex forecasts:

- Technology Strategy – Gas Distribution Network (Appendix 6A)
- Gas Maintenance Plan (Appendix 6B)
- Gas Safety Case Summary (Appendix 6C)
- Network Regulator Strategy, AMS 30-51 (Appendix 6D)
- Mains and Services Strategy, AMS 30-52 (Appendix 6E)
- Consumer Regulators Strategy, AMS 30-53 (Appendix 6F)
- Gas Meter Management Strategy, AMS 30-54 (Appendix 6G)
- Gas Corrosion Protection Strategy, AMS 30-56 (Appendix 6H)
- Supervisory Control and Data Acquisition (SCADA) Strategy, AMS 30-57 (Appendix 6I)
- Network Capacity Strategy, AMS 30-17 (Appendix 6J)
- Gas Digital Metering – Program of Works (Appendix 6K)
- Communications Systems Strategy, AMS 30-59 (Appendix 6L)

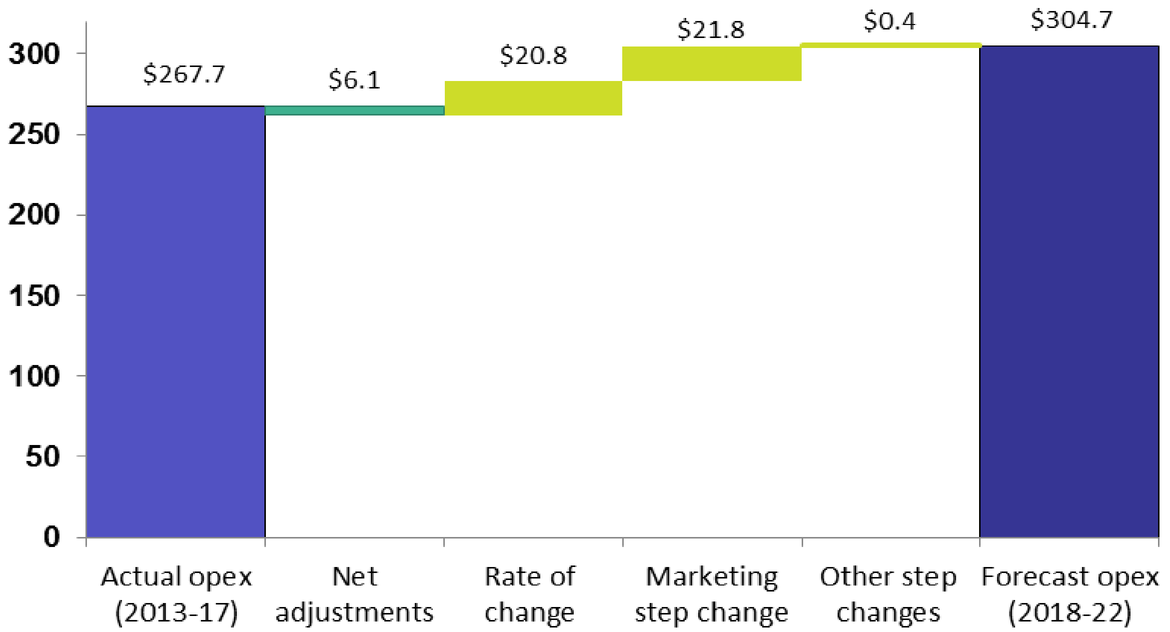
7 Operating Expenditure Forecast

7.1 Key points

- AusNet Services' operating expenditure (opex) forecast delivers critical activities necessary to support the operation and maintenance of our assets, and the continued efficient management of our gas network.
- Using the revealed cost methodology, AusNet Services has forecast **$304.7m** of opex for the 2018-22 access arrangement period (real $2017).
- 2015 is the 'base year' for forecasting purposes as it is our most recent audited year of opex and the efficiency of the expenditure can be inferred from the following:
    - AusNet Services' opex is subject to the incentive properties of the Efficiency Benefit Sharing Scheme (EBSS) and AusNet Services has successfully reduced opex in response to this incentive during the current access arrangement period; and
    - independent benchmarking analysis indicates that AusNet Services is one of the most efficient gas networks in Australia.
- The opex forecast includes a step change for marketing expenditure aimed at increasing gas usage and delivering lower long term network prices for all customers. This initiative is expected to have a positive return on investment that will be in the long term interests of our customers. Maintaining and expanding AusNet Services' customer base and average demand enables efficient costs to be shared across a larger number of customers, thus limiting the need for price rises in the future.

The key components of AusNet Services' total forecast opex are shown in the figure below alongside the actual opex in the current period. The increases to opex are driven by step changes, output growth and real price growth.

Figure 7-1: Opex forecast ($m, real 2017)



Source: AusNet Services

Note: Includes debt raising costs

7.1 Introduction and chapter structure

Rule 72(1)(e) states that the access arrangement information for a full access arrangement proposal must include a forecast of opex over the access arrangement period and the basis on which the forecast has been derived. Rule 74(2) states that a forecast or estimate must be arrived at on a reasonable basis, and must represent the best forecast or estimate possible in the circumstances.

Rule 91(1) requires:

> *"Operating expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services."*

The AER has limited discretion in relation to its approval of forecast opex, as explained in rule 40(2):

> *"If the Law states that the AER's discretion under a particular provision of the Law is limited, then the AER may not withhold its approval to an element of an access arrangement proposal that is governed by the relevant provision if the AER is satisfied that it:*
>
> *(a) complies with applicable requirements of the Law; and*
>
> *(b) is consistent with applicable criteria (if any) prescribed by the Law."*

In accordance with the NGR requirements, the information presented in this chapter demonstrates that AusNet Services' opex forecast:

- has been arrived at on a reasonable basis, and represents the best possible forecast in the circumstances, consistent with Rule 74(2); and
- is consistent with the expenditure that would be incurred by a prudent service provider acting efficiently, to achieve the lowest sustainable cost of delivering pipeline services, in accordance with Rule 91(1).

This chapter is structured as follows:

- Section 7.2 outlines the forecasting methodology used to derive the opex forecast;
- Section 7.3 explains the derivation of base year operating costs and the suitability of the base year;
- Section 7.4 summarises the forecasts for the components of the rate of change formula, and the bases for those forecasts;
- Section 7.5 summarises step changes to opex;
- Section 7.7 sets out the forecast of debt raising costs; and
- Section 7.7 presents the total opex forecast for the 2018-22 access arrangement period.

7.2 Forecasting Methodology

AusNet Services has principally adopted the revealed cost approach to forecast its opex for the forthcoming period, which is the AER's preferred methodology. It builds the forecasts from an efficient base year, which is typically the latest year for which audited data is available.

At a high level, AusNet Services' opex forecast has been developed by:

- using revealed 2015 expenditure to determine efficient base year costs;
- applying a rate of change to base year costs to reflect expected changes in price and output growth, and productivity;
- incorporating step changes, including one-off opex costs and marketing activities;
- understanding stakeholder attitudes and expectations on opex; and
- forecasting debt raising costs on a category-specific basis.

AusNet Services' approach largely aligns with the AER's Expenditure Forecast Assessment Guideline. AusNet Services considers that the base-step-trend approach (which the AER now refers to as the revealed cost method) set out in the Guideline represents an appropriate methodology to forecast the majority of the opex requirements for an efficient service provider.

The revealed cost method recognises that the EBSS provides strong incentives for network businesses to deliver efficient opex outcomes. The AER verifies the efficiency of the base year opex through benchmarking analysis. Section 7.3 demonstrates that AusNet Services' actual expenditure for 2015 is efficient, and therefore, 2015 is an appropriate base year for the purpose of forecasting opex for the 2018-22 access arrangement period.

AusNet Services has applied some adjustments to the base year opex to remove debt-rising costs, which it considers are more appropriately forecast using a category-specific forecast. This adjustment is necessary to ensure the base year reflects future recurrent expenditure.

AusNet Services applied the AER's standard rate of change formula to the adjusted base year opex to capture the impact of price changes, output growth and productivity over the forthcoming period, as follows:

Δ real opex = Δ real opex price - Δ opex partial productivity + Δ output quantity

The formula states that the change in opex in real terms is determined by:

- the forecast real increase in input prices (labour and materials); minus
- the expected productivity improvement; plus
- the expected increase in output.

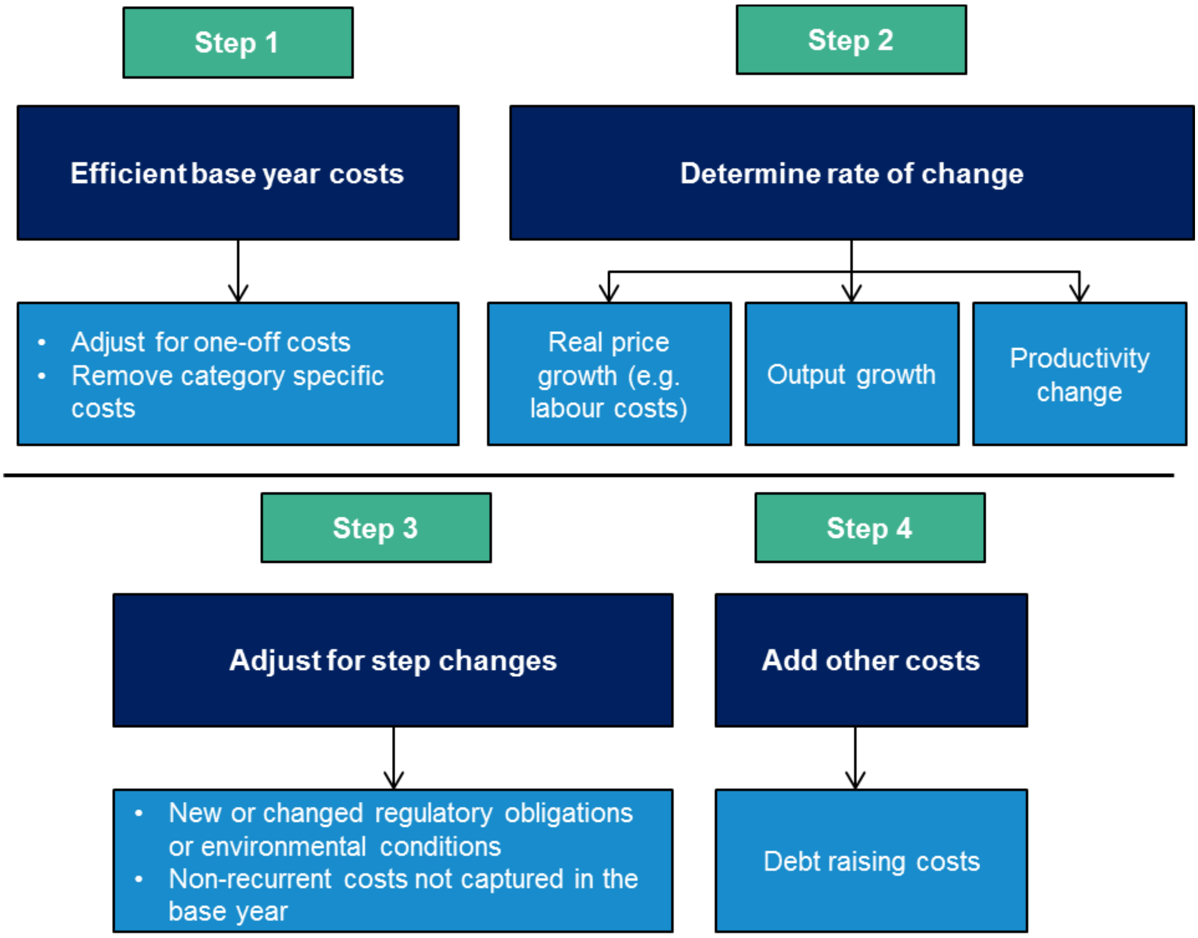
Step changes for new or changed regulatory obligations and market conditions have then been added to the forecast. The inclusion of step changes recognises that changes in the operating environment may impact the network's efficient opex requirements. In order for the opex forecast to be the 'best possible in the circumstances'[55], it must include adjustments for step changes.

The final step in the methodology was to add operating expenses that are not included in the base year, being an allowance for debt raising costs.

Figure 7-2 below illustrates the forecasting methodology described above.

55 NGR, 74(2)(b).

Figure 7-2: Opex forecasting methodology



Source: AusNet Services

Each element of the forecast is discussed in further detail in the following sections of this chapter.

7.2.1 Consumer expectations and preferences

AusNet Services has undertaken a comprehensive consumer engagement process to better understand the needs of its customers. The aim of the consumer engagement process is to understand our customers' preferences, particularly in relation to the trade-offs between network risk and costs.

The consumer engagement process is not a substitute for detailed cost-benefit analysis and risk modelling. Rather, it provides valuable insights into customers' service expectations and priorities which supplement AusNet Services' analysis. A detailed description of the consumer engagement process and AusNet Services' response to the feedback received is provided in Chapter 5. However, it is worth noting the following feedback that is particularly relevant to AusNet Services' opex forecast:

- Customers prioritised safety above factors such as reliability or minimising costs. They expect AusNet Services to maintain its gas network to ensure ongoing high levels of safety.
- Customers and stakeholders value the reliability of AusNet Services' gas network and expect that it will continue to maintain existing service levels.
- Customers expect to be using less gas in the future, due to the introduction and adoption of new technologies.

As explained in the remainder of this section, AusNet Services' approach to developing its opex forecast, including how AusNet Services continues to deliver services valued by customers, is consistent with customers' feedback.

7.3 Base year opex

In applying the revealed cost forecasting methodology, AusNet Services adopts 2015 as the base year for the following reasons:

- it is the most recent year of audited actual costs;
- it provides a fair basis for predicting recurrent ongoing costs; and
- it is efficient, having been exposed to the incentives properties of the EBSS.

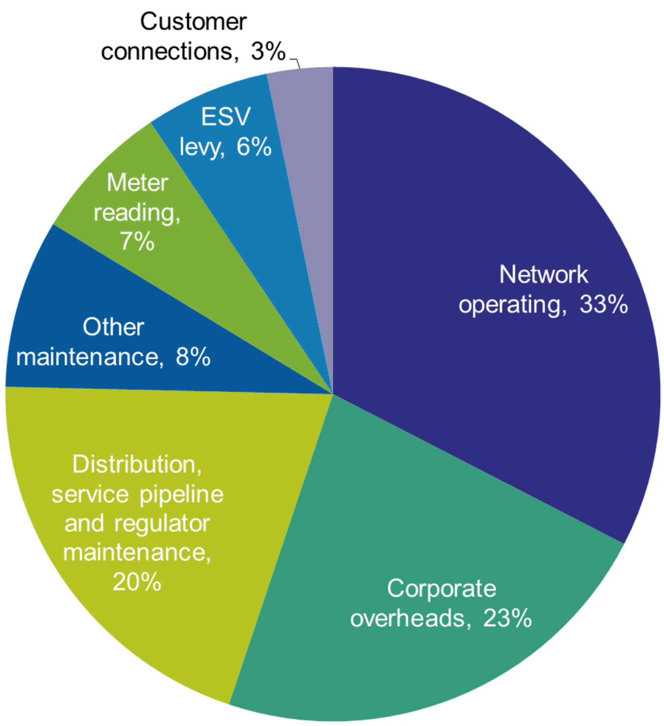
The base year was adjusted to remove costs which are better forecast on a category-specific basis.

2015 is most recent year of audited opex

The 2015 base year of $53.4m (unadjusted, $2017) is the most recent full year of actual operational costs, and contains data that has been independently verified and audited. Further, the operating environment conditions experienced during 2015 (e.g. weather conditions, regulatory and legislative environment) are considered to be representative of those that will exist in the forthcoming access arrangement period.

The 2015 base year is broken down into various cost categories for the purpose of forecasting opex. The categories AusNet Services used are consistent with those used by the AER for the current period, including for the purposes of the annual Regulatory Accounts submissions. The breakdown of costs is presented below.

Figure 7-3: Base year cost breakdown by RIN category[56]



Source: AusNet Services

56 Other maintenance costs include SCADA, meter maintenance and remote control, and cathodic protection costs.

2015 opex provides a fair basis for predicting recurrent ongoing costs

To determine a level of base year opex that reflects efficient recurrent expenditure, a number of adjustments have been made to AusNet Services' actual 2015 opex. These adjustments are to remove:

- movements in provisions to align with the AER's treatment of provisions;
- opex costs associated with non-reference services; and
- debt raising costs to align with the AER's 'PTRM benchmark' approach.

By making these adjustments, AusNet Services' forecasting approach ensures the base year opex reflects the efficient recurrent costs, excluding those costs. This approach is consistent with the AER's current access arrangement for AusNet Services, and complies with the operating expenditure criteria in the NGR.

The following table sets outs the process for adjusting 2015 actual opex to derive base year opex.

Table 7-1: Derivation of base year opex ($m, real 2017)

Actual 2015 opex	**53.4**
Less	
Movements in provisions	-0.08
Debt raising costs	-1.16
Non-reference services	-0.82
Total	**51.4**

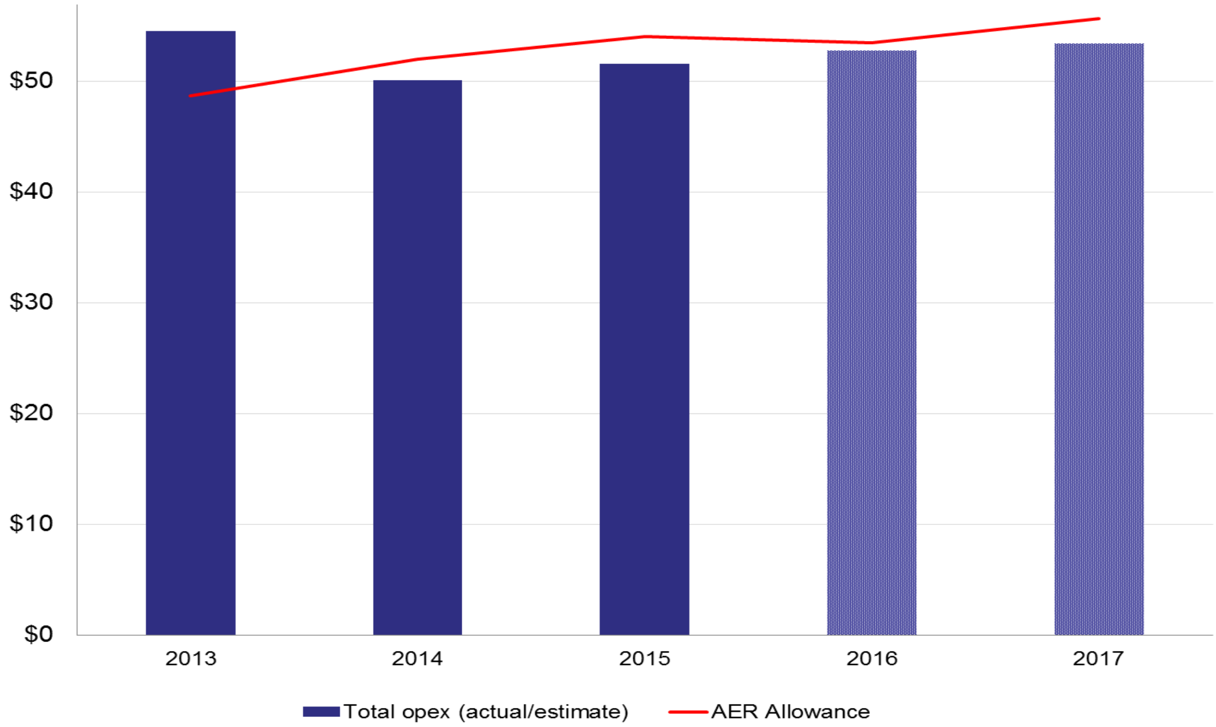
Source: AusNet Services

This recurrent cost base includes shared corporate costs allocated to the gas network in accordance with AusNet Services' cost allocation method. AusNet Services has not identified any non-recurrent costs in 2015 that should be removed for forecasting purposes.

Efficient base year cost

As explained above, AusNet Services has used revealed 2015 opex to determine its efficient base year costs. Figure 7-4 shows that 2015 opex was below the regulatory allowance for that year, as it also was for 2014. This demonstrates that AusNet Services continues to respond positively to the incentive properties of the EBSS, which rewards service providers for delivering efficiency savings.

Figure 7-4: Actual/estimated opex versus benchmark allowance ($m, real 2017$)



Source: AusNet Services

Note: Excludes debt raising costs, movement in provisions and non-reference services.

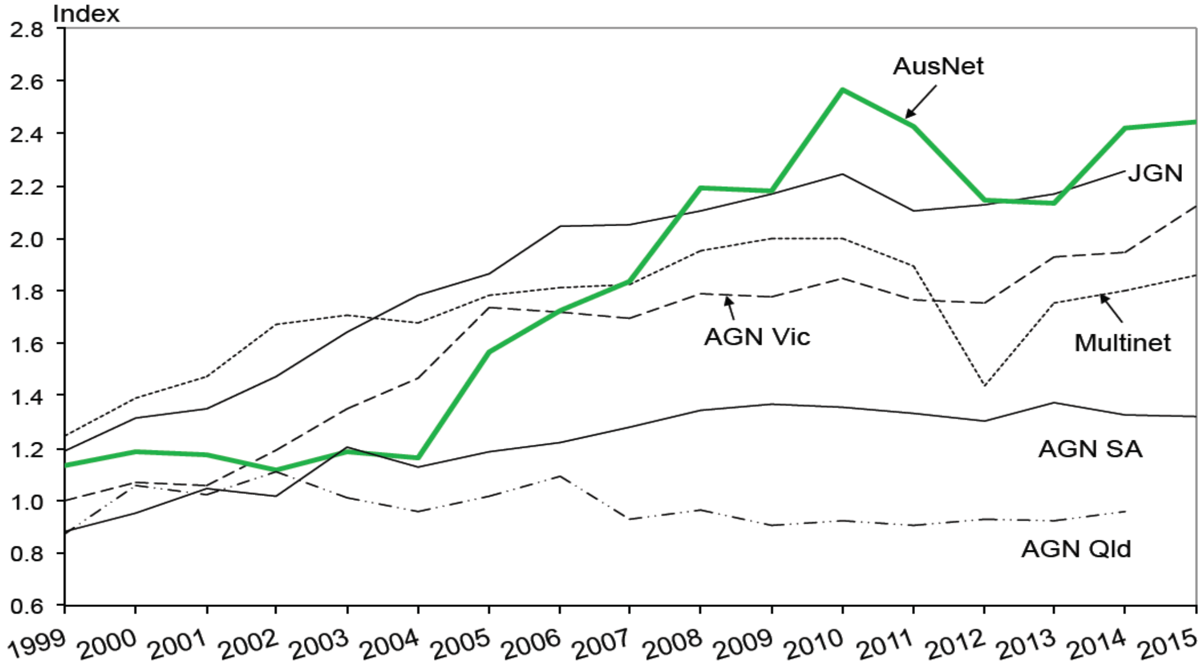
In this context, it is noted that rule 71(1) states:

> *"In determining whether capital or opex is efficient and complies with other criteria prescribed by these rules, the AER may, without embarking on a detailed investigation, infer compliance from the operation of an incentive mechanism or on any other basis the AER considers appropriate."*

AusNet Services regards the incentive properties provided by the current regulatory regime to be working well. AusNet Services' positive response to these incentives is evidence that its actual opex is efficient.

Furthermore, productivity analysis supports the conclusion that AusNet Services' opex is efficient. As illustrated in Figure 7-5 below, a study prepared by Economic Insights shows that AusNet Services' opex partial factor productivity growth has been particularly strong since 1999 compared to other gas distribution networks in Australia.

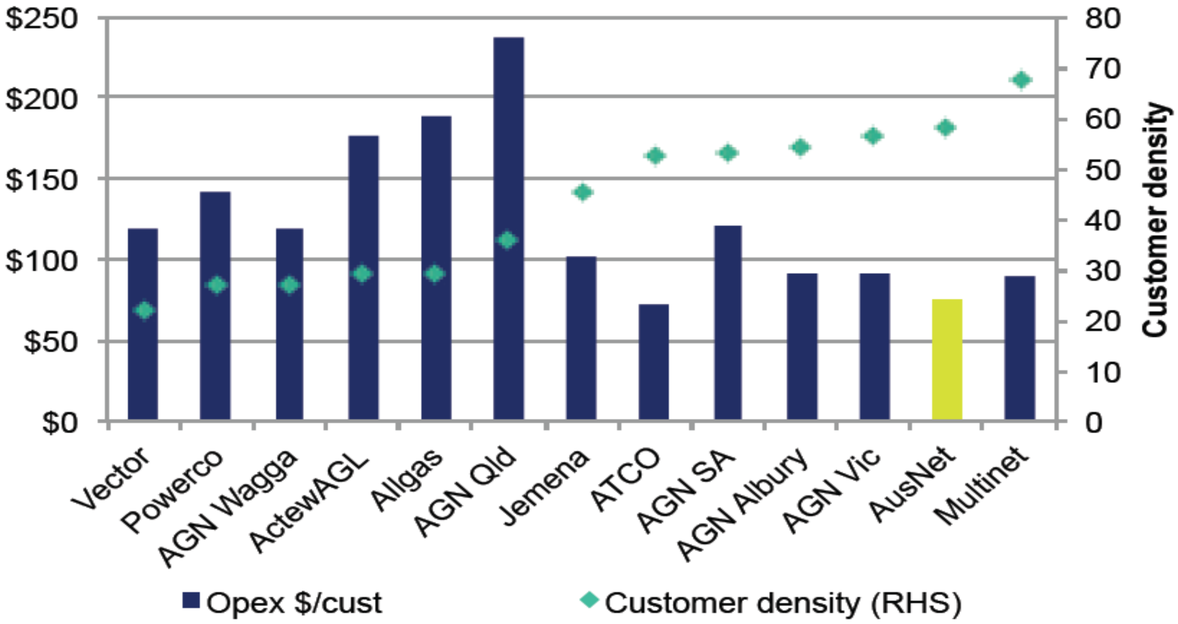
Figure 7-5: Opex partial factor productivity comparisons (1999-2015)



Source: Economic Insights, Benchmarking the Victorian Gas Distribution Businesses' Operating and Capital Costs Using Partial Productivity Indicators, 15 June 2016

Another useful form of benchmarking is partial performance indicator analysis, which compares costs normalised by the relevant outputs of a gas network. On an opex per customer basis, relative to customer density, AusNet Services is one of the most efficient gas distribution businesses in Australia (see Figure 7-6 below).

Figure 7-6: Opex per customer relative to customer density (2011-15 average)



Source: Economic Insights, Benchmarking the Victorian Gas Distribution Businesses' Operating and Capital Costs Using Partial Productivity Indicators, 15 June 2016

Note: Customer density is the total number of customers per kilometre of mains.

As indicated by Economics Insight's analysis, AusNet Services' opex in the current access arrangement period has been significantly lower than that of its peers. Collectively, these metrics suggest AusNet Services is at the efficient frontier.

7.4 Rate of change

A rate of change is applied to the base year opex to reflect the net impact of forecast changes in input prices (labour and materials), output growth and productivity over the 2018-22 regulatory period.

The AER's 2013 Expenditure Assessment Forecast Guideline[57] explains that efficient opex in the forecast period may differ from the base level due to:

- **real price growth**: changes in the prices paid for labour, materials and contractors;
- **output growth**: changes in the scale of the network or demand for network services can affect the expenditure required to service customers and the network; and
- **productivity growth**: changes in expenditure required to deliver the same level of services to customers may be driven by economies of scale, technical changes or efficiency improvements.

AusNet Services developed forecasts of each of the above components and applied these to develop forecast opex. Each element is discussed in turn below.

7.4.1 Price growth

The real price change component of the rate of change reflects expected changes in real input prices over the forthcoming access arrangement control period. That such changes in real prices may occur is recognised by the AER in the Explanatory Statement to the Expenditure Forecast Assessment Guideline:

> *"It is reasonable to assume that the cost of inputs for an efficient firm to produce the same level of output may change at a rate different to CPI. Consequently it is reasonable to account for real cost changes in inputs."*[58]

AusNet Services agrees that the rate of change should account for the impact of increased input costs on opex over the forthcoming access arrangement control period. For instance, AusNet Services' historical growth in labour costs has been higher than CPI, and this trend is expected to continue over the forthcoming period.

There are two components that determine the real price impact on opex:

- labour costs (i.e. internal and external); and
- non-labour (e.g. materials) costs.

57 AER, Explanatory Statement | *Expenditure Forecast Assessment Guideline*, p. 61.
58 AER, *EFA Guideline Explanatory Statement*, p. 61.

AusNet Services' forecasting method for each of these components is summarised in the table below.

Table 7-2: Forecasting methodologies for price growth

Price component	Overview of forecasting methodology
Labour (i.e. external and internal)	An average of forecast changes in the Victorian Wage Price Index for electricity, gas, water and waste services, using forecasts from consultants Deloitte Access Economics (DAE) and BIS Shrapnel.
Non-labour (e.g. materials)	AusNet Services assumes that non-labour prices will grow in line with the CPI. This approach is consistent with recent AER determinations and is considered reasonable in the current circumstances.

Source: AusNet Services

Labour escalation

In line with historical trends, the costs of both internal and external labour are expected to increase at a rate higher than CPI over the forthcoming access arrangement period. Changes in the cost of each type of labour reflect the market dynamics of different labour market segments, and therefore, require separate forecasts.

In forecasting internal and external labour costs, AusNet Services engaged expert economic consultant BIS Shrapnel to develop forecasts of growth in the Wage Price Index (WPI) for the Electricity, Gas, Water and Waste Services (EGWWS) and Construction industries. BIS Shrapnel's report, which is included at Appendix 7E sets out the assumptions underpinning its forecasts.

The EGWWS index has been applied to labour because the broad mix of occupations it comprises are considered to be reasonably reflective of the composition of AusNet Services' labour mix.

For the purpose of this access arrangement proposal, AusNet Services proposes to adopt an average of the forecasts provided by consultants DAE and BIS Shrapnel for both external and internal labour. This averaging approach is consistent with the AER's recent reasoning in the Victorian electricity distribution review, in which the AER stated:

> *"Where a consultant is used to forecast labour prices, we consider an averaging approach that takes into account the consultant's forecasting history, if available, to be the best method for forecasting labour price growth. We, and DAE, have previously undertaken analysis that found that DAE under-forecast utilities labour price growth at the national level. The analysis also found that BIS Shrapnel over-forecast price growth and by a greater margin. For our preliminary decision we used an average of the WPI growth rates forecast by DAE and BIS Shrapnel."*[59]

Table 7-3 shows the BIS Shrapnel forecast of real changes in Victorian WPI for the EGWWS industry over the next access arrangement period (see Appendix 7E for more details). Table 7-3 also shows the same forecasts prepared by DAE as (part of the AER's Draft Decision for AusNet Services' Transmission Revenue Reset). An average of the two forecasts is also presented.

[59] AER, *Victorian Electricity Distribution Price Review Preliminary Decision*, October 2015, pp. 7-58.

Table 7-3: Labour cost escalation rate (EGWWS)

Price growth components	2018	2019	2020	2021	2022
BIS Shrapnel (June 2016)	1.11%	0.94%	1.16%	1.66%	1.98%
Deloitte Access Economics (Feb 2016)	0.50%	0.90%	1.10%	1.10%	1.10%
Proposed real labour cost escalation rate (average)	0.80%	0.92%	1.13%	1.38%	1.54%

Source: AusNet Services

Labour and non-labour weightings

Labour accounts for a significant share (83%) of AusNet Services' current opex. Internal and external labour collectively account for a significant proportion of base opex (14% and 69%, respectively). Using AusNet Services' actual weightings to forecast its opex requirements will result in a forecast for the forthcoming access arrangement period which best reflects the operating expenditure of a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.[60]

In recent decisions for other NSPs, the AER assumed that total labour costs accounted for 62% of each network's base year opex.[61] The AER's justification for its approach in respect of other NSPs is as follows:

> *"Our weightings which have been used in our economic benchmarking represent a benchmark weighting between labour and non-labour. We consider these weighting represent the weightings for a prudent firm because it has been used in previous economic benchmarking analysis by Pacific Economic Group Research and Economic Insights."*[62]

The AER's benchmark weights are based on an index constructed by Economic Insights for the purposes of deflating opex for its benchmarking analysis, which in turn is based on analysis conducted by the Pacific Economics Group (PEG) that is now 12 years old.[63]

The outdated PEG analysis was based on estimated information and was prepared for a different purpose to that which Economic Insights, and the AER, now use it. Further, PEG's approach is inconsistent with an opex forecasting approach that relies on actual, revealed costs, which is the AER's preferred approach to forecasting opex.[64] In responding to the incentives embedded in the regulatory framework, AusNet Services, as an efficient NSP, utilises a mix of labour and non-labour inputs that best enables it to provide pipeline services at the lowest sustainable cost. Imposing an external benchmark weighting of labour and non-labour inputs implicitly (and incorrectly) assumes that these regulatory incentives are not effective.

As demonstrated in section 7.4, AusNet Services' track record of driving efficiency savings in response to the EBSS has resulted in an efficient level of base year opex. Independent productivity analysis supports the conclusion that AusNet Services' opex is efficient with AusNet Services' opex partial factor productivity growth been particularly strong since 1999 compared to other gas distribution networks in Australia. Accordingly, AusNet Services' actual

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60 Rule 91(1).

61 AER, *Final Decision*, *Jemena Gas Networks (NSW) Ltd, Access arrangement 2015–20*, Att. 7: Opex, pp. 17–18.

62 AER, *Draft Decision Ausgrid Distribution Determination 2015-19*, Att. 7: Opex, p. 146.

63 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, November 2014, p. 14.

64 AER, *Explanatory Statement, Expenditure Forecast Assessment Guideline*, p. 61.

labour and non-labour weights should be inputs into forecast real price change. This approach ensures internal consistency with the AER's preferred revealed cost approach as it reflects AusNet Services' actual labour to non-labour ratio in the base year.

The table below summarises the growth rate components and the overall impact of forecast price growth on AusNet Services' opex requirements. The table reflects AusNet Services' actual weighting between labour and non-labour costs as described above.

Table 7-4: Price growth components percentage growth

Price growth components	2018	2019	2020	2021	2022
Labour growth rate %	0.80%	0.92%	1.13%	1.38%	1.54%
Non-labour growth rate %	0%	0%	0%	0%	0%
Overall price growth rate %	0.67%	0.76%	0.94%	1.15%	1.28%

Source: AusNet Services

Further information on the price growth forecasts, including the independent expert report from BIS Shrapnel, is provided in Appendix 7E this access arrangement proposal.

7.4.2 Output growth

In its Explanatory Statement to the Expenditure Forecast Assessment Guideline, the AER acknowledged that:

> *"Increased demand for NSPs' outputs may require them to expand their networks. It is reasonable that an efficient NSP will require more inputs, and thus greater opex, to deliver more output. We therefore include forecast output growth in the rate of change formula."*[65]

AusNet Services agrees that the rate of change should account for the impact of increased outputs on opex over the forthcoming access arrangement period. For instance, the growth in energy throughput from 2018-22 is a proxy for growth in network size, which drives increases in operating and maintenance costs.

AusNet Services has adopted an output growth rate using the same methodology accepted for the current access arrangement. This approach uses a composite growth rate of gas throughput and customer numbers.

AusNet Services engaged The Centre for International Economics (CIE) to develop an independent view of forecasts for customer growth and gas throughput in AusNet Services' network for the forthcoming access arrangement period. CIE also prepared AusNet Services' demand forecasts for the 2013-17 access arrangement period, which were largely accepted by the AER.

AusNet Services' customer base is forecast to grow by around 2.1% per annum, led by strong household growth and recent trends in new dwellings connecting to gas. The forecast of household growth is sourced from the Victorian Government's 2016 *Victoria in Future* (ViF) planning document. The 2016 ViF growth rates for each local government area (LGA) were used by CIE to grow the number of customers within each postcode. The penetration rate established for each LGA by CIE was then applied to the household growth rate to forecast the

[65] AER, *Explanatory Statement, Expenditure Forecast Assessment Guideline*, p. 61.

number of new gas customers.[66] The result is a customer number forecast at the postcode level, which can be used to forecast the number of customers in each of AusNet Services' pricing zones.

Average consumption per residential customer is forecast to fall by 1.5% per annum in the 2018-22 period. This is an acceleration of the (weather normalised) trend in the last five years (where average consumption per residential customer fell by 0.9%). CIE forecasts a continuation of the declining consumption per customer that has been occurring since 2003. CIE's forecasts are comparable to those produced by AEMO.[67]

The growth forecasts by component are summarised in the table below.

Table 7-5: Output growth components and total increase

Output growth components	2018	2019	2020	2021	2022
Gas throughput growth rate (%)	2.12%	2.10%	2.09%	2.09%	1.98%
Customer numbers growth rate (%)	0.35%	0.98%	0.92%	0.71%	0.13%
Composite growth rate (weighted average)	1.15%	1.49%	1.45%	1.33%	0.96%

Source: AusNet Services

Further information on the output growth forecasts is provided as part of CIE's demand forecast analysis included as Appendix 4A to this access arrangement proposal.

7.4.3 Productivity growth

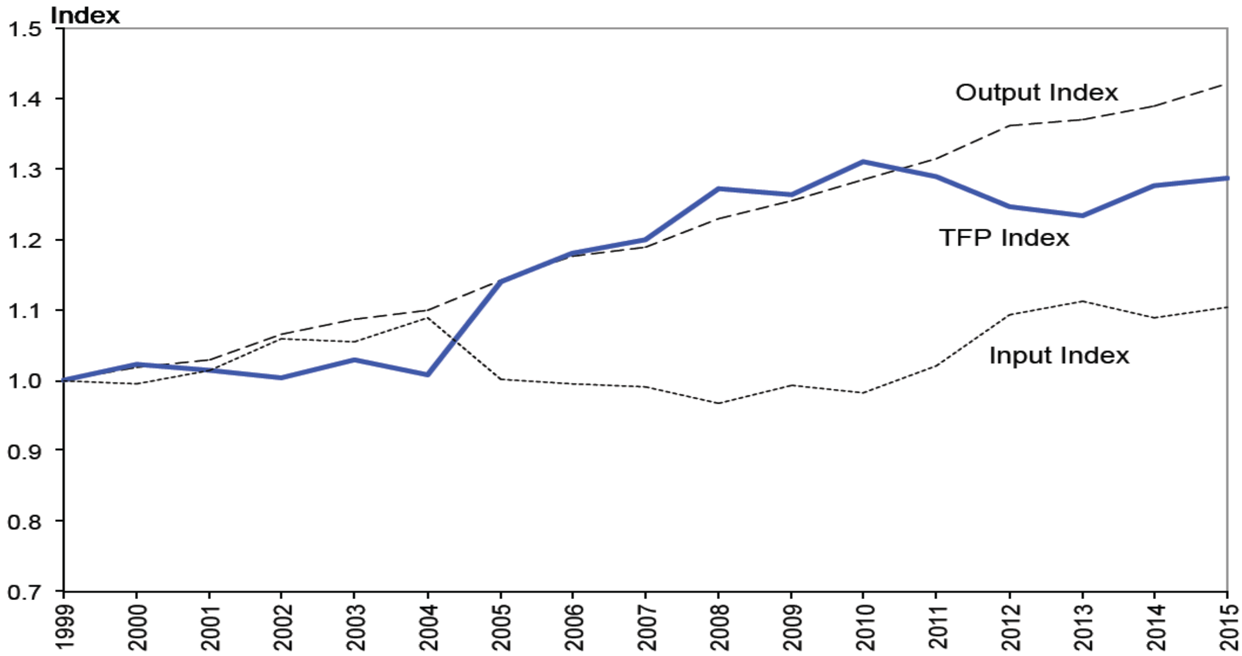
Reduction in productivity growth over time

AusNet Services has experienced a reasonably consistent upward trend in productivity (as measured by TFP) although this has slowed since 2008. On average, AusNet Services' annual productivity growth rate was 2.7% from 1999 to 2008, but fell to 0.2% in the period from 2008 to 2015 (see Figure 7-7 below).

66 CIE's report goes into more detail about how these penetration rates are calculated. In summary, CIE compares the number of new customers within a given postcode to the number of dwellings estimated to have been constructed, using data from the Australian Bureau of Statistics (**ABS**) and Federal and State Governments.

67 AEMO, *National Gas Forecasting Report V2*, 2 March 2016, Appendix A and associated models.

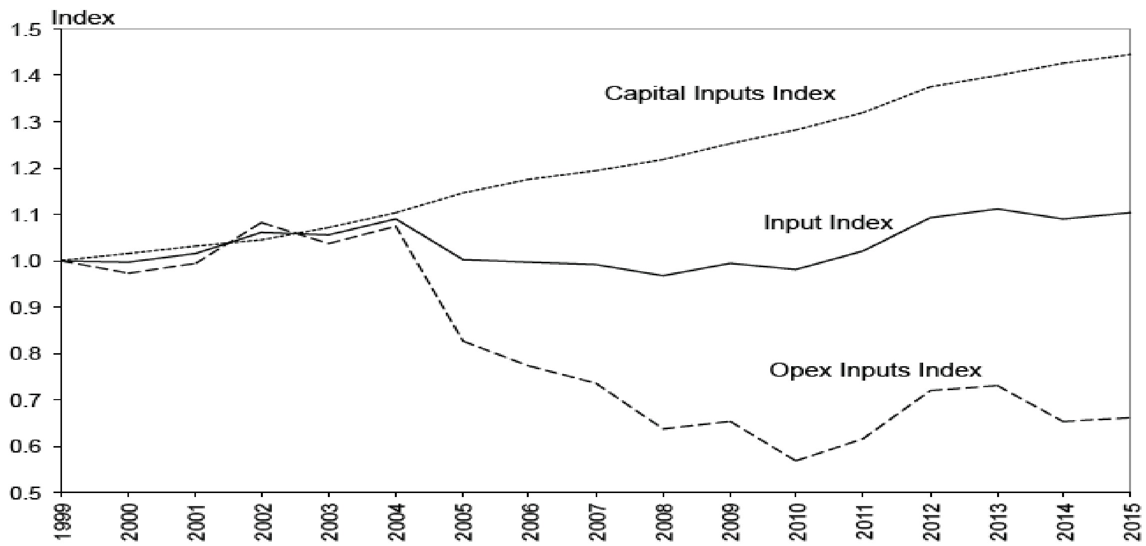
Figure 7-7: AusNet Services output, input and TFP indexes (1999-2015)



Source: Economic Insights, Victorian Gas Distribution Businesses' Productivity Performance, 15 June 2016

Trends in input use are an important element of the productivity story. AusNet Services' average annual growth rate of opex inputs between 1999 and 2015 of -2.6% represents a relatively strong decline in opex. However, there has also been a substantial slowing in opex productivity in recent years. As shown in Figure 7-8, prior to 2008 AusNet Services' opex inputs usage ***decreased by 4.9%*** per annum. Since 2008, opex input usage ***increased by 0.5%*** per annum.

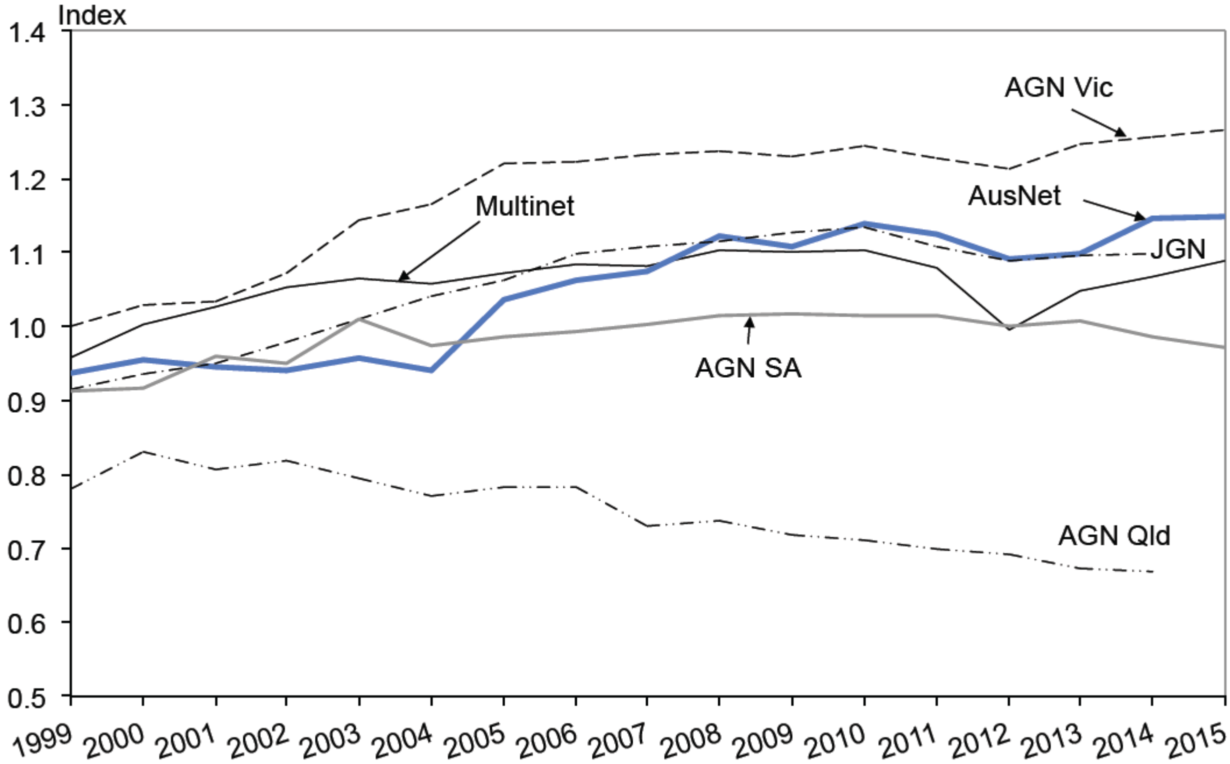
Figure 7-8: AusNet Services inputs indexes (1999-2015)



Source: Economic Insights, Victorian Gas Distribution Businesses' Productivity Performance, 15 June 2016

There is also recent evidence of limited gains in productivity across the gas industry as per capita usage declines and large capital projects such as Victoria's mains replacement have been undertaken. Overall productivity exhibited by the gas utilities industry has declined since 2010 (see Figure 7-9).

Figure 7-9: Multilateral Total Factor Productivity (1999-2015)



Source: Economic Insights, Victorian Gas Distribution Businesses' Productivity Performance, 15 June 2016

The AER recognises the trend of declining opex productivity in the energy sector. Its most recent annual benchmarking report for electricity distribution networks observed:

> *"Productivity across the industry has been declining over the past several years… with combined industry inputs increasing at a greater rate than outputs since 2006. Productivity is declining because the resources used to maintain, replace and augment the networks are increasing at a greater rate than the demand for network services."*[68]

The AER's recent Final Decision for Australian Gas Networks (South Australia), published in May 2016, approved a zero productivity forecast because it considered this was the best estimate available in the circumstances.[69] In respect of this, the AER stated:

> *"Based on a review of the material and our own analysis, we were unable to identify a better productivity factor estimate than that proposed by AGN. Therefore, we have concluded that it is reasonable to accept AGN's proposal to apply a zero productivity factor for the forecast period. We consider this is the best estimate available in the circumstances".*[70]

For the above reasons, AusNet Services believes that a forecast of zero productivity change in the 2018-22 period is the best available forecast of productivity. It would also align with recent AER decisions for other service providers, as well as the productivity declines exhibited by the utilities industry overall since 2010.

68 AER, *2015 Annual benchmarking report for Electricity distribution network service providers,* p. 16.

69 AER, *Final Decision: Australian Gas Networks Access Arrangement 2016-21*, Att. 7: Opex, May 2016, p. 19.

70 AER, *Final Decision: Australian Gas Networks Access Arrangement 2016-21*, Att. 7: Opex, May 2016, p. 19.

7.4.4 Overall rate of change

The rate of change contributes $20.5m (6.5%) to the opex forecast over the access arrangement period. Table 7-6 summarises AusNet Services' rate of change forecast.

Table 7-6: Rate of change forecast

Output growth components	2018	2019	2020	2021	2022
Overall price growth rate %	0.67%	0.76%	0.94%	1.15%	1.28%
Composite growth rate (%)	1.15%	1.49%	1.45%	1.33%	0.96%
Productivity growth	0%	0%	0%	0%	0%
Total rate of change	1.82%	2.25%	2.39%	2.48%	2.24%

Source: AusNet Services

7.5 Step changes

AusNet Services has identified two opex activities that will need to be undertaken during the access arrangement period but which are not captured in 2015 opex. AusNet Services assessed the prudency and efficiency of these activities against the requirements of rule 91(1) of the NGR.

A change in opex complies with rule 91 if the increase in costs is driven by one or more of the following factors:

- a change in the business environment arising from external factors (e.g. attributable to the imposition of regulatory obligations);
- an initiative to improve service levels in a manner that is in the long-term interests of consumers;
- an initiative to reduce long-term costs to consumers;
- an initiative to improve the safety of network service provision;
- such other occurrence which results in an increase in opex which is consistent with the requirements of the NGR.

AusNet Services considers that each proposed step change reflects expenditure required by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

AusNet Services has forecast two step changes for the next access arrangement period, which are summarised in the table below.

Table 7-7: Step changes ($m, real 2017)

Step change	Description	Recurrent / non-recurrent	Rationale	Total cost $m
Marketing (network development)	Marketing initiative to improve asset utilisation and reduce average network prices	Recurrent	Provides net benefits to customers	$21.8
Ring-main pigging	Pipeline inspection through intelligent pigging enables detection of pipe wall loss, gouge or pitting. It is standard industry practice that the major oil and gas transmission pipelines are pigged once in 10 years. The last pigging project was undertaken in 2009.	Non-recurrent	One-off opex driven by regulatory requirements relating to management of safety risk	$0.41
Total step change				**$22.2**

Source: AusNet Services

Each of these step changes is discussed in turn below.

7.5.1 Gas marketing initiatives

Gas networks across Australia engage in targeted marketing activities to grow their customer base, and thereby support lower average network prices over time.

Need for gas marketing

Natural gas has typically enjoyed high levels of popularity in Victoria driven by customer preferences for its heating qualities when compared to electric alternatives. The Victorian gas market is, however, entering a period of significant change. In particular, market conditions are expected to deteriorate over the coming access arrangement period, driving down demand for gas on a per customer basis. AEMO's most recent projections for Victoria suggest that annual gas consumption will fall by approximately 1% per annum between 2015 and 2022.[71]

Against this backdrop, AusNet Services is proposing a step change to undertake gas marketing activities during the next access arrangement period. The driver of this step change is the net benefit to AusNet Services customers in the form of lower average network prices enabled by expected increases to customer numbers to counter the deterioration in market conditions over the next access arrangement period.

[71] AEMO, *National gas forecasting report for eastern and south-eastern Australia*, December 2015.

A range of social and environmental factors are contributing to the expected decline in market conditions:

- The new liquefied natural gas (LNG) export market from eastern Australia is pushing up retail prices for domestic gas[72], a situation that is expected to worsen in the coming years and make gas less attractive for many people.
- Many Victorians have resorted to 'economic fuel switching' (i.e., switching from gas to electricity by installing heat pumps and replacing gas stoves with induction cook tops) as a result of rising gas prices.
- Increased penetration of solar technology has meant that more than 1.4 million solar powered systems have been installed in Australia,[73] thus driving down demand for gas-based appliances.
- A range of influential key stakeholders operating within the AusNet Services gas network (i.e., local councils and consumer advocacy groups) have been actively promoting the electrification of homes, therefore dissuading the installation of gas appliances.
- Customer perceptions of natural gas and its environmental benefits have been damaged by the ongoing negative publicity that coal seam gas production has attracted in Australia[74].

Investing in marketing efforts that have a positive return on investment will be in the long term interests of our customers and stakeholders. Maintaining and expanding AusNet Services' customer base and average demand enables efficient fixed costs to be shared across a large number of customers, thus avoiding price rises. As such, expenditure on a gas marketing will:

- maintain and increase the demand for gas services;
- increase new connection rates;
- limit appliance switching; and
- positively influence customers' attitudes to and perceptions of gas.

Proposed gas marketing activities

AusNet Services' proposed marketing program involves research, branding, advertising and appliance rebates, as summarised below.

Figure 7-10: Proposed marketing program

The proposed marketing activities include three components:

- *Research and branding ($0.24 million)* – The first step of the program will be to develop a 'fit-for-purpose' understanding of the different customer segments that exist for our gas network. Identifying these customer segments will equip us with the tools to engage more effectively with customers and ultimately meet our gas marketing objectives. Developing a

72 AER, *State of the energy market,* 2015.
73 Clean Energy Council, *Clean energy Australia Report,* 2014.
74 Newgate Research, *Research report on community attitudes towards energy networks,* March 2016.

brand identity for the gas marketing campaign will ensure that the branding and message remains consistent over various media and communication platforms.

- *Rebate scheme ($2.8 million)* – The marketing program will include collaboration with other Victorian gas businesses to develop a series of rebates to encourage the purchase and installation of gas appliances. Customer insights suggest that the price of gas appliances, compared to electric appliances, is a key barrier to installation and use. The appliance rebate program will provide residential customers a financial incentive of up to $750 to purchase gas appliances including gas heaters and hot water systems.
- *Advertising and communication ($1.35 million)* – Television, radio, print and media campaigns will play a key role in how we communicate with customers in metropolitan and regional Victoria to promote gas appliances and services in the home.

Table 7-8 sets out key cost assumptions relating to AusNet Services' proposed marketing activities.

Table 7-8: Appliance Rebate Program Assumptions (real $2016)

Input		Central heating	Space heating	Hot water	Total
No. of appliances rebates p.a.	(a)	1,483	1,318	2,471	5,271
Rebate per appliance	(b)	$750	$500	$400	-
Take-up of rebates	(c)	100%	100%	100%	-
Average load per appliance	(d)	25 GJ	15 GJ	13 GJ	-
Life of appliance	(e)	20 years	15 years	12 years	-
Cost of rebates	(f)=(a)x(b)x(c)	$1,111,926	$658,919	$988,379	$2,759,224
Fulfilment costs	(g)=(a)x$8.30	$8.30 per appliance rebate			$43,780
Total cost of rebate scheme	**(h)=(f)+(g)**	**-**			**$2,803,003 p.a.**
Advertising and industry campaigns	**(i)=(a)x$296.90**	**$296.90 per appliance rebate**			**$1,564,933**
Incremental demand per annum	(j)=(a)x(d)	37.1 TJ p.a.	19.8 TJ p.a.	32.1 TJ p.a.	88.95 TJ p.a.
Appliance rebates that result in new connections	**(k)=5% x (a)**	**5%**			264 p.a.

Source: Axiom Economics

Note: Some numbers may not add up due to rounding

The marketing program will seek to:

- counter some of the projected decline in residential consumption that is expected to occur in the next access arrangement period by encouraging the uptake and use of gas appliances and new connections; and
- encourage greater take up of gas in regional areas, including those areas that have recently been connected through the Energy for the Regions program.

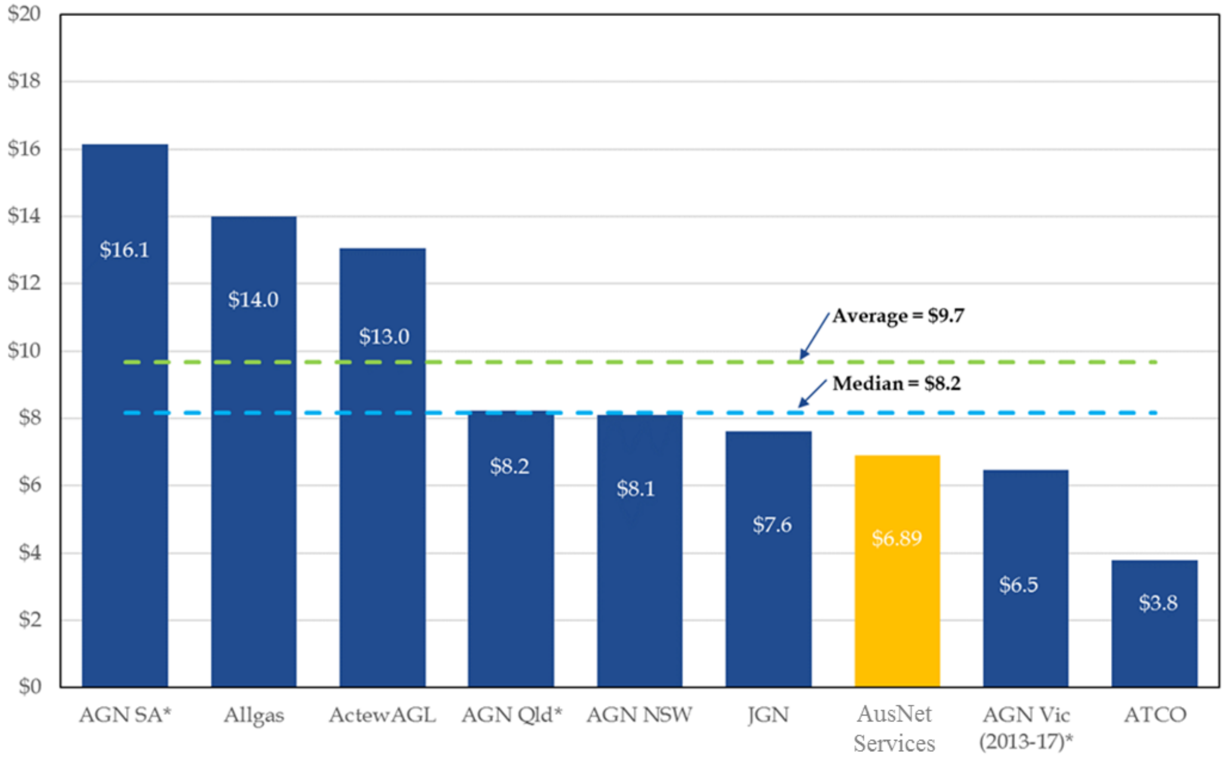
A campaign of this nature can be an efficient response to lower than efficient levels of network utilisation if it results in a measurable increase in the volume of gas transported through the network.[75] It can also be in the interests of consumers if it results in lower reference tariffs over the long run, which will occur if the benefits of the incremental demand exceed the costs of the campaign. AusNet Services' marketing campaign has been designed to achieve both these outcomes.

Prudency of proposed allowance

Axiom Economics was engaged to assess whether the proposed marketing activities (which will be undertaken jointly with AGN (Vic) and MultiNet Gas) in the 2018-22 access arrangement period satisfies Rule 91 of the NGR.

Regulated gas distribution businesses that have carried out marketing and had their allowances approved by the AER and the ERA in the last five years include JGN, ATCO Gas, AGN, Allgas and ActewAGL.[76] The marketing allowances that were approved for each of these networks, per residential customer, are set out in Figure 7-11.

Figure 7-11: Marketing Allowance Expenditure per residential customer



Source: Axiom Economics

As this figure shows, the AusNet Services' marketing campaign is estimated to cost $6.89 p.a. per residential customer over the access arrangement period, which is toward the lower end of the range of the allowances that have been approved by the AER and the ERA in the last six

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75 This could occur as a result of an increase in the number of customers connected to the network and/or an increase in the average volume of gas consumed at connection points.

76 See: AER, Final Decision: Jemena Gas Networks AA 2015-2020, Attachment 7, June 2015, p. 7-24, JGN, ERA, Final Decision: Proposed Revisions to the AA for the Mid-West and South-West Gas Distribution Systems, 30 June 2015, pp. 47 and 97, AER, Final Decision: Envestra AA proposal for the SA gas network, June 2011, pp. 83 and 106, AER, Final Decision: Envestra AA proposal for the Qld gas network, June 2011, pp. 76 and 95, AER, Final Decision: Allgas AA proposal for the Qld gas network, June 2011, pp. 48, 51 and 67, AER, Final Decision: AA proposal for the ACT, Queanbeyan and Palerang gas distribution network, March 2010, pp. 100 and 146, AER, AA proposal for the Wagga Wagga natural gas distribution network, March 2010, pp. 55 and 66.

years. It is also lower than both the median ($8.20) and average ($9.70) allowances approved by the AER and the ERA over this period.

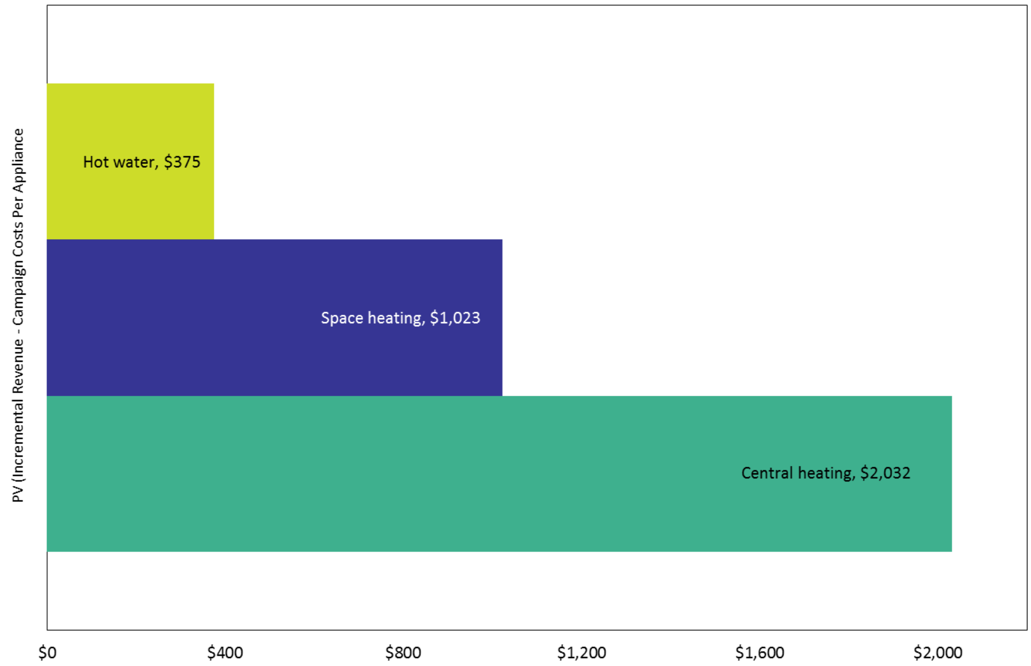
While the preceding discussion has focused on regulated businesses, there are also numerous examples of unregulated businesses using marketing to encourage greater utilisation of their networks. For example, Tas Gas Networks and AGN (NSW) have implemented marketing campaigns in their networks, both of which face strong inter-fuel competition from electricity. [77] The fact that these unregulated businesses are also using marketing to try and increase the utilisation of their networks and compete with electricity provides further support for the view that marketing is a prudent form of expenditure that can constitute an efficient response to the conditions prevailing in a particular network. The proposal to carry out the marketing activities can, therefore, be viewed as replicating what would occur in a competitive market.

To determine whether the proposed expenditure of the marketing activities is prudent, efficient and in the long-term interests of consumers, Axiom Economics compared:

- the present value (PV) of the incremental revenue[78] to be derived from the use of the additional appliances over the life of those appliances; with
- the PV of the costs of the proposed campaign (i.e. the cost of the rebate program and the cost of the advertising and industry representation campaigns).

This analysis has been carried out at an individual appliance level and across each tariff zone in AusNet Services' network as summarised in Figure 7-12.

Figure 7-12: Net Present Value of Proposed Expenditure per appliance



Source: Axiom Economics

Note: *The network average has been calculated on a weighted average basis, with the weights based on the number of residential customers in each tariff zone at the end of 2015.*

[77] https://www.tasgas.com.au/rebate and https://www.maketheconnection.com.au/nsw/household-nsw/promos-news/gas-promotions-rebates/

[78] The incremental revenue has been calculated as revenue from the operation of the appliance *less* the share of new connection and incremental operating costs.

As Figure 7-12 reveals, the incremental revenue generated from the use of the additional central heating, space heating and hot water systems exceeds the cost of the campaign. The proposed expenditure on the campaign can therefore be considered prudent and efficient and in the long-term interests of consumers.

Net benefit to consumers

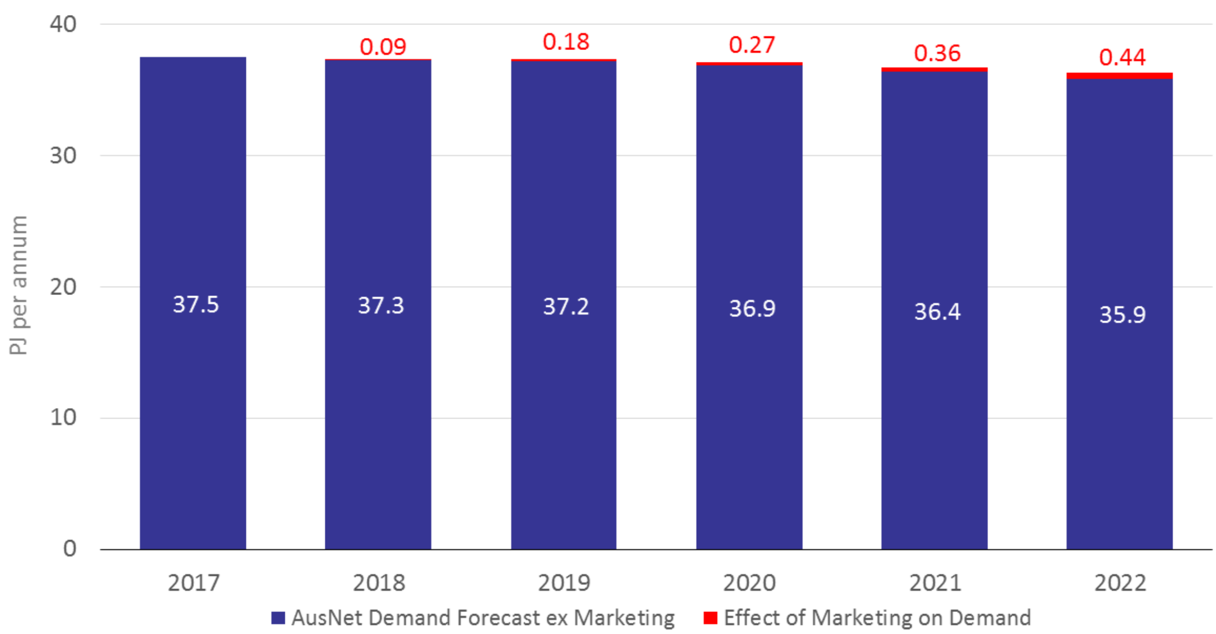
Cost benefit analysis undertaken by Axiom Economics shows that the proposed marketing program will deliver a net benefit to customers by increasing asset utilisation and reducing average network prices over subsequent access arrangement periods.

Given the predominantly fixed cost nature of providing gas network services, increasing the utilisation of the network in this manner will allow the costs to be spread over a greater number of customers and/or volume of gas, which will reduce the unit cost of transporting gas and, in turn, reference tariffs. A reduction in the cost of transporting gas on AusNet Services' network will also lead to improvements in the competitiveness of gas vis-à-vis other fuels.

AusNet Services' proposed marketing activities are expected to offset the projected decline in demand over the next five years and add 1,054 new connections in AusNet Services' network. By 2022, the additional demand attributable to the proposed marketing activities results in demand being 1.2% higher than would otherwise be forecast.

The expected incremental effect of the marketing program on demand during the next period is shown in Figure 7-13. The uptake of gas appliances will continue to have an effect on residential and small commercial demand post 2022, with a further 5.8 PJ of demand expected to be added between 2023 and 2041. This additional expected demand results from a combination of new customer connections and assumed increased in the uptake of gas appliances by existing customers.

Figure 7-13: Effect of Marketing Program on Demand

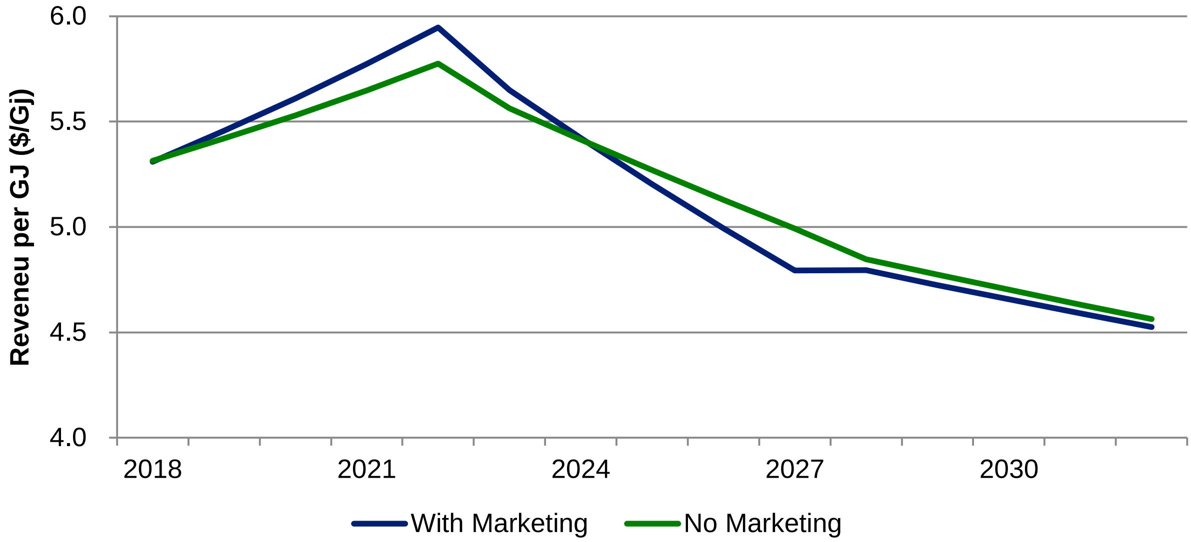


Source: Axiom Economics

Axiom Economics' analysis indicates that while the program will result in slightly higher average costs per customer up until 2023, the reduction in average costs per customer in subsequent years, brought about by the additional demand, will more than offset this increase as the fixed costs of providing services are spread over a greater number of customers (see Figure 7-14). The marketing program is, therefore, in the long-term interests of AusNet Services' consumers and is consistent with the National Gas Objective (NGO).

The regulatory framework does not provide incentives for an opex step change where the benefits span multiple access arrangement periods. Under the current framework, a service provider is incentivised to increase opex to drive demand and revenue increases if these increases fall principally within the same period. This is because revenue increases in subsequent periods that have been facilitated by the opex increase will be factored into the determination for that period (i.e. through higher demand forecasts and, consequently, lower prices). Accordingly, an opex step change is required to fund an opex increase associated with a step change where the benefits span multiple periods. The higher demand forecasts used to set prices in subsequent periods ensure customers do not pay twice.

Figure 7-14: Effect of Marketing Program on Average Cost per GJ



Source: AusNet Services

Note: Smoothed revenue per GJ ($2017)

AusNet Services' proposed marketing activities also replicate the outcomes of a competitive market. There are numerous examples of unregulated businesses using marketing to encourage greater utilisation of their networks (e.g. Tasmanian Gas Distribution Network and AGN's Wagga Wagga Network).[79] The fact that unregulated businesses use marketing to increase the utilisation of their networks provides further support for the view that marketing constitutes an efficient response to the prevailing market conditions.

Drawing on Axiom Economics' analysis, it is clear the proposed marketing expenditure is:

- as such as would be incurred by a prudent service provider acting efficiently;
    - the level of the proposed rebates and the proposed expenditure on the advertising and industry representation campaigns are in line with those that have previously been approved by the AER and the ERA;
    - the proposed expenditure on the campaign, when expressed on a per residential customer basis, is at the lower end of the range of allowances approved by the AER and ERA in other decisions and well below the median allowance ($6.89 per customer vs $8.20 per customer); and

[79] https://www.tasgas.com.au/rebate and https://www.maketheconnection.com.au/nsw/household-nsw/promos-news/gas-promotions-rebates/

  - the proposed cost of the campaign, when expressed on a per GJ of incremental demand basis, is more efficient than the allowance the AER recently approved for JGN ($3.07 per GJ vs $3.60 per GJ).

- in keeping with accepted good industry practice;
  - the range of other regulated and unregulated gas distribution businesses that use marketing to promote the efficient utilisation of their networks; and
  - prior decisions by both the AER and ERA that have allowed regulated gas distribution businesses to undertake this expenditure; and
- expected to achieve the lowest sustainable cost;
  - the projected increase in demand brought about by the proposed campaign would enable the fixed cost of providing services to be spread over a greater number of customers and volumes of gas, which can be expected to result in the lowest sustainable cost of delivering services over the longer run.

To conclude, AusNet Services' proposal to use a marketing campaign to increase network utilisation is an efficient response to the expected deterioration in market conditions. It is also consistent with the key elements of the regulatory framework, including the NGO and the revenue and pricing principles. Further information on the cost-benefit analysis undertaken by Axiom Economics is provided in Appendix 7D to this access arrangement proposal.

The forecast opex costs of the marketing program are summarised in the table below.

Table 7-9: Proposed Annual Expenditure on Marketing activities ($M, real $2016)

Activity	Annual expenditure for AusNet Services
Advertising campaign	$1.350
Industry representation	$0.214
Appliance rebate scheme (including fulfilment costs)	2.803
TOTAL	**$4.368**

Source: Axiom Economics

7.5.2 Ring-main pigging

AusNet Services will carry out the in-line inspection of part of its gas transmission pipeline in 2021. Consistent with good industry practice, AusNet Services undertakes intelligent assessment of the pipeline structure at 10-yearly intervals to monitor pipeline integrity, ensuring continuity of supply and maintaining public safety. The last inspection was undertaken in 2009 with specific funding approved by the AER. AusNet Services will carry out inspection in 2021 instead of 2019 to accommodate the pipeline relocation works required by the proposed Metro Tunnel works being carried out by the Melbourne Metro Rail Authority.

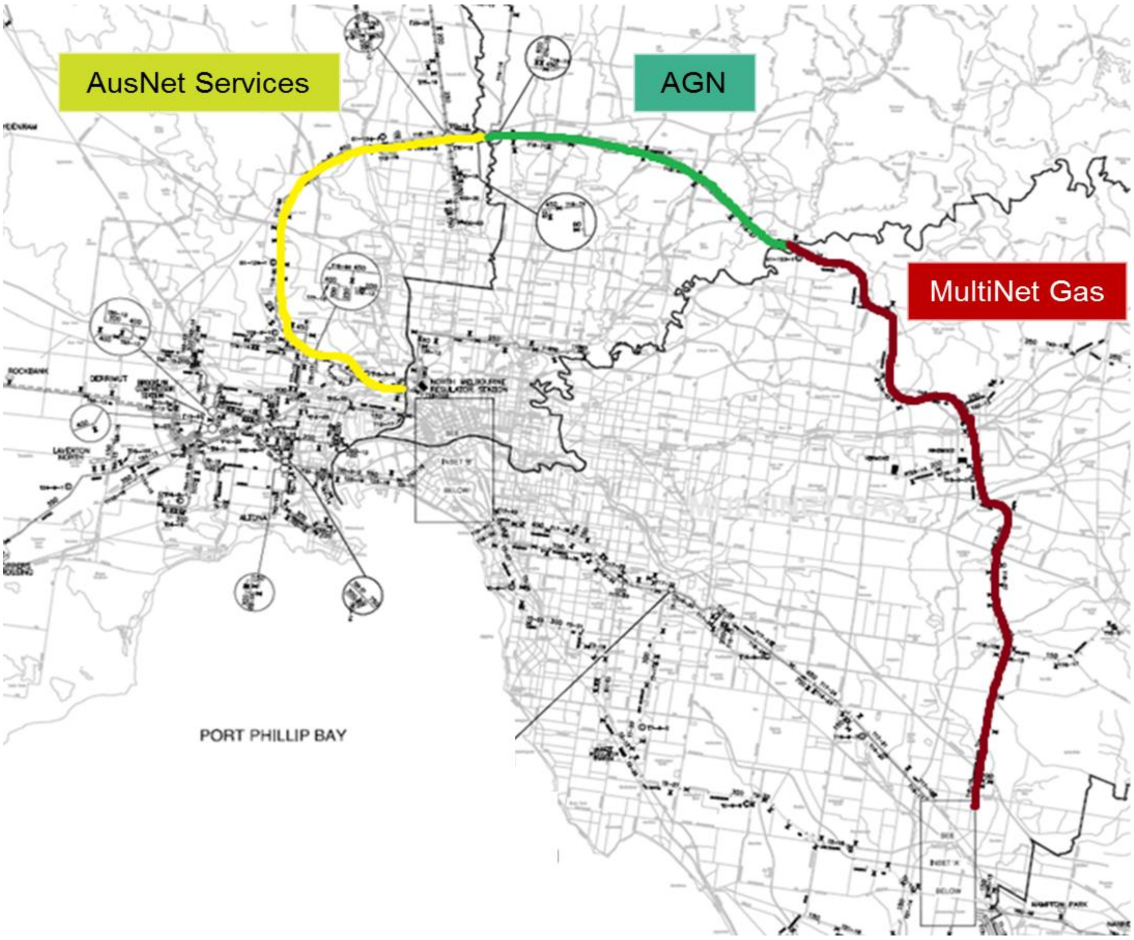
Pipeline inspection through intelligent pigging enables detection of pipe wall loss, gouge or pitting especially at locations where other inspection technologies are not feasible. It is standard industry practice that the major oil and gas transmission pipelines are pigged once in 10 years.

Details of intelligent in-line inspection (pigging) project

The Dandenong to Docklands transmission pipeline system (AusNet Services' Licence 203) was last pigged in 2009 and its next inspection by intelligent pig is scheduled for 2021. The pigging operation is carried out in collaboration with Australian Gas Networks (Victoria) and Multinet Gas, who each owners of the 82km long transmission pipeline system (Figure 7-15).

AusNet Services' 25km section of the pipeline circles around the Melbourne metropolitan area, and traverses high density suburbs such as Glenroy, Avondale Heights, High Point, Maribyrnong, Kensington, Footscray, and North Melbourne. This pipeline supplies gas to approximately 200,000 customers within AusNet Services' distribution network. The pipeline route and the population density make this a higher risk asset in comparison to other pipelines within AusNet Services' transmission pipeline network.

Figure 7-15: Map of Dandenong to Docklands transmission pipeline system



Source: AusNet Services

Australian Standard 2885.3-2012 and the *Victorian Pipelines Act 2005* require licensees to operate and maintain their gas transmission pipelines so as to minimise, as far as is reasonably practicable, hazards and risks to the safety of the public and the environment. The risk of not inspecting the pipeline using in-line inspection may lead to undetected wall loss or corrosion. This can result in a major gas leak in a high density residential area and delayed interruption of gas supply to a large number of domestic and commercial customers. Data gathered from the pigging operation will be compared to the 2009 results in order to establish a pipeline condition trend to ensure continued safe and sustainable supply to customers, and to provide a basis for developing cost-effective and safe operational and maintenance programs.

Risks of not completing this project

The consequence of any supply interruption or damage to this pipeline is considerably higher than any other AusNet Services' gas transmission pipeline. Inline inspection by intelligent tools ascertains the integrity of the pipeline, especially at locations where access is restricted for direct inspections such as railway crossings, river or creek crossings. The intelligent inspections also discover defects (e.g. laminates, cracks, wall loss, corrosion under coating) which are not possible to identify through non-destructive indirect coating integrity inspection.

The risk of not inspecting the pipeline using an intelligent tool is considerably higher and may lead to wall loss or corrosion going undetected and, subsequently, a major gas leak in residential areas and delayed interruption of gas supply to tens of thousands of domestic and commercial customers.

The inspection of the pipeline using an intelligent tool is the best and most unrestrictive methodology to identify the metal loss or any crack at 360 degree perimeter of the pipeline. Whilst identified anomalies provide opportunity to repair the faults, the positive results provide assurance of the continued supply of natural gas to the community.

Process

The pig will be launched at Henty Street (Dandenong) and will be retrieved at Docklands (former West Melbourne outstation site.[80]

AusNet Services has engaged with other licensees and agreed to form an alliance. An independent consultant will be engaged to deliver project management responsibilities.

The pigging results will be verified to ensure the pipeline condition results are accurate. Verification involves excavating the pipeline at the locations where the intelligent pig observes anomalies.

In 2009, five pigs were launched as part of the pigging project. The runs included two cleaning pigs, one electronic gauging pig (to measure the extent and location of dents in the pipeline) and two corrosion detection pigs (to measures the extent and location of any loss of wall thickness of the pipe).

Proposed Costs

The pigging inspection project will incur both direct and overhead costs. Direct costs will relate to the works undertaken by the service providers to execute the project and carrying out the verification dig ups. AusNet Services will incur indirect costs as its planning and integrity engineers work to ensure the pipeline pigging project complies with the AusNet Services' licence conditions.

AusNet Services will engage vendors to offer specific services necessary to complete the pigging of the transmission pipeline. The vendors are required to be engaged for the following works:

1) Pigging Company: To provide pigging equipment, pigging operation services and delivering detailed report. The pigging company will be selected based on its capability to provide the requested services, availability and a competitive tender process.
2) Other Licensees: To fabricate and install the pig launcher and receiver facility at Dandenong and Docklands facility respectively.
3) Project Management: A Project Management consultant will be engaged to deliver the project achieving safety and efficiency objectives and to act on behalf of all three licensees.
4) AusNet Services' Operational Contractor: Downer will provide operational support and emergency management. Downer's field crew will be required to track the pig along the pipeline during pigging and to operate branch valves to prevent liquids or waste material entering in AusNet Services' distribution networks.
5) Legal Consultant: To draft and execute a legal agreement amongst the licensees and to engage the pigging contractor and the project management consultant.

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80 AEMO (Australian Energy Market Regulator) report 'Ringmain Pigging 2009', Document Number: 291637.

Indirect costs for preparing and reviewing the framework and procedures are required to ensure the pigging project complies with the requirement of AusNet Services' licence conditions. Post pigging, verification dig-ups will be carried out. An estimated 150 hours of work will be required by the senior pipeline/asset management engineer, principal planning engineer, administration officer and corporate lawyer during the life of the project.

Table 7-10: Proposed costs for pigging activity (real $2017)

	Estimation method	$m
Direct costs	Based on historic costs	0.354
Overhead costs	Based on contractor unit rates and internal labour costs	0.055
Total costs		**0.409**

Source: AusNet Services

As mentioned above, the last pipeline inspection through intelligent pigging was performed in 2009. As such, this cost is not included in AusNet Services' base year costs, but is necessary expenditure to meet regulatory obligations in the next period. The timing of these inspections means they unlikely to ever be captured in base year costs, as they only occur every 10 years, early in an access arrangement period. The timing of AusNet Services' GAAR determinations means these costs will be represented where the revealed-cost approach is applied. It is therefore necessary to forecast intelligent pipeline inspection as if it were a one-off opex cost in the forecast period. This will afford AusNet Services a reasonable opportunity to recover its efficient costs, in accordance with the revenue and pricing principles. Further details regarding this step change are provided in Appendix 7C.

7.5.3 Summary of step changes

In developing a forecast of opex attributable to step changes that is reflective of efficient costs, AusNet Services has developed bottom-up cost estimates based on actual costs incurred for similar projects or activities, or using market rates where applicable. AusNet Services' proposed step changes are summarised in Table 7-11 below.

Table 7-11: Step changes ($m, real $2017)

Step changes	2018	2019	2020	2021	2022	Total
Marketing program	4.37	4.37	4.37	4.37	4.37	**21.8**
Ring-main pigging	-	-	-	0.41	-	**0.41**
Total	4.37	4.37	4.37	4.78	4.37	**22.2**

Note: may not add due to rounding

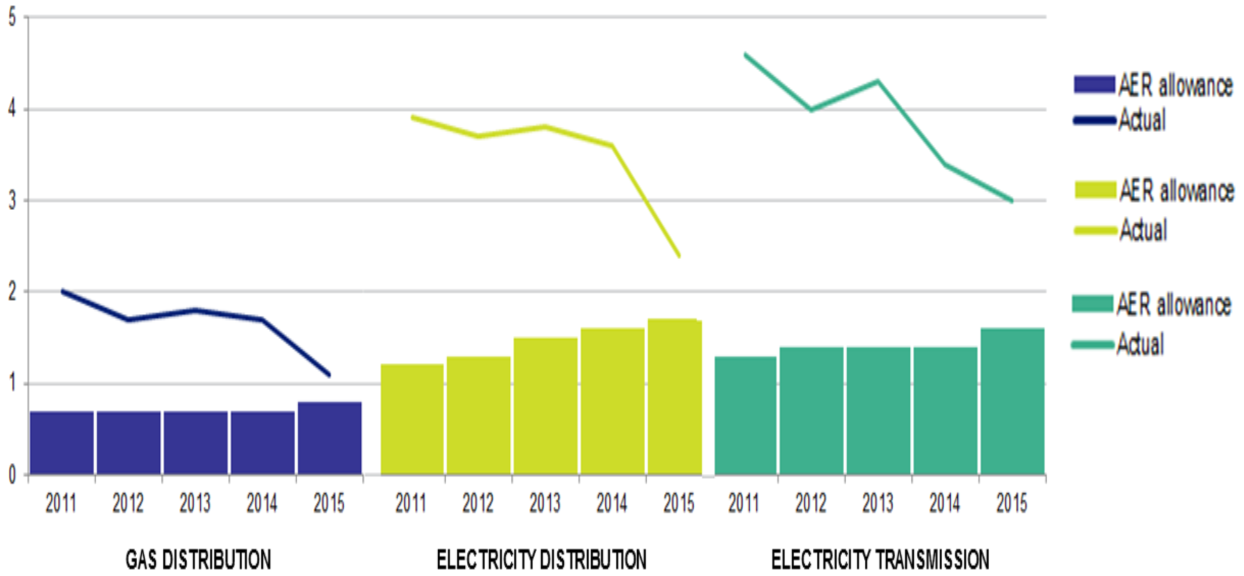
7.6 Debt raising costs

The AER's current approach to forecasting debt raising costs is to apply a 'PTRM benchmark' cost. Applying this approach results in an assumed debt raising cost equivalent to 0.8 to 0.95 basis points per annum of the value of the regulated asset base.

AusNet Services' actual costs for raising debt are materially higher than the AER's allowance. The disparity has led to **$27 million** of unrecovered costs over the last five years across

AusNet Services' portfolio of electricity distribution, electricity transmission and gas distribution (see Figure 7-16).

Figure 7-16: Variance in debt raising costs ($m, real 2017)



Source: AusNet Services

In a recent draft decision for AusNet Services' transmission network, the AER rejected the inclusion of actual debt raising costs in the base year and instead forecast these costs using its benchmark approach.[81] The AER's view was that AusNet Services' debt raising costs are either inefficient or do not capture the same scope of costs as the benchmark, and lack transparency.

AusNet Services disagrees with the AER's view for the following reasons:

- The use of a benchmark approach is inconsistent with the AER's preference to use actual revealed costs to forecasting opex;
- The AER has not provided evidence to justify its preference for the benchmark approach over the revealed cost approach for certain categories of expenditure, particularly in circumstances where the AER has recently rejected category-specific forecasts for other expenditure categories;[82]
- AusNet Services faces a strong incentive to minimise its debt raising costs to an efficient level because it retains the full benefit of any underspend, and must bear the entirety of any overspend; and
- AusNet Services' actual debt raising costs are verifiable and audited annually.

AusNet Services believes that the revealed cost approach is the appropriate way to forecast debt raising costs.

A revealed cost approach (based on 2015 costs) results in an allowance for debt raising costs of $1.1 million per annum. The AER's approach results in a debt raising allowance of $0.81 million per annum. Given that these two approaches do not lead to a materially different outcome for the gas network, AusNet Services forecast its debt raising costs for this forthcoming access arrangement period using the AER's current PTRM benchmark approach.

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[81] AER, *AusNet Services Draft Decision*, Attachment 3 – Rate of return, July 2016, p. 341.

[82] See, for example: AER, *Final Decision AusNet Services distribution determination 2016 to 2020, Attachment 7 – Operating Expenditure*, May 2016, pp 7-94, 7-97 and 7-98; and AER, *Draft Decision AusNet Services transmission determination 2017-18 to 2021-22, Attachment 7 – Operating Expenditure*, July 2016, pp. 7-33 to 7-36.

Notwithstanding this, AusNet Services maintains the view that debt raising costs should be forecast using a revealed cost approach, and that such an approach should be adopted in the future. Accordingly, AusNet Services encourages the AER to reconsider its benchmark approach at the next review of its Expenditure Forecast Assessment Guideline, and engage in an open and informed debate on this issue with all stakeholders. In particular, it is important that the approach to forecasting debt raising costs not continue to be integrated into the consideration of the cost of debt as it has been to date. A wide-ranging and thoughtful discussion about the appropriateness of category-specific forecasts in general should result in a regulatory approach which is consistent with, and best achieves, the National Gas and Electricity Objectives.

Calculating debt raising costs

At the start of the access arrangement period, AusNet Services' gas distribution business has an opening RAB of $1.56 billion (nominal). On the basis of the assumed benchmark gearing ratio of 60:40, the notional debt component of the opening RAB is approximately $936 million (nominal). Based on the AER's current method, this will require around 3-4 bond issues over the forthcoming access arrangement period.

Therefore, the appropriate benchmark for AusNet Services' debt raising costs is 8.4 basis points per year. The table below shows AusNet Services' proposed debt raising cost forecasts based this approach.

Table 7-12: Proposed debt raising costs ($m, real 2017)

Output growth components	2018	2019	2020	2021	2022	Total
Debt raising costs	0.79	0.80	0.81	0.82	0.83	**4.05**

Source: AusNet Services, AER's PTRM

7.7 Summary of total opex

AusNet Services is forecasting opex of $308.5 million, inclusive of forecast step changes, for the next access arrangement period. The table below shows the total forecast opex for each year of the period.

Table 7-13: Total opex forecasts ($m, real 2017)

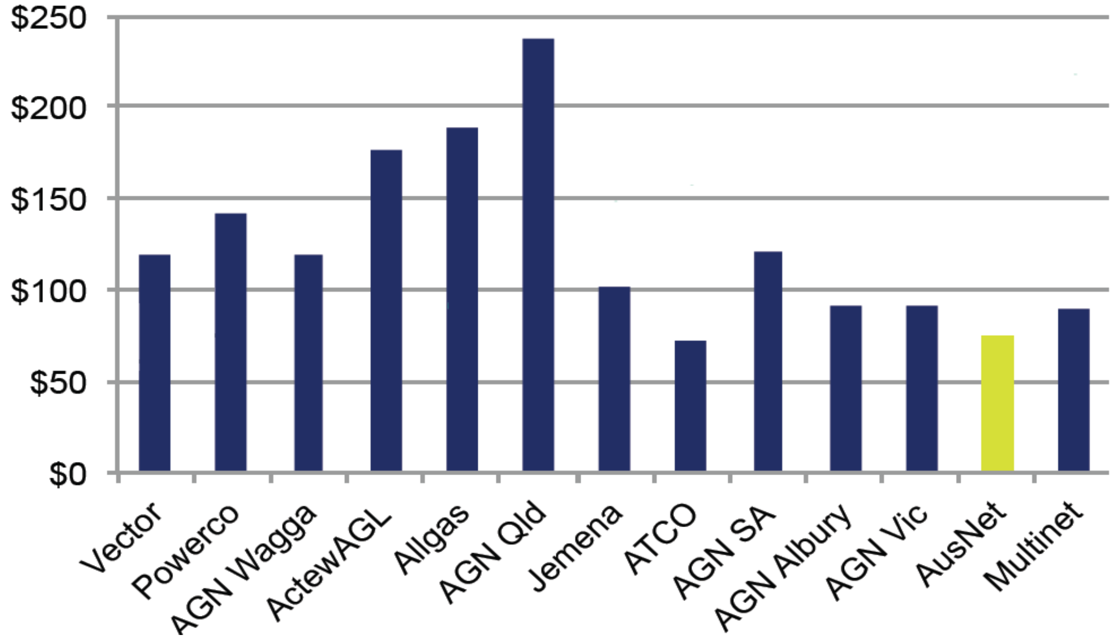
	2018	2019	2020	2021	2022	Total
Base year opex	51.5	51.5	51.5	51.5	51.5	257.5
Rate of change	1.7	2.9	4.1	5.5	6.7	20.9
Step changes	4.4	4.4	4.4	4.8	4.4	22.3
Debt raising costs	0.79	0.80	0.81	0.82	0.83	4.05
Total opex	**58.4**	**59.6**	**60.8**	**62.6**	**63.4**	**304.8**

Source: AusNet Services

Note: Including debt raising costs, may not add due to rounding.

As indicated by Economics Insight's analysis, AusNet Services' opex in the current access arrangement period has been significantly lower than that of its peers. AusNet Services' average opex per customer between 2011 and 2015 is 20% and 10% lower than AGN (Vic) and MultiNet respectively (see Figure 7-17).

Figure 7-17: Annual opex per customer $2010 (2011-2015 avg)



Source: Economic Insights, Benchmarking Gas Businesses Opex and Capital Efficiency, June 2016

The information and analysis presented in this chapter and the appendices demonstrate that:

- AusNet Services' opex forecast has been arrived at on a reasonable basis and represents the best possible forecast in the circumstances, in accordance with the requirements of rule 74(2).
- AusNet Services' opex forecast is consistent with the costs that would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice to achieve the lowest sustainable cost of delivering pipeline services, in accordance with the requirements of rule 91(1).
- AusNet Services has explained the basis of its forecasts or estimates in accordance with rules 74 and 75, which require all forecasts to be reasonable and supported by a statement of explanation and for source data to be provided.

All other rules requirements relating to the preparation and presentation of opex forecasts have been met.

7.8 Supporting documents

In addition to the PTRM and relevant parts of the RIN templates submitted with this proposal, the following documentation is provided in support of this chapter:

- The Productivity Performance of Victorian Gas Distribution Businesses, Economic Insights (Appendix 7A);
- Benchmarking the Victorian Gas Distribution Businesses' Operating and Capital Costs Using Partial Productivity Indicators, Economic Insights (Appendix 7B);
- Details Of Intelligent Inspections Projects (Appendix 7C);
- Consistency of the Victorian Gas distribution businesses' joint marketing campaign with rule 91 of NGR, Axiom Economics (Appendix 7D);
- Utilities Sector and Construction Industry Wage Forecasts to 2022, BIS Shrapnell (Appendix 7E).

8 Capital Base and Depreciation

8.1 Key points

- The opening capital base reflects the value of past investments that we have made in the network, but not yet fully recovered. AusNet Services' opening capital base is expected to be $1,575.4 million on 1 January 2018 and is projected to increase to $1,693.2 million ($real 2017) by the end of the 2018-2022 access arrangement period.
- AusNet Services' capital base projections for the forthcoming access arrangement period reflects forecasts of conforming capital expenditure, straight-line depreciation, inflation and customer contributions and complies with the requirements of the NGR.
- AusNet Services will continue to apply the straight-line depreciation method to the opening capital base. However, it is proposed that from 2018 onwards, AusNet Services will use a year by year tracking method to enhance the accuracy of depreciation. This is consistent with the method applied to calculating depreciation for our electricity distribution network.

8.2 Introduction

This chapter sets out how AusNet Services proposes to roll forward the RAB over the current access arrangement period taking into account its capex, disposals and depreciation and then project that value forward to the end of the next access arrangement period.

In preparing its depreciation proposal, AusNet Services has carefully considered the requirements of the NGR and consumer feedback regarding the rate of depreciation. The principal provisions of the NGR are:

- Rule 88 sets out requirements relating to the depreciation schedule. The depreciation schedule describes the basis on which the pipeline assets are to be depreciated for the purpose of determining a reference tariff. The schedule may consist of a number of separate schedules, each relating to a particular asset or class of assets.
- Rule 89 specifies criteria governing the design of the depreciation schedule. To summarise, the depreciation schedule is to be designed so that:
  - reference tariffs vary over time in a way that promotes efficient growth in reference services;
  - an asset or class of assets can be depreciated only once over its economic life;
  - adjustments to depreciation are allowed to reflect changes in the expected economic life of assets; and
  - depreciation may allow for the service provider's reasonable cash flow needs.
- Rule 90 sets out provisions regarding the calculation of depreciation for rolling forward the capital base from one access arrangement period to the next. It requires that the access arrangement must resolve whether depreciation of the capital base is to be based on forecast or actual capital expenditure.

In light of these requirements, the remainder of this chapter is structured as follows:

- Section 8.3 explains the opening capital base as at 1 January 2018;
- Section 8.4 presents AusNet Services' asset lives and depreciation methodology; and
- Section 8.5 sets out AusNet Services' forecast depreciation and projected capital base.

8.3 Opening Capital Base as at 1 January 2018

AusNet Services' calculation of the opening capital base as at 1 January 2018, being the start of the forthcoming access arrangement period, involves the following steps:

- Adopt the AER's current determination for the opening capital base, which is $1275.3 million ($ nominal) as at 1 January 2013.
- Apply the 'all-lagged' inflation approach in the AER's RAB roll forward model consistent with the methodology used in the previous access arrangement period[83].
- Adjust the opening capital base for differences between the estimated and actual capital expenditure in 2012.
- Roll forward the adjusted capital base to 1 January 2018 by making the following adjustments, all expressed in December 2017 prices:
    - add actual capex or forecast capex (where actual data is not available) for the current regulatory period;
    - deduct actual or forecast customer contributions;
    - deduct actual disposals; and
    - deduct the AER's depreciation allowance, in accordance with the current access arrangement provisions.

In accordance with the calculations described above, the written-down value of the rolled forward capital base as at 1 January 2018 is $ 1,575.71 million as shown in Table 8-1 below.

Table 8-1: Opening Capital base as at 1 January 2018 ($m nominal)

	2013	2014	2015	2016	2017
Opening capital base	1,275.30	1,339.16	1,407.35	1,471.01	1,510.56
Actual Net Capex	86.77	94.07	92.56	83.68	99.59
Actual Straight-line Depreciation	-48.47	-54.82	-61.38	-66.24	-70.46
Actual Inflation on Opening RAB	25.56	28.94	32.48	22.12	19.58
Closing capital base	1,339.16	1,407.35	1,471.01	1,510.56	1,559.27
Difference Between Actual and Forecast Net Capex					12.05
Return on Difference - Net Capex					4.38
Capital Base as at 1 Jan 2018					**1,575.71**

Source: AusNet Services

The information presented in this table, together with the preceding information, explains how the opening capital base is arrived at and provides a demonstration of how the capital base increased or diminished over the current access arrangement period, in accordance with rule 72(1)(b) of the NGR.

[83] AusNet Services has made modifications in the AER's RFM to accommodate the all-lagged inflation approach.

8.4 Asset lives and depreciation methodology

All assets in the RAB will continue to be depreciated on a straight-line basis, with the standard lives for new assets largely consistent with the standard lives approved in the AER's Final Decision PTRM (2013-17), as set out below. The table below also shows the standard lives proposed for all subsequent capital additions.

Table 8-2: Asset categories and lives for depreciation purposes

Asset Class Name	Standard Life (years)	
	Current AA period	Future AA periods
Transmission Pipelines	60	60
Distribution Pipelines	60	60
Service Pipes	60	60
Cathodic Protection	60	60
Supply Regulators / Valve Stations	50	50
Meters	20	15
SCADA & Remote Control	15	15
Land & Building	40	40
Other – IT	5	5
Other – Non IT	5	5
Land	n/a	n/a

Source: AusNet Services

It should be noted that the 'Distribution pipelines' asset class was introduced in the 2008-2012 GAAR to reflect the asset replacement program. The AER determined it was appropriate to adopt a shorter asset life for low pressure pipelines, which recognises the planned capex projects to replace low pressure mains with high pressure mains by 2025.

The standard life for metering assets has also been updated to 15 years to reflect the current estimated technical life of these assets. This is now standard practice and consistent with the AER's approach for South Australian and other Victorian gas networks. Previously, the standard life adopted was 20 years.

AusNet Services' proposal results in existing assets and new additions being depreciated on a straight-line basis, in accordance with the lives in the above table. Under AusNet Services' approach:

- reference tariffs vary over time in a way that promotes efficient growth in reference services (in accordance with rule 89(1)(a));
- an asset or class of assets will be depreciated only once over its economic life (in accordance with rule 89(1)(b) and (d));
- adjustments to depreciation reflect changes in the expected economic life of assets (in accordance with rule 89(1)(c)); and

- the depreciation profile allows for AusNet Services' reasonable cash flow needs to meet financing, non-capital and other costs (in accordance with rule 89(1)(e)).

8.5 Forecast depreciation and projected asset base

The AER determines regulatory depreciation as straight-line depreciation less the inflation indexation that is applied to the RAB. This section discusses the determination of straight-line depreciation to apply in determining regulatory depreciation for the next access arrangement period.

Straight-line depreciation

Recent energy trends have created a high level of uncertainty about the future use of gas networks. In response to significant changes to the energy market, it has been suggested that networks increase the rate at which capital is recovered from customers by applying accelerated depreciation to assets.

The AER's current approach is to depreciate new investment equally over the expected life of the asset, typically over 60 years. The straight-line approach has the advantage of being easily understood, transparent and capable of being replicated on an ongoing basis. The straight-line approach has been applied on the basis that the economic benefits from the assets will be realised equally over the useful/remaining life of those assets.

The rapidly evolving energy market environment poses a significant challenge to the current approach to depreciation. It is much less certain that customers in 50 or more years from now will be willing to pay for the costs of today's investments. This uncertainty raises important questions regarding inter-generational cost recovery and whether the current regulatory approach is sustainable.

As such, the assumption regarding the economic benefits of the assets being realised equally over the life of an asset is no longer certain. There has been an ongoing decline in the average usage of gas amongst customers and a slowing in connection rates. This reflects a range of factors, including warming weather trends, continuous improvements in energy efficiency, customer appliance preferences and the installation of solar equipment in recent years.

The implication of these factors is that the straight-line approach to depreciation may not be sustainable into the future. Depending on the impact of these factors, the ongoing (and likely higher rates of) decline in gas usage puts at risk the ability to recover the value of the assets through the continual application of straight-line depreciation.

The AER has rejected increasing the rate of depreciation for new assets in a series of recent regulatory decisions across gas and electricity distribution and transmission networks. Most recently, the AER rejected accelerating the rate of depreciation for new assets in its Draft Decision for AusNet Services' Transmission network on the basis that it may not reflect the nature of the assets over their economic life.

The notion of accelerated depreciation was not supported by customers and stakeholder groups during consultation undertaken by AusNet Services in mid-2016 for this gas access arrangement proposal. Stakeholders agreed that infrastructure costs should be spread evenly over the lifetime of an asset, regardless of utilisation at a particular point. This response was influenced by the level of uncertainty around future energy consumption behaviours. Stakeholders suggest that a strong evidential case for future utilisation risk is required.

While remaining concerned over future utilisation levels, AusNet Services is proposing to continue to apply the straight-line depreciation method over the next access arrangement period. AusNet Services reiterates that this approach carries some risk, particularly regarding our ability to recover the value of the asset base in an environment of declining network usage.

Forecast depreciation

In determining forecast depreciation for the next access arrangement period, we have applied the year-by-year method to set depreciation in respect of forecast capex (also referred to as the 'baseline' tracking approach). This approach has the following strengths:

- It more closely reflects the nature of the assets and their economic life;
- It provides a greater degree of transparency that is likely to aid future regulatory decision making; and
- It ensures that total depreciation (in real terms) equals the initial value of the assets.

The year-by-year method was approved by the AER in recent decisions for the Victorian electricity distributors. Adopting this method for AusNet Services' gas distribution business provides greater consistency in the regulation of gas and electricity distribution.

Table 8-3 below sets out AusNet Services' forecast depreciation for the forthcoming access arrangement period.

Table 8-3: Forecast depreciation

(Nominal $M)	2018	2019	2020	2021	2022
Nominal Straight-line Depreciation	82.7	72.5	76.4	81.0	85.8
Inflation on Opening RAB	26.0	26.9	27.9	28.8	29.6
Nominal Regulatory Depreciation	56.7	45.6	48.5	52.1	56.2

Source: AusNet Services

AusNet Services' forecast capital base accounts for inflation by indexing the capital base. This is consistent with the approach taken in past revisions to AusNet Services' access arrangements, with the NGR, and with the precedent set in the majority of Australian regulatory decisions.

Inflation

The forecast of inflation is an important component of the building block determination. It influences the determination of a number of building blocks, including the indexation of the asset base and depreciation. If the forecast of inflation used to derive the building blocks is not accurate, there is the potential for under-recovery of costs (if the forecast of inflation is too high) or over-recovery of costs (if the forecast is too low).

The AER's approach in recent decisions, relying on Reserve Bank of Australia (RBA) short term inflation forecasts and long term inflation targets, is not producing the best possible forecast of inflation, with the consequence that service providers will be undercompensated. Such an outcome is inconsistent with the revenue and pricing principles, and does not contribute to the achievement of the NGO.

AusNet Services' proposal is to forecast inflation by reference to a market-based approach (the breakeven approach) which AusNet Services submits gives rise to the most accurate forecast of inflation currently available.

AusNet Services proposes to derive forecast inflation using the break-even approach over a 10 year term. As a placeholder, using an averaging period from 1 September to 30 September 2016 gives rise to a forecast of inflation of 1.65%.[84] Further details regarding AusNet Services' forecast inflation methodology is provided in Chapter 9 of this access arrangement proposal.

Projected capital base

The projected capital base for the forthcoming access arrangement period is set out in the table below. The table shows the calculation of the opening asset base and forecast depreciation as

[84] CEG, *Best estimate of expected inflation*, September 2016.

described in this chapter. In addition, it includes forecast capital expenditure and customer contributions over the forthcoming access arrangement period as described in Chapter 6.

Table 8-4: Projected capital base

(Nominal $M)	2018	2019	2020	2021	2022
Opening capital base	1,575.7	1,628.5	1,689.9	1,747.2	1,795.8
Net Capex	109.4	107.0	105.9	100.7	97.8
Straight-line Depreciation	-82.7	-72.5	-76.4	-81.0	-85.8
Inflation on Opening RAB	26.0	26.9	27.9	28.8	29.6
Closing capital base	**1,628.5**	**1,689.9**	**1,747.2**	**1,795.8**	**1,837.5**

Source: AusNet Services

Note: AusNet Services has forecast zero asset disposals over the 2018 to 2022 access arrangement period.

The information presented in the above table and the capex forecasts provided in Chapter 6 satisfy rule 72(1)(c), which requires AusNet Services to present the projected capital base over the access arrangement period, including:

- a forecast of conforming capital expenditure for the period and the basis for the forecast; and
- a forecast of depreciation for the period including a demonstration of how the forecast is derived on the basis of the proposed depreciation method.

9 Rate of Return and Corporate Tax Allowance

9.1 Key points

- The NGL recognises the importance of ensuring that regulation allows service providers a reasonable opportunity to recover at least their efficient costs, which includes the rate of return (weighted average cost of capital, or WACC).
- Consistent with the Australian Competition Tribunal's first decision on the AER's Rate of Return Guideline, AusNet Services has adopted the fundamental steps of the AER's Guideline approach for estimating the cost of equity. However, in current market conditions this approach warrants a higher Market Risk Premium than has recently been applied by the AER.
- AusNet Services has applied the AER's Guideline transition to a trailing average approach. However, AusNet Services proposes to measure the return on debt using the data published by the RBA.
- AusNet Services continues to propose a value of imputation credits of 0.25. This value has been upheld by the Australian Competition Tribunal in several decisions and reflects the value implied by the most reliable and up to date evidence available.
- The AER's inflation forecasting methodology produces outcomes that are far higher than inflation over the last 12 months and forward looking expectations of inflation as informed by financial markets. The AER's methodology has led to negative real risk free rates being applied in its recent decisions. However, investors can access a positive real risk free return in Australian markets today. The AER's inflation forecast does not reflect an accurate or realistic estimate of inflation expectations.
- AusNet Services' allowance for corporate tax reflects the straight-line method of tax depreciation applied in the PTRM for historic and forecast capex. It is noted that this method was approved by the AER in its recent Victorian electricity distribution determinations

9.2 Introduction

This chapter deals with the allowed rate of return, to be determined as a weighted average of the return on equity and the return on debt on a nominal vanilla basis consistent with the estimate of the value of imputation credits.[85]

Interrelated with the rate of return is the forecast of inflation used to adjust revenue in order to maintain a real rate of return. Accordingly the methodology for estimating inflation is also addressed in this chapter. Relevant interrelationships are also addressed at the end of this chapter.

Network service providers require capital to invest in their business. These funds are provided by the owners (through equity) or lenders (through debt). Both the owners and lenders require a return on the funds they provide and this return reflects the single largest cost to networks.

In order to promote the National Gas Objective it is crucial that the rate of return be set to enable a network to attract necessary capital and undertake efficient investment in the network in the long term interests of its customers. To promote efficient investment, a regulated network must be provided with a reasonable opportunity to recover its efficient costs, which includes its financing costs. Specifically in relation to the allowed rate of return, this requires:

[85] NGR 87(4)(b)

- The allowed rate of return to be estimated such that it achieves the allowed rate of return objective (**ARORO**), being a rate of return commensurate with the efficient financing costs of a benchmark efficient entity (**BEE**) with a similar degree of risk as that which applies to the service provider in respect of reference services.
- The return on equity must reflect the returns required by owners in order to invest in the BEE and in doing so have regard to prevailing market conditions.
- The return on debt must provide the network with a reasonable opportunity to recover at least its efficient debt financing costs of the BEE.

The AER published its Rate of Return Guidelines in December 2013 (Guidelines). The AER has, with some exceptions, largely applied its Guideline approach in its decisions made since 2013.

Since that time, a number of networks have sought merits (and judicial) review of the AER's decision, including in relation to the return on equity and the return on debt. The Tribunal handed down its decision on a number of reviews in February 2016. The AER has sought judicial review of the Tribunal's decision by the Full Federal Court. In addition, a number of merits and judicial review applications remain on foot.[86]

For the reasons set out in this Proposal:

- **Return on Equity** – AusNet Services' position is that the AER's Guideline and Draft Decision approach does not give rise to an estimate of the return which is consistent with the ARORO, nor does it contribute to the achievement of the National Gas Objective or meet the Revenue and Pricing Principles. However, AusNet Services acknowledges the recent decisions of the Tribunal[87] and:
  - applies the SL CAPM to estimate the required return on equity consistent with the AER's "foundation model" approach;
  - applies an equity beta of 0.7; and
  - does not agree that an MRP estimate of 6.5% is correct and proposes an MRP estimate of 7.5%.
- **Return on Debt** – AusNet Services' proposal is to apply the AER's Guideline transition to a trailing average approach. However, AusNet Services proposes to measure the return on debt using the data published by the RBA.
- **Expected Inflation** – AusNet Services proposes to adopt the break-even approach to estimating forecast inflation over a 10-year term.

The supporting documents submitted and relied upon are listed in Section 9.13. The remainder of this chapter is structured as follows:

- Section 9.3 describes the legislative framework for estimating the rate of return;
- Section 9.4 sets out AusNet Services' estimate of the cost of equity;
- Section 9.5 addresses AusNet Services' cost of debt;
- Section 9.6 sets out the proposed benchmark gearing;
- Section 9.7 details AusNet Services' proposed expected inflation;

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86 For example, merits review applications CitiPower Pty Ltd (ACT 4 of 2016), Powercor Australia Ltd (ACT 5 of 2016), ActewAGL Distribution (ACT 6 of 2016), Jemena Electricity Networks (Vic) Ltd, ACT 7 of 2016 and AusNet Electricity Services Pty Ltd (ACT 8 of 2016) and judicial review of the Tribunal's decision in Application by SA Power Networks [2016] 4 CompT9 in NSD 2032/2016.

87 The lead decision in *Application by PIAC, Ausgrid,* [2016] ACompT1

- Section 9.8 presents a summary of the rate of return parameter values;
- Section 9.9 presents AusNet Services' proposed annual return on capital allowance;
- Section 9.10 sets out information on the value of imputation credits (gamma);
- Section 9.11 presents information on the allowance for corporate tax;
- Section 9.12 describes relevant interrelationships between rate of return parameters, the value of imputation credits and expected inflation; and
- Section 9.13 provides a list of supporting documents and expert reports submitted and relied upon in this chapter.

The information set out in this chapter accords with all of the applicable requirements of the NGL and the NGR.

9.3 Legislative Framework for estimating the Rate of Return

The return on capital building block must be calculated by applying a rate of return determined in accordance with clause 87 of the NGR to the value of the regulatory asset base as at the beginning of the relevant regulatory year.[88]

The allowed rate of return must be determined such that it achieves the allowed rate of return objective (**ARORO**), being:

- That the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.[89]
- The rate of return must be a weighted average of the return on equity and the return on debt and determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits.[90]

In determining the allowed rate of return, regard must be had to:[91]

- Relevant estimation methods, financial models, market data and other evidence;
- The desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and
- Any interrelationships between the estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

The overarching requirements on the AER in estimating the rate of return are to:

- Perform its regulatory functions in a manner that will or is likely to contribute to the achievement of the NGO, being to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.[92]
- Where there are two or more possible decisions open to the AER that will contribute to the achievement of the NGO, the AER must make the decision that it is satisfied will or is likely to contribute to the achievement of the NGO to the greatest degree.[93]
- Take into account the Revenue and Pricing Principles (RPP), being relevantly:

88 NGR 87(1)
89 NGR 87(3)
90 NGR 87(4)(a)
91 NGR 87(5)
92 NGL 28(1)(a)
93 NGL 28(1)(iii)(A)

- That a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services and complying with a regulatory obligation or requirement or making a regulatory payment.[94]
- A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes efficient investment in, or in connection with, a pipeline with which the service provider provides reference services, the efficient provision of pipeline services and the efficient use of the pipeline.
- A reference tariff should allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates.
- Regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline with which the service provider provides pipeline services.
- Regard should be had to the economic costs and risks of the potential for under and over utilisation of a pipeline with which a service provider providers pipeline services.

9.3.1 The Benchmark Efficient Entity (BEE)

A key concept in the determination of the allowed rate of return is the definition of the BEE. The ARORO requires that the rate of return be commensurate with the efficient financing costs of the BEE with a similar degree of risk as that which applies to the same service provider in respect of the provision of the prescribed transmission services.

In its Guideline and recent decisions the AER defines the BEE *as a pure play, regulated energy network business operating within Australia' acting efficiently.*[95]

It is noted that the Australian Competition Tribunal recently found this definition of the BEE to be incorrect. In particular, the Tribunal found that the BEE referred to in the ARORO is not a regulated entity.[96] Rather, the BEE is likely to refer to the hypothetical efficient competitor in a competitive market for those services.[97] The Tribunal also found that the BEE will not necessarily be identical for all service providers.[98] That decision is under judicial review by the Full Federal Court but the decision is yet to be handed down. AusNet Services will monitor legal developments on this issue as they occur.

9.4 Estimating the cost of equity

9.4.1 The approach in the AER Guidelines

The AER published Rate of Return Guidelines on 17 December 2013 (Guideline). In its Guideline, the AER estimates the cost of equity using the “foundation model approach”. The AER uses the SL-CAPM to provide what it describes as a starting point estimate. It then uses other relevant material to inform the parameter estimates for the SL-CAPM and to determine the final return on equity estimate.

9.4.2 Proposal

AusNet Services’ view is that the SL-CAPM has significant shortcomings and that a broader and deeper consideration of other models would be more consistent with the intention behind the

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94 NGL 28(2)

95 AusNet Services transmission determination 2017-18-2021-22 Draft Decision (AusNet Transmission Draft Decision), Attachment 3-24.

96 *Application by PIAC, Ausgrid,* [2016]ACompT1, [907]

97 Ibid at [914]

98 Ibid at [907] and [916]

AEMC's reforms of the Rate of Return Rules. However, AusNet Services acknowledges the Tribunal's decision in *Ausgrid* found the AER's foundation model approach is not an incorrect application of the NER. Accordingly, in this proposal AusNet Services applies the foundation model approach and estimates the return on equity using the SL CAPM. The following section sets out the proposal in relation to the input parameters to the SL CAPM, namely the risk free rate, equity beta and the market risk premium.

9.4.3 Parameter estimates

Risk Free Rate

Consistent with the Guideline, AusNet Services proposes that the risk free rate be estimated based on the average yield on Commonwealth Government Securities (CGS) with a 10 year term over its proposed averaging period.

AusNet Services has proposed a longer (8 month) equity averaging period than the 20 business day period set out in the Rate of Return Guideline. The averaging period chosen means the cost of equity is not as vulnerable to sudden movements in the market that might fall into a 20 business day period but still allows for it to capture fundamental changes in equity markets. The longer averaging period also goes some way to addressing issues associated with the AER's current approach which combines of a spot interest rate with a long term equity premium. The proposed approach protects both customers and business from the "lottery" effect of an ex-ante short sample period selection.

This departure from the Guideline provides a greater level of stability in returns and customer prices across regulatory periods which we believe furthers the long term interests of consumers.

Equity Beta

In its Rate of Return Guideline and recent decisions, the AER estimates equity beta at 0.7, from a range of 0.3 to 0.7. The AER relies primarily on empirical estimates set out in Professor Henry's 2014 report. Professor Henry's 2014 report on which the AER relies presented empirical estimates of equity beta for a set of 9 Australian energy network firms using data from 29 May 1991 to 28 June 2013.

In its recent decisions, the AER considers a number of Professor Henry's regression permutations and concluded that the empirical analysis supported a range for equity beta of 0.4 to 0.7.[99] The AER also concluded that Henry's 2014 results indicated a best empirical estimate of approximately 0.5 for a benchmark efficient entity because most of the estimates are clustered around 0.5.[100]

The AER states that it also considered other empirical studies using different econometric techniques and comparator sets. The AER considered international empirical estimates and concluded that it was satisfied that an equity beta of 0.7 reflects a similar degree of systematic risk as the service provider is exposed to in providing regulated services because:

- *Our range and point estimate are based on direct measurements (that is, empirical estimates) of the equity beta that businesses with a similar degree of risk as AusNet Services have exhibited in the past. We consider these are reliable indicators of the prevailing, forward-looking equity beta for an efficient business (or benchmark efficient entity) with a similar degree of risk as AusNet Services.*
- *Our range and point estimate are consistent with our conceptual analysis. This suggests the systematic risk of AusNet Services[101] would be less than the systematic risk of the market as a whole (that is, its equity beta would be less than 1.0). Our conceptual analysis is supported by McKenzie*

99 For example, AusNet Transmission Draft Decision, Attachment 3 -234.

100 Ibid at pp. 3-236.

101 More precisely, an efficient business (or benchmark efficient entity) with a similar degree of risk as that which applies to AusNet Services in the provision of standard control or prescribed transmission services.

and Partington.[102]

- *The theoretical principles underpinning the Black CAPM are reasonably consistent with an equity beta towards the upper end of our range. For firms with an equity beta below 1.0, the Black CAPM theory may support using a higher equity beta than those estimated from businesses with a similar degree of risk as AusNet Services when used within a Sharpe-Lintner CAPM. This is a result of the Black CAPM relaxing an assumption underlying the Sharpe-Lintner CAPM, which allows for unlimited borrowing and lending at the risk free rate.*[103] *However, we do not consider the theory underlying the Black CAPM warrants a specific uplift or adjustment to the equity beta point estimate. The reasons for our use of the Black CAPM theory are set out in more detail in section B.2.3.*
- *We recognise the importance of providing stakeholders with transparency and predictability in our rate of return decisions, which we consider is consistent with the achievement of the ARORO.*[104] *In this context, a point estimate of 0.7 is consistent with our Guideline (which was developed following extensive consultation) and is a modest step down from previous regulatory.*[105]

The AER notes that its direct measurements referred to in the first dot point above are primarily based on Professor Henry's 2014 report.[106]

Updated Henry estimates of equity beta

The empirical estimates in Henry's 2014 report relied upon by the AER are now three years old.

CEG has replicated and updated Table 3-30 in the AER's Draft Decision for AusNet Services (Transmission) which sets out the average of re-levered equity beta estimates from Henry's 2014 analysis (OLS, Weekly).[107] CEG extended the analysis from the Henry report to June 2016. The results of CEG's replication and extension of Henry's analysis on individual firm betas over the longest available period, the period excluding the GFC and the "last five years" are set out below.[108]

Table 9-1: Summary of extension results for re-levered OLS weekly individual beta estimates

	Longest available period	Longest available period (excl. tech boom and GFC)	Last five years
Henry original results	0.52	0.56	0.46
CEG extension results	0.60	0.66	0.65
Change	**0.08**	**0.10**	**0.19**

Source: Bloomberg data, CEG analysis

CEG has also replicated and extended Professor Henry's portfolio analysis which forms the basis of the AER's Table 3-31. The updated portfolio analysis is set out in the following table:[109]

102 See: McKenzie and Partington, *Report to the AER, Part A: Return on equity*, October 2014, pp. 10–12; Partington, *Report to the AER: Return on equity (Updated)*, April 2015, p. 31; Partington and Satchell, *Report to the AER: Return on equity and comment on submissions in relation to JGN*, May 2015, p. 6; Partington & Satchell, *Report to the AER: Analysis of criticism of 2015 determinations*, October 2015.

103 However, the Black CAPM replaces this with an assumption of unlimited ability to short sell stocks.

104 Stakeholders, particularly service providers, sought greater certainty of process. See: AER, *Explanatory statement: Rate of return guideline*, December 2013, p. 51; AEMC, *Final rule determination*, November 2012, pp. 42–43, 45, 50; RARE Infrastructure Limited, *Submission to AER's rate of return guidelines consultation paper*, June 2013; The Financial Investor Group, *Response to the AER's rate of return guidelines consultation paper*, June 2013, p. 1; ENA, *Submission to AER's rate of return guidelines issues paper*, February 2013, p. 4; PIAC, *Submission to AER's rate of return guidelines issues paper*, February 2013, p. 17.

105 For example, AusNet Transmission Draft Decision, Attachment 3- 64.

106 Ibid pp. 3-64 and 3-65.

107 Attachment, 3 at 3-234.

108 CEG: *Replication and extension of Henry's beta analysis,* September 2016, Table 13, p. 15.

109 Ibid, Table 14 at p. 16.

Table 9-2: Summary of extension results for re-levered OLS weekly portfolio beta estimates

	P1	P2	P3	P4	P5	P6[110]
Equal weighted						
Longest available period	0.52	0.56	0.52	0.53	0.52	0.54
Increase vs Henry	0.06	0.04	0.02	0.05	0.13	N/A
Longest available period (excl. tech boom and GFC)	0.56	0.56	0.58	0.61	0.61	0.64
Increase vs Henry	0.07	0.04	0.03	0.08	0.16	N/A
Value weighted						
Longest available period	0.61	0.76	0.44	0.46	0.54	0.55
Increase vs Henry	0.11	0.06	0.00	0.04	0.15	N/A
Longest available period (excl. tech boom and GFC)	0.66	0.76	0.53	0.56	0.65	0.66
Increase vs Henry	0.12	0.06	0.01	0.06	0.17	N/A

Source: Bloomberg data, CEG analysis

As noted above, the AER considers an equity beta of 0.7 reflects a similar degree of systematic risk as the service provider, in the above case, AusNet Services. A primary reason why it holds this view is because its range and point estimate are based on direct measurements of the equity that businesses with a similar degree of risk as AusNet Services have exhibited in the past (being Professor Henry's estimates updated by CEG above). CEG's update of Henry's 2014 empirical estimates show that equity betas have increased since the 2014 report. More recent estimates also show an increase in equity beta. In addition to updating Henry's estimates, CEG has undertaken analysis of the last 52 weeks individual beta estimates (using the same approach as Professor Henry). This shows an average re-levered equity beta of 0.775.[111]

The AER in choosing its point estimate of 0.7 from the top end of the range acknowledges the theoretical principles underpinning the Black CAPM are consistent with an equity beta towards the upper end of its range. That is, for firms with an equity beta below 1, the Black CAPM theory may support using a higher equity beta than those estimated from businesses with a similar degree of risk as AusNet Services when used within a SL- CAPM. The AER says that it does not consider the theory underlying their Black CAPM warrants a specific uplift or adjustment to the equity beta point estimate but it does acknowledge that it is consistent with an equity beta towards the upper end of its range.

What the CEG updates show is that even on the AER's own approach, using updated Henry 2014 estimates, equity beta has increased. While AusNet Services has applied an equity beta of 0.7 in this Proposal, it still considers the best estimate of equity beta for the BEE is higher than 0.7.

[110] Portfolio 6 was added by CEG and is the same as Portfolio 5, but excluding Envestra (now Australian Gas Networks) because it has been de-listed.

[111] CEG: Table 12 at 13.

MRP

The AER's Recent Decisions

In its Rate of Return Guideline and recent decisions,[112] the AER's estimate for MRP is 6.5 per cent. In its Draft Decision for AusNet Services' transmission, the AER commenced by establishing a range of MRP estimates from 4.8 to 8.84 per cent from the bottom of its historical averages and the top of its construction of the DGM. It then derived its point estimate from within this range.

The historical excess returns relied upon by the AER are said to range from 4.8 per cent to 6.0 per cent. The AER refers to a baseline estimate for the MRP of 5.5 to 6.0 apparently reflecting a range based on arithmetic averages.

The AER's DGM estimates indicate a market risk premium estimate above this baseline with a range of 7.57 to 8.84 per cent. The AER considers its DGM model to be theoretically sound but to be subject to certain limitations in practically implementing it. The AER considers the DGM estimates provide some support for a point estimate above the range from historical returns.

Despite these so-called limitations, the AER still uses its DGM estimate to establish the upper point of its range of MRP estimates. Moreover, the AER says it has not changed the weight it applies to the DGM,[113] but this is difficult to reconcile with its conclusion.

Consistent with the Guidelines the AER gives limited consideration to other evidence but broadly concludes it supports its MRP estimate of 6.5 per cent.

Historical excess returns

In the Guidelines and its decisions up to April 2015 the AER's view was that the mean historical excess returns supported an MRP range of 5.0% to 6.5%. The bottom of that range was set to 20 basis points above the highest geometric mean estimate and the top of that range was set slightly above the highest arithmetic mean estimate. However, in the Draft Decision for AusNet Services' transmission the AER appears to change its approach to reporting the evidence from historical excess returns. The AER says:

> *"Historical excess returns provide our baseline estimate and indicates a market risk premium of approximately 5.5 to 6.0 per cent from a range of 4.8 per cent to 6.0 per cent. We consider both geometric and arithmetic averages of historical returns. However, we consider there may be evidence of bias in the geometric averages. Therefore, our range for historical returns is based on arithmetic averages."*[114]

The AER provides no explanation of why it now adopts 6.0% rather than 6.5% as the top of its range based on arithmetic averages when the arithmetic averages that it has recently reported range between 5.2% and 6.2%, depending on which historical period is considered,[115] and when two of the five arithmetic mean estimates are above 6.0% and four of the five are above 5.7%. The 4.8% figure is a geometric mean estimate and is therefore irrelevant to a range that is based on arithmetic averages.

Frontier Economics has proposed a corrected arithmetic mean point estimate range of 5.5% to 6.5%. Frontier Economics notes that its range is consistent with the estimates recently reported by the ERA for corresponding time periods. For the reasons set out in section 4.2 of the Frontier Report, AusNet Services adopts a range for historical excess returns of 5.5% to 6.5%.[116]

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[112] For example AusNet Transmission Draft Decision, Attachment 3-45. Powerlink Transmission Draft Decision, Attachment 3-40.
[113] AusNet Transmission Draft Decision, Attachment 3-207.
[114] AusNet Transmission Draft Decision, Attachment 3-59. Powerlink Transmission Draft Decision, Attachment 3-47.
[115] AusNet Transmission Draft Decision, Attachment 3-191-192 Table 3-22. Powerlink Transmission Draft Decision, Attachment 3-104-105, Table 3-16.
[116] Frontier Economics: *The market risk premium*, September 2016, p. 29, paragraph 115.

DGM estimates

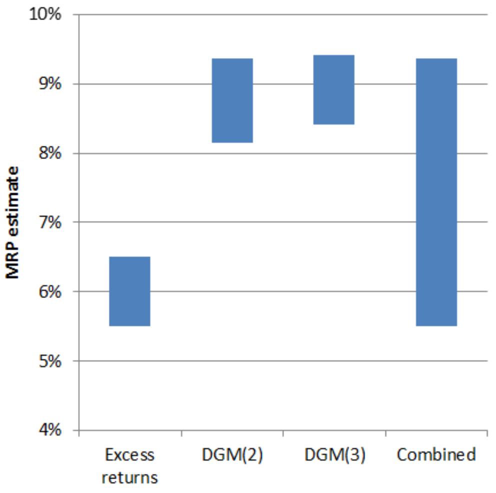
Like the AER in both the Guidelines and its recent draft decisions, AusNet Services applies DGM estimates to establish the top of the range for the estimates for the MRP.

The DGM estimate is set by using the AER's most recent DGM estimates of the required return on the market and subtracting the current 10-year government bond yield of 1.9%. This gives a range for the three-stage DGM of 8.4% to 9.4%.[117]

The range of MRP estimates

Like the AER in both the Guidelines and the Draft Decision, AusNet Services establishes a combined range from the historical excess returns and DGM ranges. This is set out in the figure below.

Figure 9-1: Current MRP range – AER Guideline approach



Source: Frontier Economics calculations based on estimates set out in the AusNet Services Draft Decision, Attachment 3.[118]

A point estimate for the MRP

Having established the combined range, the next step is to select a point estimate for the MRP. The AER's Guideline approach was to select a point estimate from within the combined range where:

> *"This point estimate lies between the historical average range and the range of estimates produced by the DGM. This reflects our consideration of the strengths and limitations of each source of evidence.*"[119]

However, in the Draft Decision for AusNet Services' transmission the AER appears to have altered its approach. This seems to primarily arise from the AER's view that the DGM estimates are not reliable on their own, but that they provide some support for a point estimate above the range from historical returns.

Reliability of DGM estimates

The AER says:

> *"We are not confident that the recent increases in estimates of the market risk premium from these models necessarily reflect an increase in the 'true' expected ten-year forward looking market risk premium. We consider our, and other, dividend growth models are likely to*

[117] Frontier Economics: *The market risk premium*, September 2016, p. 72, paragraph 273.
[118] Frontier Economics: *The market risk premium*, September 2016 page 11, paragraph 35
[119] AER, *Rate of Return Guideline*, Explanatory Statement, p. 97.

> *produce upward biased estimates in the current market. We also consider our, and other, models may not accurately track changes in the return on equity for the market. For these reasons, we do not consider that the dividend growth model estimates are reliable on their own, but that they do provide some support for a point estimate above the range from historical returns."*[120]

It is not clear why the AER's view on its own DGM approach has changed so markedly since the Guidelines. At that time, the AER stated that the DGM approach has the attractive features of being a forward-looking estimate that is more likely to reflect the prevailing market conditions than other approaches and that its then expressed concerns about the reliability of input parameters were mitigated by its preferred implementation.

For the reasons expressed in section 7.2 of the Frontier Report, AusNet Services submits that the concerns the AER raises above are not new or have not intensified since then and there is no reason to suggest that the AER's concerns are any more or less important than at the time of the Guidelines. Since the Guidelines, the only thing that has changed in relation to the AER's DGM estimates is that they are now higher.

A point estimate above the range from historical returns

Even if the DGM estimates only provide some support for a point estimate above the range from historical returns, once that range is corrected to be 5.5% to 6.5%, it is clear that on the AER's own analysis a MRP estimate of 6.5% is too low.

A point estimate from the combined range

Frontier Economics has identified the sorts of considerations that the AER applied when selecting its Guideline MRP of 6.5%. Applying those same sorts of considerations to the current evidence that the AER has compiled, the result is an estimate of 7.5%[121]

Frontier identifies the following factors that appear to be relevant to the AER's adoption of a point estimate MRP of 6.5% in the Guidelines at that time:

a) The AER's historical excess returns mid-point estimate is 6.0%[122] and its mid-point three-stage DGM estimate is 7.1%.[123] The mid-point of these two estimates is 6.55%;

b) The AER adopted an upper bound of 6.5% from its historical excess returns approach and a lower bound of 6.7% from its three-stage DGM approach. The mid-point of this gap between the two ranges is 6.6%;

c) The AER's historical excess returns range and two-stage DGM range overlapped in the region of 6.1% to 6.5%. The mid-point of this region of overlap is 6.3%;

d) The combined range adopted by the AER was 5.0% (the lower bound of the excess returns range) and 7.5% (the upper bound of the DGM range). The mid-point of the combined range is 6.3%; and

e) If the historical excess returns range is based on arithmetic means (which is consistent with the AER's subsequent decisions) the combined range is 5.7%124 to 7.5%, with a mid-point of 6.6%.

Frontier reaches an estimate for the MRP adopting these factors as follows:

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120 AusNet Transmission Draft Decision, Attachment 3-59.

121 Frontier Economics: *The market risk premium*, September 2016, pages 71-73, paragraphs 270-274.

122 AER, *Rate of Return Guideline*, Explanatory Statement, p. 93.

123 The AER has subsequently stated its preference for the three-stage specification of the DGM. See, for example, JGN Draft Decision, Attachment 3, Appendix C, p. 222.

124 AER, *Rate of Return Guideline*, Explanatory Statement, p. 93.

a) The AER stated that its preferred historical excess returns estimate is 6.0%125 and its mid-point three-stage DGM estimate is now 9.0%. The mid-point of these two estimates is 7.5%;

b) The upper bound of the AER's historical excess returns approach is 6.5% and the lower bound from the AER's three-stage DGM approach is 8.4%. The mid-point of this gap between the two ranges is 7.5%;

c) At the time of the Guideline, the AER's historical excess returns range and its two-stage DGM range overlapped. In the current market conditions, the upper bound of the historical excess returns range is 6.5% and the lower bound of the two-stage DGM range is 8.2%. The mid-point of the gap between these two ranges is 7.4%; and

d) The combined range is from 5.5% (the lower bound of the excess returns range) and 9.4% (the upper bound of the DGM range126). The mid-point of the combined range is 7.5%.

For the reasons set out in section 8 of the Frontier Report, AusNet Services adopts this point estimate of the MRP of 7.5%.

Other relevant material

The AER has recently said:

> *"Survey evidence supports a market risk premium around 6.0 to 6.5 per cent. Other regulators' estimates are used as a cross check and indicate a market risk premium estimate of around 6.5 per cent is reasonable. Conditioning variables indicate that there has not been a material change in market conditions since our October and November 2015 decisions."*[127]

In AusNet Services' view, this material should either be given no weight or alternatively regarded as supporting an MRP of 7.5%.

AER's reliance on survey evidence

Survey evidence is unreliable and should be given no material weight because of methodological shortcomings relating to such issues as the nature of the respondents, the survey response rate and any potential bias in the response rates of different groups, when the survey was conducted and the level of government bond yields at the time, the content and relevance of the questions asked and how and for what purpose the MRP is used.

Moreover, the MRP figures reported in surveys are ex-imputation estimates – they have not been grossed-up to reflect the AER's assumed value of imputation credits. Consequently, before they can be compared to the AER's (with-imputation) 6.5% allowance, they must be adjusted. By way of example, the QCA has concluded that this adjustment requires the addition of 83 basis points.[128]

Other regulator's decisions

Other regulator's decisions do not indicate a market risk premium estimate of around 6.5 per cent is reasonable.

To the contrary, when regulatory decisions made under regulatory regimes with characteristics similar to the Rules (or decisions are adjusted to be comparable to decisions made under the

[125] AER, *Rate of Return Guideline*, Explanatory Statement, p. 97.
[126] Note that the upper bound is currently the same for the AER's two-stage and three-stage DGM approaches.
[127] AusNet Services transmission Draft Decision, Attachment 3, p. 59.
[128] Frontier Economics: *The market risk premium*, September 2016, pp. 34-35, paragraphs128-130.

Rules) are given appropriate weight, these decisions support a MRP of over 7% and in some cases over 8%.[129]

Conditioning variables

AusNet Services submits that no reliance should be placed on conditioning variables in the absence of a formal econometric mapping of these conditioning variables to a point estimate of the MRP. In market conditions of record low government bond yields, the challenge of mapping conditioning information to a point estimate of the MRP is particularly difficult. This is because some of the conditioning variables relate to required returns whereas others relate to risk premiums. For example, the dividend yield is related to overall required returns – a higher yield implies that a given set of dividends is being discounted at a higher rate. By contrast, corporate bond spreads relate to risk-premiums.

When government bond yields are near their long-run average levels, this distinction is much less important as risk premiums in the current and the historical data are computed by subtracting the same base risk-free rate. The analysis in the prevailing market conditions is complicated by the fact that current government bond yields are so far below the historical average over the period for which conditioning information is available.

However, to the extent reliance is placed on conditioning variables, they are generally consistent with a stable required return on equity and a higher MRP than estimated by the AER.

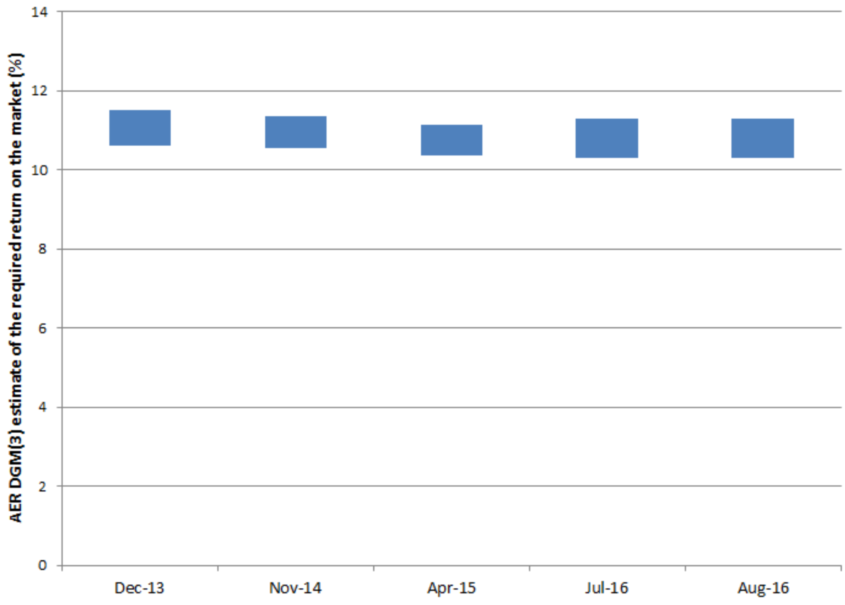
Market and other evidence of the required return on equity

The DGM and Wright estimates of the required return on equity

For the reasons discussed above, AusNet Services regards the AER's view that the DGM estimates of the required return on equity are unreliable is wrong.

Applying the DGM suggests that the overall required return on equity has remained remarkably stable since the Guideline, even as government bond yields have fallen sharply. This is illustrated in the figure below.

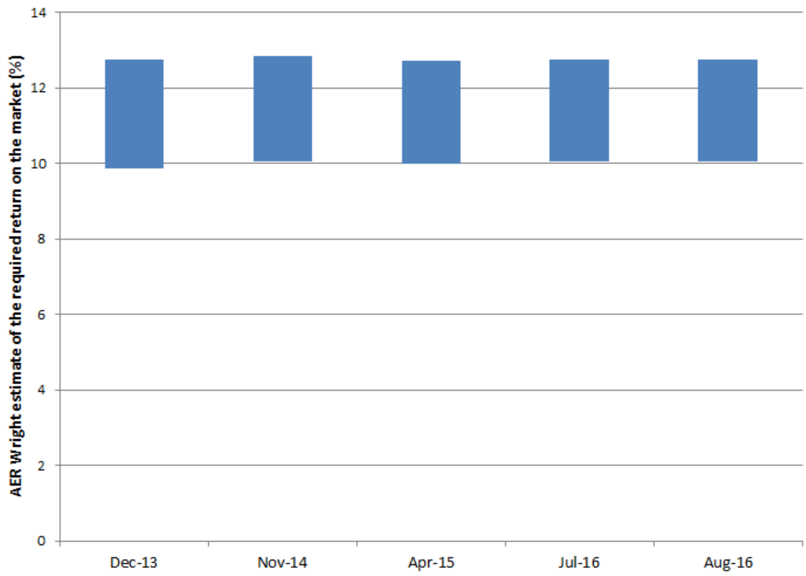
Figure 9-2: AER three-stage DGM estimates of the required return on the market



The AER also reports that its Wright estimates of the required return on the market have remained stable since the Guideline, as summarised in the following figure:

129 Frontier Economics: *The market risk premium*, September 2016, p. 13, paragraph 39.

Figure 9-3: AER Wright estimates of the required return on the market



Moreover, evidence from a range of respected market participants is consistent with the weight of evidence set out above – that the required return on equity has remained relatively stable even as government bond yields have fallen. This position is supported by:

a) Central banks such as the Reserve Bank of Australia and the Federal Reserve Bank of New York;

b) Other regulators such as Ofgem, FERC, the ERA, and IPART;

c) Corporate advisory firms such as McKinsey and NERA-US; and

d) Independent expert firms such as EY, KPMG, Deloitte, and Lonergan Edwards.[130]

Response to the AER's Recent Decisions

The Rules requires a forward-looking estimate of the MRP that is commensurate with the prevailing conditions in the market for equity funds.

The historical excess returns approach estimates the MRP by taking the mean excess return over a long historical period. Self-evidently, this estimate must reflect the average market conditions over the historical period that was used. Logically, this approach can only produce a forward-looking estimate that is commensurate with the prevailing conditions in the market in two circumstances:

- investors always require the same MRP in all market conditions; or
- the current market conditions are the same as the average market conditions over the historical period.

Neither of these conditions is likely to hold.

The prospect that investors always require the same risk premium in all market conditions is inconsistent with the generally accepted view that risk premiums are higher during recessions and financial crises and lower during economic expansions. It is also inconsistent with the AER's own view that the MRP likely varies over time.[131]

130 Frontier Economics: *The market risk premium*, September 2016, pp. 46-54, paragraphs 170-199.

131 AER (2013), *Rate of Return Guideline: Explanatory Statement*, p. 91.

The alternative motivation for the use of mean historical excess returns is that the current market conditions are the same as the average market conditions over the historical period. However, the prevailing market conditions are very different from the average historical conditions in that government bond yields (to which the MRP is added to produce the allowed return on equity) have been at historically low levels.

For the reasons set out in section 3.3 of the Frontier Report, it is irrational to use historical excess return estimates in the manner adopted by the AER. There is no reason to conclude that the AER's use of a consistent historical excess returns approach would produce a forward-looking MRP that is commensurate with the prevailing conditions in the market for equity funds.

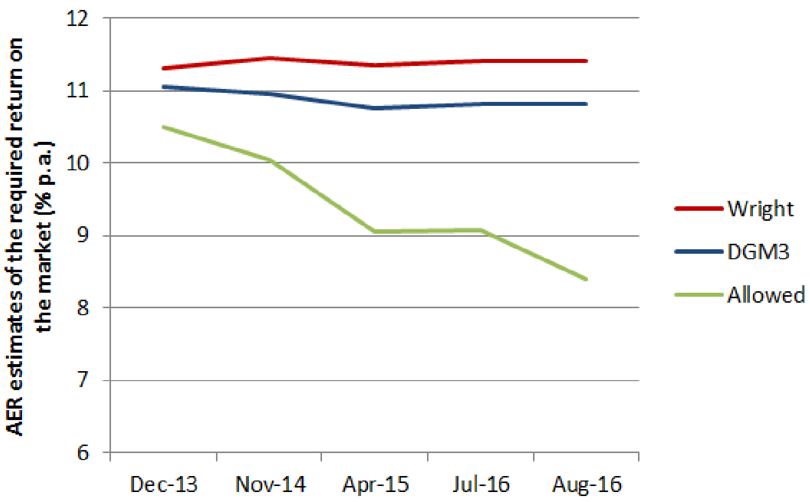
A consistent MRP allowance

Since the Guideline, the AER has allowed an MRP of 6.5% in every one of its draft and final decisions.

As Frontier discusses in section 6 of its Report, the consequence of this is that the allowed return on equity falls one-for-one with falls in government bond yields. The AER adds its risk premium to the contemporaneous government bond yield and the sum is adopted as the allowed return on equity. Since government bond yields fell sharply since the Guideline, the AER's allowed return on equity has also fallen correspondingly.

However, as shown above, the evidence is that the required return on equity has remained stable since the Guidelines. The distinction between the AER's estimates and its regulatory allowance is summarised in the figure below.

Figure 9-4: The required return on the market – AER estimates and allowances



Source: Rate of Return Guideline, Explanatory Statement, Appendix; Ausgrid Draft Decision Attachment 3; Ausgrid Final Decision Attachment 3; AusNet Services Draft Decision, Attachment 3

The AER has maintained the same 6.5% MRP in its decisions since December 2013. Thus, the AER considers that the required return on equity for the average firm[132] has fallen from 10.6%[133] in December 2013 to 8.4%[134] as at September 2016. This represents a decline of more than 25% over the last two and a half years, as illustrated in the figure below.

[132] Which, under the CAPM, is equal to the sum of the risk-free rate and the MRP.
[133] 4.1% + 6.5%.
[134] 1.9% + 6.5%.

Figure 9-5: AER estimate of the required return on equity for an average firm

Source: AER Rate of Return Guideline, December 2013; MRP allowance from AusNet Draft Decision, May 2016; RBA current 10-year government bond yield August 2016.

By contrast, there is a substantial body of evidence to support the propositions that:

a) Real-world investors do **not** determine the return that they require by simply adding a constant figure to the contemporaneous government bond yield; and

b) The required return on equity has **not** fallen by over 25% in the last two and a half years.

The AER's approach to setting the MRP allowance produces implausible outcomes. These implausible outcomes arise because the AER's estimation approach produces a consistent estimate of the MRP. This results in an allowed return on equity that is volatile – it rises and falls one-for-one with every change in government bond yields.

In some market conditions, the true required return on equity may well fall when government bond yields fall. However, in other market conditions the required return on equity may stay constant, or even rise, as government bond yields fall. It depends on the reasons why the government bond yield has fallen.

The application of the AER's approach assumes that the required return on equity always falls one-for one with every decline in government bond yields. This assumption leads to implausible estimates in some market conditions, including the current market conditions.

9.4.4 Cross checks on the overall return on equity

In recent decisions the AER considers various cross checks of its return on equity estimate: The AER considers that in conducting cross checks the relevant matter is the equity risk premium. However, this is an extension of its approach of simply adding a fixed premium to the contemporaneous government bond yield and is therefore flawed and unreasonable for the reasons discussed above. Moreover, under the Rules, it is the return on equity that is relevant. Any cross checks should be conducted at the return on equity level, not the equity risk premium level, as the equity risk premium is only one part of the overall return on equity.

As Frontier notes,[135] even if it were the case that the equity risk premium allowed by the AER were consistent with that adopted by some market practitioners, the task would not finish there – it would still be necessary to consider the other elements of the return on equity. There is

[135] Frontier Economics: *The market risk premium*, September 2016, p. 44, paragraph 165.

evidence that market practitioners regularly adopt higher risk-free rates and apply other uplifts to the return on equity. Moreover, these adjustments and uplifts tend to increase in frequency and magnitude as government bond yields fall – as they have in the prevailing market conditions. Thus, a cross check that ignores these elements will be incomplete.

In any event there are a number of problems with the AER's approach. Frontier gives two examples.[136] Firstly, that the AER's conclusion that its allowed equity risk premium lies within the Grant Samuel range fails to recognise that Grant Samuel specifically disavowed its mechanistic range as being inappropriate for current market conditions and for use in its valuation Grant Samuel corrected that range to one (adjusted for imputation) that the AER's equity risk premium falls outside and below. Second, an example is given of an adjustment to the risk-free rate which, when taken into account, also produces a premium materially above the AER's allowance.

The AER's stated reasons for disregarding this material is based upon supposition that these adjustments may be made in a manner that is inconsistent with the ARORO. However, the AER's conjecture is without foundation, whereas the evidence is clear that market practitioners make uplifts to mechanistic CAPM estimates and risk free rates in order to reflect prevailing conditions in the market for equity funds.

9.4.8 Return on Equity Averaging Period

AusNet Services has used as a placeholder averaging period 5th September 2016 to 30th September 2016.

9.4.9 SL CAPM Parameter estimates

These parameter estimates are based on the indicative averaging period identified above. AusNet Services will update these estimates after the Draft Decision.

Table 9-3: Cost of equity parameters

Parameters	Proposal
Risk free rate	2.04%
Equity beta	0.7
MRP	7.5%
Return on Equity	7.3%#

 # Rounded to a single decimal place in line with the AER's rate of return guideline

9.5 Cost of debt

9.5.1 Key Messages

AusNet Services agrees with the AER's approach to determining the return on debt using a trailing average approach on the basis that this approach recognises that, in practice, the actual return on debt of a benchmark efficient entity (**BEE**) will be determined by historical rates at the time of debt issue. This approach better reflects the actual practice of energy networks and other businesses who raise debt with staggered maturities, and is a more replicable approach, than the "on-the-day" methodology previously adopted by the AER. AusNet Services agrees

[136] Frontier Economics: *The market risk premium*, September 2016, pp. 41-43, paragraphs154-160.

that the trailing average approach reflects an efficient debt financing strategy. AusNet Services also agrees with the AER's use of a 10-year debt term in estimating the return on debt.

In its proposal, AusNet Services has adopted the 10-year transition (from the previous "on-the-day" approach to a trailing average approach to estimating the return on debt) proposed by the AER in the Rate of Return Guideline and adopted by the AER in its recent decisions, although AusNet Services notes that there remains uncertainty about the appropriateness of this approach (and whether it complies with the NGR, the NGO and the ARORO) given a number of diverse recent decisions and unresolved legal processes regarding this issue (discussed further below).

AusNet Services' proposal adopts the AER's Guideline approach to the return on debt, as set out in its Rate of Return Guideline, but differs in the independent third party sources used to calculate the trailing average return on debt.

AusNet Services disagrees with the AER's reliance on a simple average of Reserve Bank of Australia (**RBA**) and Bloomberg data to calculate the return on debt in circumstances where the RBA continues to outperform Bloomberg in terms of the appropriateness and size of the datasets, the transparency of its bond selection and curve fitting methodologies and its track record for accuracy.[137]

While this issue was discussed briefly in the decision of the Australian Competition Tribunal (**Tribunal**) in *Ausgrid*[138] (and no reviewable error found in the AER's decision), AusNet Services submits that further evidence has come to light since the AER's 2015 decisions that further establishes the superiority of the RBA data as compared to Bloomberg. The Bloomberg curve has, since about July 2015, been disproportionately influenced by, and moved almost in 'lock step' with, the yield of a single bond (the Asciano bond). More recently, the Bloomberg curve has been impacted by the addition of two newly issued bonds (by Jemena and Mirvac) that have yields that are outliers for the broad BBB rated category of bonds, and which have caused erratic movements in Bloomberg's yield estimates. These issues emphasise the difficulties that arise from the small dataset utilised by Bloomberg and the lack of transparency of its bond selection and curve fitting methodologies.[139]

The consequence of the AER's approach to data sources is that the AER's approach to estimating the return does not use estimates of the prevailing return on debt that are arrived at on a reasonable basis or that represent the best forecast or estimate possible in the circumstances. Therefore, the resulting return on debt will not be commensurate with the efficient debt financing costs of a BEE with a similar degree of risk as that which applies to AusNet Services and will not comply with the NGR. As a result, AusNet Services may not be able to recover at least its efficient costs (as required by the NGL).

AusNet Services is of the view that the correct approach to estimating the return on debt involves estimating the prevailing rate of return based solely on the data published by the RBA.

Alternatively, if data from Bloomberg is also to be used in calculating the trailing average cost of debt, data from Reuters should also be included (and given equal weight to Bloomberg) in any averaging of third party data sources (on the basis that Reuters' performance is at least as good as Bloomberg's and there is no justifiable reason to give equal weight to data from RBA and Bloomberg and zero weight to data from Reuters[140]).

9.5.2 Background

Prior to the issue of its Rate of Return Guideline in December 2013 (**Guideline**), the AER's approach to estimating the cost of debt involved the use of an "on-the-day" approach, under

[137] CEG, *Criteria for assessing fair value curves: an update*, September 2016.
[138] *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (***Ausgrid***).
[139] CEG, *Criteria for assessing fair value curves: an update*, September 2016.
[140] CEG, *Criteria for assessing fair value curves: an update*, September 2016.

which a fixed prevailing rate of return on debt was estimated and applied throughout the regulatory control period.

In the Guideline, the AER proposed to move to a trailing average approach to estimating the cost of debt under which:

> *…The trailing average will be calculated using a simple 10 year average and will be updated annually. The yearly average will be calculated over a period of 10 or more consecutive business days using yield estimates from an independent third party service provider for a 10 year debt term and the closest proximate for a BBB+ credit rating. There will be a 10 year transition period from the current 'on the day' approach to the trailing average portfolio approach.*[141]

The trailing average approach estimates the average return that would have been required by debt investors in a BEE if it raised debt over a 10 year historical period prior to the commencement of the regulatory period. It assumes that the benchmark efficient entity would have a staggered debt portfolio where 10% of its debt is refinanced each year.

In the Explanatory Statement for the Guideline, the AER has acknowledged that the trailing average (as compared to the "on-the-day" approach) "*more closely aligns with the efficient debt financing practices of regulated businesses and means that prices are likely to be less volatile over time*".[142] The AER's change to this methodology was also described as "*a major change in the regulatory framework… arrived at… through an extensive consultation process and analysis*".[143]

As noted above, AusNet Services agrees with the AER that the trailing average approach better reflects the actual practice of energy networks and other businesses who raise debt with staggered maturities, is clearly better aligned with the actual financing practices of the BEE (whether regulated or unregulated), and is a more replicable approach, than the "on-the-day" methodology previously adopted by the AER. AusNet Services agrees with the AER that a trailing average approach reflects an efficient debt financing strategy.[144]

The question that arises is whether, and in what form, a transition from the "on the day" methodology to the trailing average approach is needed.

Transition

The 10 year transition proposed by the AER (and adopted by AusNet Services in its proposal) involves a transition of the entire return on debt (i.e. not just the risk-free rate component) over a ten year period such that:

- in the first year, the return on debt is based entirely on the prevailing rate of return (similar to the "on-the-day" approach);
- in the second year, the prevailing rate of return is given 90% weight and 10% weight is given to the observed rate in the first year;
- in the third year, the prevailing rate of return is given 80% weight and 10% weight is given to the observed rates in each of the first and second years; and
- so on, until in the tenth year the rate of return represents a full trailing average with equal weighting given to each of the observed rates over the previous ten years.[145]

The AER first implemented the trailing average approach to estimating the cost of debt, and its proposed 10 year transition, in a number of distribution determinations made under the National

141 Guideline, p. 4.
142 Explanatory Statement – Rate of Return Guideline, p. 12.
143 Explanatory Statement – Rate of Return Guideline, p. 101.
144 Explanatory Statement – Rate of Return Guideline, p. 12.
145 Guideline, pp. 19-20.

Electricity Rule in April 2015[146] and an access arrangement final decision made under the National Gas Rules in June 2015.[147]

The businesses the subject of those determinations and decisions sought merits review of the AER's decisions in respect of the return on debt (amongst other things) and, on 26 February 2016, the Tribunal found error in the AER's decisions for each service provider and remitted the decisions "*in relation to the trailing average approach*" to the AER to be remade.[148] Those remitters are yet to be completed by the AER.

The AER has sought judicial review of the Tribunal's decisions in *Ausgrid et al*,[149] including in relation to the return on debt, which reviews were heard by the Full Federal Court in October 2016. The Court's decisions on those applications remain reserved.

In its recent draft and final decisions for various businesses, and notwithstanding the Tribunal's findings in *Ausgrid et al*, the AER has maintained the same approach to a 10 year transition to the implementation of the trailing average, although it has sought to justify that approach on a different basis.

AusNet Services agrees with the change to using a trailing average approach to estimate the return on debt and, while it has concerns about the transition approach adopted by the AER and notes the current legal uncertainty regarding the issue (discussed further below), AusNet Services has adopted the AER's Guideline approach to transition in this proposal.

Data sources

The Guideline provided that the trailing average would be calculated "*[u]sing the published yields from an independent third party data service provider*",[150] but did not specify the third party provider or providers to be used. In its decisions since publication of the Guideline, the AER has determined to adopt a simple average of 10-year debt data published by the RBA and Bloomberg.

AusNet Services disagrees with that approach for the reasons set out in more detail below.

9.5.3 Legislative Framework

NGR 87 provides that:

- the return on debt must be estimated such that it contributes to the allowed rate of return objective (**ARORO**) (NGR 87(8));
- the return on debt may be estimated using a methodology which results in the return on debt being the same or different (or potentially different) for each regulatory year in the access arrangement period (in the latter case, any resulting change to the annual revenue requirement must be effected through the automatic application of a formula specified in the access arrangement decision (NGR 87(9) and 87(12));
- the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting either of, or a combination of, the following:

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146 Distribution determination final decisions published on 30 April 2015 for each of Ausgrid, Endeavour Energy, Essential Energy and ActewAGL Distribution.

147 Final access arrangement decision published on 3 June 2015 for Jemena Gas Networks (NSW) Ltd.

148 *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (***Ausgrid***), order 1(b); *Applications by Public Interest Advocacy Centre Ltd and Endeavour Energy* [2016] ACompT 2, order 1(b); *Applications by Public Interest Advocacy Centre Ltd and Essential Energy* [2016] ACompT 3, order 1(b); *Application by ActewAGL Distribution* [2016] ACompT 4, order 1(c); *Application by Jemena Gas Networks (NSW) Ltd* [2016] ACompT 5, order 1(a).

149 Action nos. NSD 415, 416, 418, 419 and 420 of 2016 in the Full Federal Court of Australia.

150 Guideline, p. 21.

  - the return that would be required by debt investors in a BEE if it raised debt at the time or shortly before the making of the access arrangement decision for the access arrangement period;
  - the average return that would have been required by debt investors in a BEE if it raised debt over an historical period prior to the commencement of a regulatory year in the access arrangement period,
- (NGR 87(10));
- regard must be had to the following factors in estimating the return on debt:
  - the desirability of minimising any difference between the estimated return on debt and the return on debt of a BEE referred to in the ARORO;
  - the interrelationship between the return on equity and the return on debt;
  - the incentives that the return on debt may provide in relation to capital expenditure over the access arrangement period, including as to the timing of any capital expenditure; and
  - any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a BEE that could arise as a result of changing the methodology that is used to estimate the return on debt from one access arrangement period to the next,
- (NGR 87(11)).

Calculating the rate of return on debt requires the making of estimates. NGR 74 provides that such estimates must be arrived at on a reasonable basis and must represent the best estimate possible in the circumstances.

In relation to the return on debt, the AER is also required to makes its decision in a manner that will or is likely to contribute to the achievement of the national gas objective (**NGO**).[151] Further, where there are two or more possible decisions that will or will be likely to contribute to the achievement of the NGO, the AER must make the decision that it is satisfied will or is likely to contribute to the NGO to the greatest degree and specify the reasons as to the basis on which that is the case.[152]

The AER must also take into account the revenue and pricing principles (**RPP**) set out in section 24 of the NGL.

9.5.4 Proposal

AusNet Services proposes that the return on debt be estimated:

- using a 10-year transition from the “on-the-day” approach to a trailing average approach in the manner set out in the Guideline. That is, the return on debt is to be updated each regulatory year through the application of a formula, being that set out in section 6.3.2 of the Guideline;[153]
- adopting a 10-year debt term for the BEE (as per the Guideline);
- adopting a BBB+ credit rating for the BEE (as per the Guideline);
- adopting a gearing ratio of 60% for the BEE (as per the Guideline); and
- using a single third party data source, namely the 10 year estimate from the non-financial corporate BBB rated data series published by the RBA (adjusted to extrapolate the data

[151] Section 28(1)(a) of the NGL.
[152] Section 28(1)(b)(iii) of the NGL.
[153] Guideline, pp. 19-20.

series from a 'target' 10 year term to an 'effective' 10 year term, to interpolate the monthly data points to produce daily estimates, and to convert the estimates from semi-annual to an effective annual rate).

AusNet Services submits that its proposal is consistent with the Guideline, except in relation to the third party data sources used to calculate the return on debt and the benchmark credit rating. AusNet Services' proposal departs from the Guideline in this respect for the reasons set out below.

This proposal gives rise to an indicative cost of debt of 4.52% in the first year of the access arrangement period calculated over AusNet Services' placeholder averaging period.

9.5.5 Transition

As noted above, there remains uncertainty (and unresolved legal processes) as to the appropriate form of transition (from the "on-the-day" approach to a trailing average approach) that satisfies the requirements of the NGR, as discussed below.

In the face of such uncertainty, AusNet Services has proposed the Guideline approach to transition, but sets out below a summary of the issues in contention and which are the subject of ongoing legal reviews. AusNet Services will continue to monitor these issues as they develop.

Immediate or no transition

The NGR require that both the overall allowed rate of return be determined such that it achieves the ARORO,[154] and that the return on debt for each regulatory year be estimated such that it contributes to the achievement of the ARORO.[155]

The ARORO is that:

> *…the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services….*[156]

The AER stated in the Guideline, and continues to maintain (notwithstanding the recent decisions of the Tribunal to the contrary[157]) that the BEE referred to in the ARORO is a "*pure play, regulated energy network business operating within Australia*".[158]

Prior to the Tribunal's decision in *Ausgrid*, the assumption that the BEE was a regulated energy network business formed a key part of the AER's reasoning for applying a full transition from the "on-the-day" approach to the trailing average approach (i.e. the Guideline transition approach). In the Explanatory Statement for the Guideline, the AER stated that one of the considerations in applying the transition was "*that the benchmark efficient firm is likely to need a transition in moving from the current 'on the day' approach to the trailing average approach*".[159]

The rationale, therefore, in the Guideline for the transition was that the BEE had previously adopted efficient financing practices in response to the previous "on-the-day" approach (such as entering into hedging contracts) that would need to be unwound in moving to the trailing average approach. This rationale, of course, is only valid if the BEE is assumed to be a regulated entity that structured its debt financing practices to meet the requirements of the previous method of regulation. An unregulated BEE would have engaged in efficient financing practices unaffected by the AER's previous regulatory practice.

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154 NGR 87(2).
155 NGR 87(8).
156 NGR 87(3).
157 *Ausgrid* et al.
158 For example see AER's Draft Decision for Powerlink (29 September 2016), Attachment 3, pp. 3-20, 3-29, 3-135 to 3-136.
159 Explanatory Statement – Rate of Return Guideline, p. 120. See also pp. 121-122.

However, in *Ausgrid*¸ the Tribunal found that the assumption underlying the AER's rationale for the transition was incorrect, and the BEE referred to in the ARORO should be considered to be an unregulated entity.[160] The Tribunal held that:

> *The BEE, in the view of the Tribunal, is likely to refer to the hypothetical efficient competitor in a competitive market for those services. Such a BEE is not a regulated competitor, because the regulation is imposed as a proxy for the hypothetical unregulated competitor. Otherwise, the starting point would be a regulated competitor in a hypothetically regulated market. That would not be consistent with the policy underlying the purpose of the NEL and the NGL in relation to the fixing of terms on which monopoly providers may operate. Indeed, the concept of a regulated efficient entity as the base comparator would divert the AER from the role of fixing the terms for supply of services on a proxy basis compared to those likely to obtain in a competitive market, and focus its attention on some different and unidentified regulated market.*[161]

While the Tribunal found the AER's approach to the BEE to be in error in *Ausgrid*, it remitted the issue of the return on debt to the AER and did not determine what transition, if any, should have been applied. The AER has sought judicial review of the Tribunal's decisions in *Ausgrid et al*.[162] Those applications for judicial review were heard by the Full Federal Court in October 2016, and the Full Federal Court is yet to deliver its decisions on those applications.

The finding that the BEE is unregulated leads to an argument that no transition to the trailing average approach is required, and the trailing average approach should be implemented immediately.

An unregulated BEE, in the current and previous access arrangement period, would not have structured its debt financing strategy to respond to the AER's previous "on-the-day" approach (as an unregulated entity in the competitive market is not affected by the AER's regulatory approach). Rather, the unregulated BEE would have structured its debt financing strategy in such a way that mirrors the trailing average approach. This is because the unregulated BEE, operating in a workably competitive market, is likely to already hold a staggered long term (i.e. of approximately 10 year term) debt portfolio, such that no transition to that position is required.

Since the Tribunal's decision in *Ausgrid*, the AER has continued to adopt the Guideline transition approach in its Draft and Final Decisions, although justified on a different basis.[163] The AER now justifies the Guideline transition on the basis of a so-called "zero NPV investment condition", which other businesses have recently identified concerns with.[164]

For the reasons set out above, there remains uncertainty about the proper definition of the BEE referenced by the ARORO (whether it is a regulated or an unregulated entity) and whether an immediate implementation of the trailing average approach (i.e. with no transition) satisfies the NGR, the ARORO and NGO (and to a greater degree that the Guideline transition approach).

The "hybrid transition" alternative

Since the publication of the Guideline, other businesses have proposed a hybrid transition of just the base rate component of the return on debt. The Tribunal has recently considered proposed hybrid transitions in the merits review applications made by Jemena Gas Networks (NSW) Ltd[165] and SA Power Networks.[166]

It is accepted by the AER that businesses (and the BEE) cannot hedge, and have not hedged, the debt risk premium (**DRP**) component of the return on debt.[167] The AER has also previously

[160] *Ausgrid* at [907].
[161] *Ausgrid* at [914].
[162] Action nos. NSD 415, 416, 418, 419 and 420 of 2016 in the Full Federal Court of Australia.
[163] For example see AER's Draft Decision for Powerlink (29 September 2016), Attachment 3.
[164] CEG, *The AER's current interpretation of the ARORO*, September 2016, section 9, report for AusNet Services.
[165] *Application by Jemena Gas Networks (NSW) Ltd* [2016] ACompT 5 (***JGN***).
[166] *Application by SA Power Networks* [2016] ACompT 11 (***SAPN***).
[167] Explanatory Statement – Rate of Return Guideline, p. 105.

accepted (based on advice from Chairmont, who recommended the adoption of the hybrid transition[168]) that the hybrid transition would "*provide a good match*" between the allowed return on debt and the efficient financing costs of a BEE (being the focus of the ARORO).[169]

However, the AER continues to maintain a preference for the Guideline transition approach over a hybrid transition.

Although in *JGN* the Tribunal found error in the AER's approach to the return on debt (in relation to the definition of the BEE as discussed above), and remitted to the matter to the AER, the merits of the hybrid transition approach (as proposed by Jemena Gas Networks (NSW) Ltd) were not addressed in any detail by the Tribunal in that decision.

The hybrid transition approach was discussed in more detail by the Tribunal more recently in *SAPN*, which found no error in the AER's approach in rejecting the hybrid transition approach proposed by SA Power Networks in favour of the AER's Guideline transition approach.

Critically, in doing so, the Tribunal found that the AER had not erred in interpreting rule 6.5.2(k)(4) of the National Electricity Rules – the equivalent of NGR 87(11)(d) which requires the AER to have regard to any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a BEE referred to in the ARORO that could arise as a result of changing the methodology that is used to estimate the return on debt from one access arrangement period to the next – as enabling a consideration of more than just the periods immediately surrounding the change in regulatory approach, and including the effects over the life of the asset.[170] This, the Tribunal said, justified the attention given by the AER to its "NPV=0" criterion in assessing the return on debt.[171]

AusNet Services has concerns both about the Tribunal's interpretation of the equivalent of NGR 87(11)(d), and the logic of the AER's so-called "NPV=0" criterion, and notes that there remains uncertainty around the hybrid transition because SA Power Networks has sought judicial review of the Tribunal's decision in SAPN, which application is yet to be heard by the Court,172 and because the AER is yet to reconsider Jemena Gas Networks (NSW) Ltd's proposed hybrid on remitter.

Further, the Tribunal's decision in *SAPN* did not consider at all the definition of the BEE as both parties appear to have proceeded on the basis that the BEE was a regulated entity.

Other recent decisions

In addition to the uncertainty arising from the matters set out above, both the immediate implementation and hybrid transition approaches were raised before the Tribunal again even more recently in merits review applications made by (predominantly) Victorian electricity businesses.[173] Those matters were heard by the Tribunal in November 2016 and the Tribunal is yet to deliver its determinations on those Applications.

9.5.6 Credit rating

In the Guideline and its recent decisions, the AER adopts a BBB+ benchmark credit rating to estimate the return on debt.[174]

AusNet Services considers that adopting a BBB+ credit rating assumption is highly conservative, in the sense that it is likely to understate the degree of risk faced by AusNet Services in the supply of prescribed transmission services.

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168 Chairmont, *Financing practices under regulation: Past and transitional*, October 2015.

169 For example see AER's Final Decision for SA Power Networks (29 October 2015), Attachment 3, pp. 3-165.

170 *SAPN*, [289].

171 *SAPN*, [289].

172 Action no. NSD 2032 of 2016 in the Federal Court of Australia.

173 Action nos. ACT 3, 4, 5, 6, 7 and 8 of 2016 in the Tribunal.

174 AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, p. 106.

The empirical evidence referred to by AER in support of a BBB+ rating, when correctly applied and interpreted, supports a BBB to BBB+ rating. As noted by the AER, the median credit rating over the past ten years (2006-2015) across all businesses in the AER's sample is BBB to BBB+.[175] A credit rating of BBB to BBB+ is also consistent with the advice from Professor Lally to the AER.[176] However, it is a departure from the Guideline.

Adoption of a BBB+ credit rating assumption is likely to lead to under-estimation of the efficient financing costs of a BEE facing a similar degree of risk as that which applies to AusNet Services in respect of the supply of reference services. In short, AusNet Services may be inadequately compensated for efficient financing costs, creating a risk that AusNet Services cannot attract the capital required to undertake efficient investment.

AusNet Services notes that if a broad BBB band data series is available and is used to estimate the return on debt, then whether a BBB or BBB+ credit rating assumption is adopted is of little practical consequence. However if the AER were to start using a BBB+-specific data series (should one become available), it is likely that this would lead to under-estimation of the efficient financing costs of a BEE facing a similar degree of risk as that which applies to AusNet Services in respect of the supply of prescribed transmission services. This is because a BBB+-specific data series is likely to overestimate the cost of debt for businesses with a risk profile in the BBB to BBB+ band.

For the same reasons, given that the evidence supports a credit rating of BBB to BBB+, use of a broad BBB band data series is entirely appropriate.

9.5.7 Implementation – data sources

In its recent decisions, the AER determined to apply a simple average of the Bloomberg and RBA curves on the basis that:

- Both curves have their unique strengths and weaknesses, but the AER is not satisfied that either is clearly superior to the other;
- Both curves require adjustments from their published form to make them fit-for-purpose, and the AER is not satisfied that either can be more simply or reliably adjusted to estimate the annual return on debt than the other;
- The AER's approach is consistent with expert advice from Dr Lally (from 2014) that it adopt a simple average of the BVAL and RBA curves, subject to the necessary adjustments to each curve;
- The two curves have regularly produced materially different results at particular points in time. Both curves have their strengths and shortcomings, but it is not clear to the AER that one approach is clearly superior to the other. When the curves depart, the AER considers it is not easily discernible which curve produces estimates that better reflect the efficient financing costs of a BEE. The BVAL curve has produced estimates both higher than, lower than, and similar to, the RBA curve, so there is no clear indication that one curve produces systematically higher or lower estimates than the other;
- The AER's approach is consistent with the Tribunal's decision in Application by ActewAGL Distribution [2010] ACompT 4; and
- The AER's approach will reduce the likely price shock if either curve becomes unavailable or produces erroneous estimates during the period.[177]

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[175] AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, p. 312, Table 3-39.
[176] Lally, *Implementation issues for the cost of debt*, November 2014, p. 4.
[177] AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, pp. 112-113.

The AER also refers to eleven "*points of distinction*" discussed by Dr Lally in his 2014 report, of which:

- Three are said to favour the use of the BVAL curve (after April 2015);
- Two are said to favour the use of the RBA curve (after April 2015);
- Five are said to not favour one curve over the other; and
- One is said to be irrelevant.[178]

The AER also refers to the Tribunal's decision in relation to the NSW electricity determinations which upheld its approach to apply a 50:50 weighting to each of the RBA and Bloomberg curves given the evidence available to it at the time.

The AER has responded to concerns raised previously by AusNet Services about the performance of the Bloomberg curve. It concluded that:

- AusNet Services' concerns relate to a lack of available bonds in the BVAL curve beyond 7 years term to maturity. This has already been considered by the AER and does not raise material new issues;
- While there is a correlative relationship between the Asciano bond and BVAL 10 year estimate, there is no clear evidence that the BVAL 10 year curve is not fit for purpose.

AusNet Services' response to these concerns is set out below.

9.5.8 AA Proposal

AusNet Services proposes that the RBA curve should be relied upon exclusively to estimate the cost of debt. The Bloomberg curve should not be given any weight.

Overview

Rules 87(10) and (11) of the NGR together require the allowed return on debt to reflect that which would be required by debt investors in a BEE for a regulatory year.

AusNet Services has expressed concerns throughout both its recent electricity distribution and transmission review processes that the BVAL curve does **not** reflect the return a debt investor in a BEE requires.

Therefore, the AER's decision to place reliance on the BVAL curve, even as part of an average, does not achieve the ARORO. As a more reliable curve is available (being the BBB 10 year curve published by the RBA), the use of the RBA curve alone will better achieve the ARORO.

The AER's assessment of curves is only carried out once, at the beginning of each access arrangement period. It would be incorrect to assume that, if one curve is performing poorly at the beginning of an access arrangement period, a superior result will be achieved by applying an average of a currently poor performing curve and a currently well-performing curve. Instead, a superior and reliable outcome is more likely if only the well-performing (in terms of providing more accurate estimates) curve were relied upon.

Concerns about the Performance of the BVAL Curve

AusNet Services' key concerns about the performance of the BVAL curve are:

- Its reliance on a very small sample of bonds. This has been acknowledged by Bloomberg, which has confirmed that there is a 'real dearth in market observations beyond 5-7 years in the BBB corporate curve'.[179] One factor which greatly limits the potential sample size of the BVAL curve is Bloomberg's exclusion of debt issued overseas by Australian entities, which

178 AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, pp. 114-115.

179 Email from Bloomberg to AusNet Services, 27 January 2016. Submitted to the AER on 4 February 2016.

accounts for approximately 80% of total debt issued. Therefore, the movements in the market faced by a debt investor in a BEE cannot be not fully reflected in the movements in the BVAL curve.

- The observed lag between the issuance of a bond meeting BVAL's selection criteria and any adjustment made to the BVAL curve to reflect this issuance. This lag indicates that there are periods where BVAL yields do not reflect prevailing market conditions.

In recent months these concerns have led to mismatches between the BVAL curve and the return required by debt investors in a BEE, as discussed below.

Between May 2015 and 28 July 2016, the Asciano bond was the only bond in the 10 year BVAL curve's sample with a term to maturity exceeding six years. Over this period, the BVAL curve placed an inappropriately high weighting on this bond. In AusNet Services' debt averaging period for the electricity distribution network's Final Decision, a 91% correlation between changes in the BVAL 10 year spread and changes in the Asciano bond spread was observed.

This was particularly problematic because Asciano was the subject of takeover activity over this period. The influence of takeover activity on the Asciano bond's yields reflects firm-specific factors that would have no relevance to the benchmark efficient firm, and is therefore not relevant to setting the return on debt faced by debt investors in a BEE.

As set out in AusNet Services' 24 March 2016 submission to the AER in the electricity distribution review process and supporting CEG memo (CEG, Review of AER Position on Curve Selection), over AusNet Services' distribution businesses' averaging period, all bonds included in the RBA's sample with tenors between 8 and 12 years (excluding the Asciano bond) exhibited very different movements in yields than the Asciano bond. At this time, there was a high degree of financial market volatility, which is consistent with the finding that there was a general rise in DRPs across the market. The Asciano bond was an outlier over this time period as its DRP did not increase by an amount commensurate with the general market. As the BVAL curve moved in (close to) lock step with the Asciano bond's yields, the BVAL curve did not reflect general market movements.

Superiority of RBA curve

As a more superior curve is available, being the RBA curve, and as the other curves distort the effect of applying the RBA curve, the ARORO can be best achieved by relying on this curve alone. Incorporating the other curves will detract from the achievement of the ARORO.

AusNet Services obtained advice from CEG on desirable characteristics of curve selection. CEG identified the five criteria below as those most relevant to estimating the cost of debt for a BEE:

(a) Dataset that best matches the characteristics of debt issued by a BEE;

(b) A large dataset that is consistent with criterion (a);

(c) Derived from a transparent and robust method;

(d) Regularly published by an independent reputable organisation; and

(e) Track record of accuracy.[180]

As described in CEG's report, the RBA curve fulfils all five of the criteria. This supports AusNet Services' proposal to rely exclusively on the RBA curve.

The Bloomberg and Reuters curves only fulfil criteria (d), and fail to satisfy each of the other criteria for the reasons identified in CEG's report and in the Table below.

[180] CEG, *Criteria for assessing fair value curves*, September 2016.

Table 9-4: Assessment of Third Party Data Sources against Criteria

Criterion	Bloomberg	Reuters	RBA
(a) Dataset that best matches the characteristics of debts issued by a BEE	✘ Does not include bonds issued in foreign currency or with optionality features	✘ Does not include bonds issued in foreign currency or with optionality features	✓ Includes bonds issued in foreign currency and with optionality features
(b) A large dataset that is consistent with criterion (a)	✘ At times, only a single bond with a term to maturity beyond 7 years has been included in the sample	✘ At times, only a single bond with a term to maturity beyond 7 years has been included in the sample	✓ A sample size exceeding 10 bonds with terms to maturity beyond 7 years has consistently been observed
(c) Derived from a transparent and robust method	✘ The curve-fitting methodology is proprietary and so it is not possible to assess it	✘ The curve-fitting methodology is proprietary and so it is not possible to assess it	✓ Transparently describes its sample selection and estimation processes
(d) Regularly published by an independent reputable organisation	✓	✓	✓
(e) Track record of accuracy	✘ AusNet Services has submitted analysis to illustrate recent inaccuracies of the BVAL curve given its reliance on a very small number of bonds	✘ More difficult to assess as has only been available for a short period of time	✓ Generally considered to have been the most accurate data series over a historical period, including the GFC

Note: Further discussion is included in CEG – Criteria for assessing fair value curves, January 2016

By incorporating the Bloomberg and/or Reuters curves in the cost of debt estimate, the application of the curves becomes distorted in a manner which undermines the objective of this exercise, which is to reflect the characteristics of a BEE, and will undermine the achievement of the ARORO.

Moreover, AusNet Services considers that the AER's reliance on the BVAL curve but not the Reuter's curve is even more unjustified. While our strongly held contention is that the BVAL curve should be given no weight at all, if it were to be relied upon, there is no reason why the Reuters curve should not be given an equal weight.

We recognise that the AER and Lally have carried out an assessment of the BVAL and RBA curves based on certain criteria and found neither of these curves to be superior. While we acknowledge the matters raised in this assessment, it does not include a criteria that distinguishes between the curves when one relies on a single, or inappropriately small number of bonds. Therefore there is no safeguard for the situation that has occurred since mid- to late-2015, whereby the BVAL curve exclusively relies upon a single bond.

Response to the AER's analysis of the BVAL curve

The AER raised the concerns below about AusNet Services' submissions that the BVAL curve is not fit-for-purpose in its Draft Decision in AusNet Services' electricity transmission review process. These concerns were also raised in the AER's Final Decision for AusNet Services' electricity distribution network.

1. Criticisms of CEG's Regression Analysis

The AER criticised CEGs regression analysis on the basis that:

- It had not included a variable for an underlying base rate component in its regressions. The AER considered that the inclusion of such a variable is important, because the swap curve is a key driver of pricing. The AER 'mirrored' CEG's approach and regressed the BVAL 10 year spread-to-swap against the swap rate, which produced a higher R^2 value (0.95) compared to CEG's regression (0.93). The AER considered this result might indicate a degree of multicollinearity within CEG's regression, which casts doubt over its results.
- AusNet Services submits that the AER's conclusions are problematic for the following reasons:
    - The purpose of CEG's regression analysis was to examine whether the Asciano bond received a relatively higher weighting compared to the rest of the bonds in the sample, due to it being the only long-dated bonds. There may be a number of other variables that are correlated with the spread to swap of the Asciano bond (e.g. takeover activity), but including other variables in the regression would not help achieve the purpose of the test.
    - By definition, multicollinearity cannot be present in CEG's regression as it contains only a single variable. Multicollinearity can only be present in regressions containing multiple explanatory variables.
    - The AER did not report its regression results – it is therefore not clear what it has regressed. A simple interpretation of its description is that it has regressed the BVAL 10-year spread-to-swap estimate against the 10 year swap rate. However, this results in an R^2 of just 0.33. Alternatively, it may have regressed the BVAL 10 year spread-to-swap estimate on both the 10 year swap yield and the Asciano spread-to-swap. This does result in an R^2 of 0.95.
    - AusNet Services encourages the AER to transparently report the full results of its regression that it has relied upon in its Draft Decision. If reported, these results would show that both regressors are statistically significant, but the effect of the Asciano spread-to-swap is almost one-for-one (coefficient of 0.95) and is much more statistically significant compared to the swap rate.
- The AER criticised CEG's analysis as it had not tested the impact of the base rate (either the risk free rate or swap rate) on the 10 year BVAL yields. However, as explained above, the purpose of CEG's regression was not to comprehensively examine all variables that could impact the 10 year BVAL yields, but to examine the contribution of the Asciano bond.
- The AER criticised CEG's analysis as CEG had not explained methodological choices and assumptions in its regression, including its reasons for combining the spread to swaps for individual bonds into weekly averages and averaging all bond data within term-to-maturity bands. CEG has advised AusNet Services that:
    - The use of a weekly average is standard practice when measuring the relationship between assets especially where daily data is noisy. Indeed, the AER's consultant, Professor Olan Henry, applied weekly data in Henry (2014)[181], upon which the AER relies in its estimation of equity beta; and
    - Averaging bond data within term-to-maturity bands is appropriate given the purpose of CEG's regression was to establish the weight given to the Asciano

[181] Henry 2014, Estimating beta: An Update.

bond relative to other bonds in the sample. As the Asciano bond is the only long dated bond in the sample, it makes sense to disaggregate the bond sample by term-to-maturity.

2. Comparison of 7 to 10 year margins of the BVAL and RBA curves

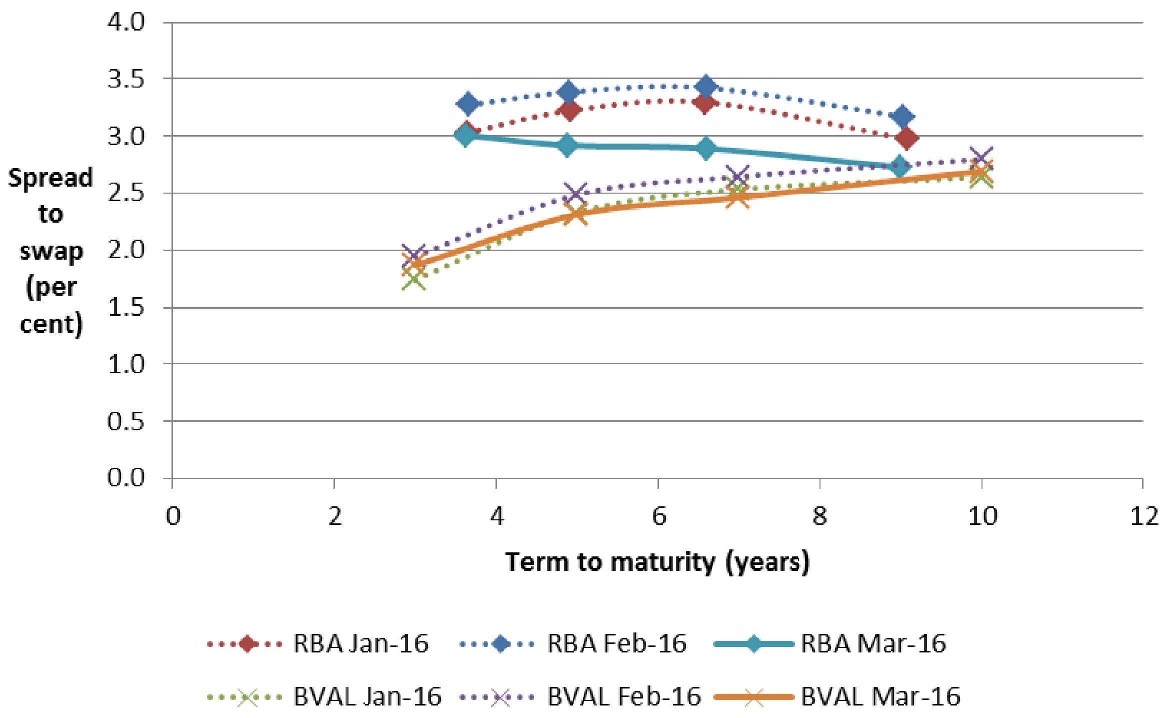
The AER states that 'If the 10 year spread-to-swap estimate is disproportionately and downwardly impacted by an influential and unrepresentative bond, we would expect to see this reflected in the margin between 7 and 10 year spread-to-swap estimates.'[182]

However, this premise is flawed because it ignores the level of the whole curve. That is, the BVAL 7 year yields could also be biased downwards, in which case a comparison between the BVAL 7 and 10 year spreads-to-swaps will not lead to meaningful information regarding whether the BVAL 10 year estimate is biased. As all BVAL yield curves exclude debt issued overseas (which does not reflect the financing practices of a BEE), they cannot be assumed to properly reflect the financing practices of a BEE.

3. Representativeness of the Asciano bond

The AER considered that the Asciano bond's yields may have performed differently compared to the bonds CEG included in its comparison of yield movements for other longer-term bonds, all of which were issued in Europe or the US, due to the different circumstances present in these different markets. It also considered that the spread-to-swap profile across the entire term spectrum of the RBA curve appeared more 'typical' compared to that across the BVAL curve, as shown in the Figure below.

Figure 9-6: Spread-to-swap Profile for Published Curves in 2016



Source: AER, AusNet Services Draft Decision, July 2016: Attachment 3 – Rate of Return, p. 300.

The bonds CEG included in its comparison were the only other long-dated bonds included in the RBA curve at the time. This was because there were no other AUD-denominated bonds with a term to maturity exceeding 8 years available at the time.

[182] AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, p. 299.

The relevant question is whether the movements in the yield of the Asciano bond, rather than the other bonds included in CEG's sample, are representative of the BEE. If a BEE issues debt in foreign markets (which it does), it follows that the BEE would be subject to the movements of bonds across these different markets.

The differences in the spread-to-swap at different terms to maturity in January to March 2016 reflect the bond data available at the time. More recently, the RBA curve has exhibited an upward sloping term structure, which the AER would deem to be more 'typical'.

Limited conclusions can be drawn about the BVAL curve reflecting a more 'typical' upward sloping yield curve. The fact that the RBA's yield curve has been observed to be downward sloping during some periods in 2015 and 2016 has not been of material concern to the AER as it has applied a 10 year RBA estimate, including a negative extrapolation adjustment based on a downwards slope between 7 and 10 years, in its recent decisions (including AusNet Services' distribution network's Final Decision).

New Developments – Inclusion of Jemena and Mirvac Bonds

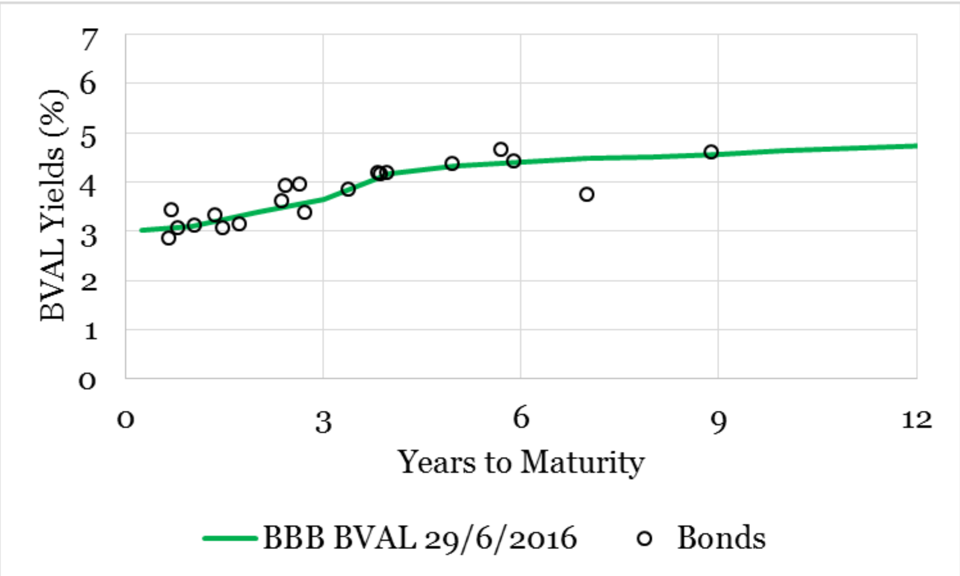
AusNet Services engaged CEG to provide an updated opinion regarding whether the BVAL curve currently reflects financing conditions faced by a benchmark efficient entity. This is provided as Appendix 9K – CEG, Criteria for assessing fair value curves: an update (September 2016). The conclusions are summarised below.

Jemena Bond

A 7 year bond was issued by Jemena on 29 June 2016. This bond has been included in the BVAL 10 year sample, following which the sample included two bonds (Asciano and Jemena) with tenors above 6 years.

The yield of this bond is materially below the BVAL 10 year curve when this bond was issued, as shown in the figure below.

Figure 9.7: BVAL curve and bond constituents, 29 June 2016

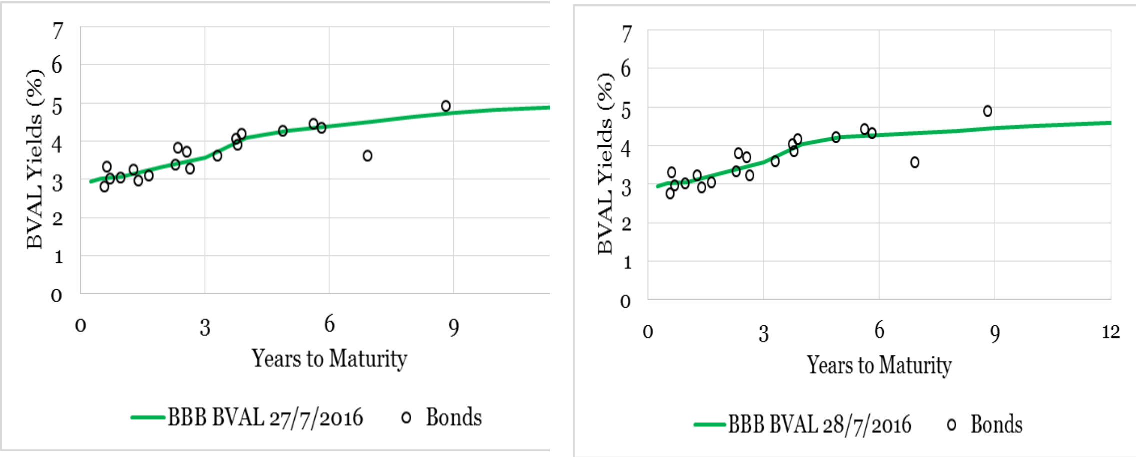


Source: CEG, Criteria for assessing fair value curves: an update, September 2016, Figure 3.3

The outlier appearance of the bond's yield can be explained by the bond's inconsistent credit ratings, being BBB+ by Standard and Poor's, and A- by Moody's. The credit rating is perhaps one reason why the yield of this bond is an outlier compared to other bonds. This has also led to differences in the treatment of this bond by the different data source providers. For example, Reuters includes this bond in its A band curve, while RBA includes it in its B band curve (however, as the RBA curve is based on a larger sample of bonds, the impact of any downwards bias is diluted).

The Jemena bond does not appear to have had an impact on the BVAL curve yields until a month after its issuance. CEG identifies a sharp reduction in the BVAL curve between 27 and 28 July 2016 (shown below), which could not be explained by the decline in the yield of any individual bond alone.

Figure 9-7 and 9-8: BVAL 10 year yields and JEN bond: 27 July and 28 July 2016



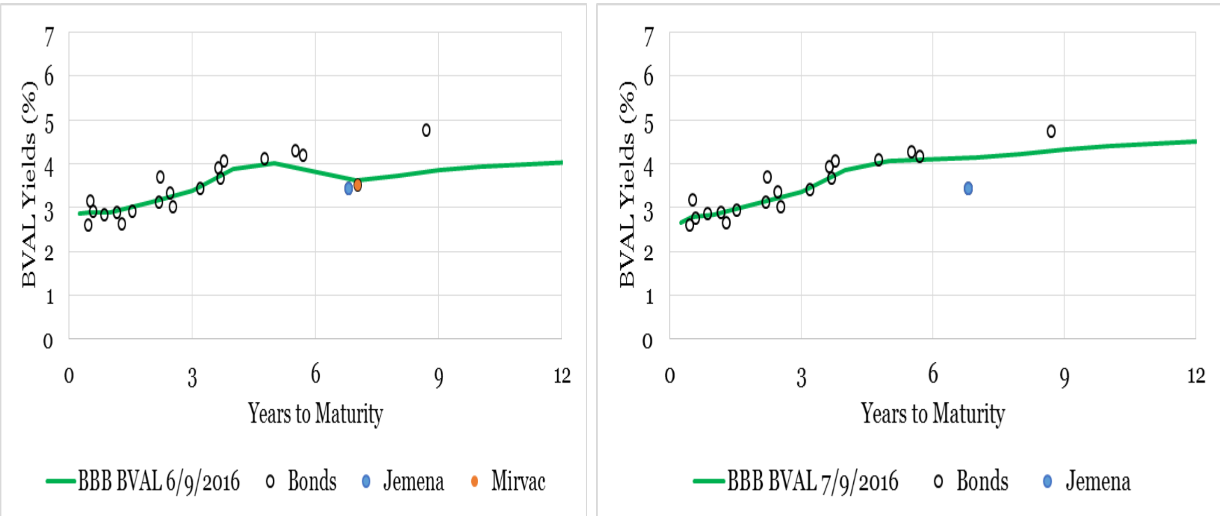
Source: CEG Criteria for assessing fair value curves: an update, September 2016, Figures 3.4 and 3.5

This further supports AusNet Services' previous concerns about the lag between the issuance of a relevant bond and the bond's yield being reflected in the BVAL curve. It is important that any curve relied on by the AER provides a reliable estimate of prevailing market conditions. The BVAL 10 year curve cannot be relied upon to provide this.

Mirvac Bond

A 7 year bond issued by the Mirvac Group was briefly included in the BVAL sample from 1 to 6 September 2016. During this brief period, the BVAL yield curve exhibited an unusual kinked shape. However, upon the removal of the Mirvac bond from the sample, the BVAL yield curve exhibited a more typical shape. This is shown in the Figure below.

Figure 9-9 and 9-10: BVAL Spread-to-swap curve and bond constituents, 6 and 7 September 2016



Source: CEG, Criteria for assessing fair value curves: an update, September 2016, Figures 3.8 and 3.9

The fleeting inclusion of a particular bond in Bloomberg's sample is problematic because:

- Due to the severely limited sample size impacting the BVAL yields at 10 years, a single bond can have a material influence over reported yields. Where this bond's yields do not reflect the financing conditions faced by the BEE, it follows that the BVAL curve will not reflect the conditions faced by the BEE, and therefore should not be applied by the AER in its regulatory decisions.

- The inclusion and subsequent exclusion of a bond within a week casts doubt over the robustness of Bloomberg's application of its own sample selection criteria. This is worsened by the lack of transparency over these criteria. If this were to occur during a network's debt averaging period (which may be as short as 10 days) this would likely materially influence the debt allowance applied to the business.

Concluding comments

CEG concludes that the new evidence available strengthens its earlier conclusion that a 100% weighting on the RBA curve is the most appropriate as the RBA curve most closely reflects the cost of debt applicable to a benchmark efficient firm.[183]

Application of 7 Year Bloomberg Curve as Contingency

In its Final Decision in AusNet Services' electricity distribution review process and its Draft Decision in AusNet Services' electricity transmission review process, the AER stated that, if it were not to adopt the BVAL 10 year estimate, it would adopt the 7 year BVAL estimate, consistent with its contingencies set out in Attachment 3, section J.2.4 of that Draft Decision.

AusNet Services submits that this would be inappropriate for the following reasons:

- The AER's contingencies do not provide for an alternative curve to be relied upon where a 10 year yield curve is deemed to be unfit for purpose. The contingency for the case where Bloomberg reduces the maximum published BVAL term from 10 years is not an equivalent scenario, and it would not be appropriate for the AER to apply.
- Even if the AER's contingencies did lead to this solution, there would be a need to consider whether the extrapolated 7 year BVAL curve reflected the costs faced by debt investors in a BEE. Where a reliable 10 year yield curve exists, it is likely to be an inferior outcome to also apply weighting to an extrapolated 7 year yield curve. This is discussed further by CEG.[184]
- Extrapolating the BVAL curve from 7 years using the shape of the RBA curve is problematic for a number of reasons:
    - the slope of the RBA curve beyond 7 years is a function of the level of the curve at 7 years. Specifically, a higher level at 7 years is likely, other things being equal, to be associate with a lower slope beyond 7 years;
    - therefore, an internal inconsistency can be created if the level of the BVAL curve at 7 years is not similar to the level of the RBA curve at 7 years. By way of example, this was clearly the case around the end of February 2016 (AusNet Services' averaging period in the distribution process), when the RBA 7-year estimate was 3.40% while the BVAL 7-year estimate was 2.65% (i.e. 0.75% difference);
    - in this circumstance, the reason the RBA curve had a negative slope between 7 and 10 years was precisely because its 7-year estimate was so high. Taking the associated negative slope and applying it to a BVL 7-year estimate that was much lower would be internally inconsistent. It would amount to adding a negative slope associated with a very high RBA 7-year estimate from a much lower BVAL 7-year estimate. This would artificially lower the extrapolated BVAL 10-year estimate;

[183] Appendix 9K – CEG, *Criteria for Assessing Fair Value Curves: An Update*, September 2016.
[184] Appendix 9K – CEG, *Criteria for Assessing Fair Value Curves: An Update*, September 2016, pp. 21-25.

- this example highlights why the AER's proposed method of extrapolation is not generally reliable, especially where the level of the curve being extrapolated (e.g. the BVAL curve) is materially different to the level of the curve supplying the rate of the extrapolation (e.g. the RBA curve) at the maturity from which extrapolation is being applied (e.g. 7 years).

Application of the Thompson Reuters Curve

As set out above, AusNet Services continues to assert that reliance on a single curve (RBA) is the only appropriate and correct application in all the current prevailing circumstances. However, should the AER insist on applying positive weight to Bloomberg (which AusNet Services asserts is a flawed approach), then it should also apply positive weight to the Thompson Reuters Curve, given they have many similar characteristics.

The AER also considers that a 'proper period of consultation' is warranted before it can apply the Reuters curve in its decisions.[185] However, the Reuter's curve was first bought to the AER's attention in early January 2016 by the Victorian distribution businesses. Their proposals to apply this and supporting analysis were published on the AER's webpage. The AER's Final Determinations, including additional supporting analysis, were published in May 2016. Information about the Reuters curve and its potential use in regulatory determinations has been available to stakeholders for 11 months, and, as far as AusNet Services is aware, has not attracted comment. Therefore, the AER's concern that consultation is warranted before the curve is applied appears to be misplaced.

9.5.9 New issue premium

AusNet Services notes that there is cogent evidence that there exists a cost "premium" to businesses issuing bonds into the primary debt market that it not accounted for in the data sources used by the AER to estimate the return on debt (being observations on the secondary debt market).

Despite the evidence for the existence of such a premium (quantified by CEG at 27 basis points on 10-year BBB rated debt),[186] AusNet Services does not seek, in this proposal, to add any explicit allowance for the "new issue premium" to its return on debt proposal but notes that the existence of such a premium results in AusNet Services' proposed return on debt being conservative.

9.5.10 Averaging period

AusNet Services proposes that the return on debt be calculated over the averaging periods set out in confidential RIN Templates.

9.5.11 Debt raising costs

In its access arrangement Proposal, AusNet Services has adopted the AER's benchmark approach to the estimation of debt raising costs.[187] However, AusNet Services submits that this approach to determining debt raising costs should be properly considered as part of the next Rate of Return or Expenditure Forecast Assessment Guideline review.

9.5.12 Annual Updating of the Return on Debt

AusNet Services adopts the Guideline in respect of annual updating. Under this approach, 10% of the cost of debt will be updated each year based on prevailing rates.

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[185] AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, p. 289.

[186] See, for example, CEG, *The new issue premium*, October 2014, a report for Citipower, Jemena, Powercor, SA Power Networks, AusNet Services and United Energy, p. 54; and CEG, *Critique of AER analysis of New Issue Premium*, December 2015, report for Australian Gas Networks, CitiPower, Jemena Electricity Networks, Powercor and United Energy.

[187] AER, *AusNet Services Draft Decision*, July 2016: Attachment 3 – Rate of Return, Appendix K.2.

AusNet Services has nominated a return on debt averaging period for each year of the 2018-22 access arrangement period. These are provided in the confidential RIN Templates.

AusNet Services proposes the formula below for updating the cost of debt.

For each of the four years 2018-2022, the annual revenue requirement will be updated by adjusting the return on capital building block for that year as follows:

ΔRocBlockt = Δcod × 60% × oRABt

Where:

ΔRocBlockt is the Adjustment to the return on capital building block in regulatory year t;

Δcod is the change in the trailing average cost of debt in regulatory year t determined in accordance with the process set out in this proposal relative to the cost of debt for that year applied by the AER in making its transmission determination; and

oRABt is the opening RAB in year t set out in the transmission determination.

Note: The 60% represents the gearing ratio assumed for the benchmark firm.

The formula to be used for each year of the regulatory period is in the box below.

The return on debt for each Regulatory Year of the Revenue Period is to be calculated as follows:

For Regulatory Year 2018: $kd_{2018} = T_{2018}$;

For Regulatory Year 2019: $kd_{2019} = (0.9 \text{ x } T_{2018}) + (0.1 \text{ x } R_{2019})$;

For Regulatory Year 2020: $kd_{2020} = (0.8 \text{ x } T_{2018}) + (0.1 \text{ x } R_{2019}) + (0.1 \text{ x } R_{2020})$;

For Regulatory Year 2021: $kd_{2021} = (0.7 \text{ x } T_{2018}) + (0.1 \text{ x } R_{2019}) + (0.1 \text{ x } R_{2020}) + (0.1 \text{ x } R_{2021})$;

For Regulatory Year 2022: $kd_{2022} = (0.6 \text{ x } T_{2018}) + (0.1 \text{ x } R_{2019}) + (0.1 \text{ x } R_{2020}) + (0.1 \text{ x } R_{2021}) + (0.1 \text{ x } R_{2022})$,

where:

- kd_t is the return on debt for Regulatory Year t of the Regulatory Period; and
- T_{20xx} is the cost of debt that feeds into the calculation of kd_t and is not yet matured in 20XX;
- R_t is the annual return on debt observation for each year t of the regulatory period (other than 2018) calculated according to the methodology set out in this Chapter.

In each case a Regulatory Year runs from 1 January until 31 December.

9.6 Gearing

The benchmark gearing (or capital structure) is used to weight the allowed return on debt and equity to derive the overall allowed rate of return.

In its regulatory determinations for gas and electricity networks, the AER has consistently applied a benchmark efficient level of gearing of 60 per cent. For the purpose of this proposal, AusNet Services has also adopted a benchmark gearing level of 60 per cent.

9.7 Expected inflation

9.7.1 Inflation

The estimate of expected inflation influences the determination of a number of building blocks, including depreciation and the return on capital. If the estimate of expected inflation used to derive the building blocks is not accurate and consistent with investors' inflation expectations, the result will be a potential under-recovery of costs (if the forecast of inflation is too high) or an over-recovery (if the forecast is too low).

Under the AER's current approach using the post-tax revenue model (**PTRM**), the estimate of expected inflation is an estimate of inflation expectations in the nominal WACC. It is used to convert the nominal WACC to a real WACC and (through a negative adjustment to depreciation) to avoid the double counting that would otherwise arise from applying a nominal rate of return to an inflation-adjusted capital base. If the estimate of expected inflation used in one part of the building block determination (to make negative adjustments through the PTRM) is significantly different from inflation expectations used in other parts (the nominal WACC), there will be a mis-match and a potential under or over-recovery of revenue. The estimates of inflation used in the building block determination must be consistent. As is explained below, basing all estimates on the inflation rate implicit in bond rates is the most consistent and appropriate course to take.

The AER's current approach to estimating inflation, relying on Reserve Bank of Australia (**RBA**) short term inflation forecasts and long term inflation targets, does not produce an estimate of expected inflation which is consistent with inflation expectations in the market, and would in fact imply negative real bond rates, despite the fact that positive indexed bonds are available in the marketplace. The consequence is that the (negative) adjustment made to total revenue for expected inflation is larger than the compensation the market expects AusNet Services will receive for inflation during the course of the coming AA period. As a result, AusNet Services cannot expect to recover at least its efficient costs and the AER's decision will not contribute to the achievement of the NGO.

Our proposal is to estimate expected inflation by reference to a market-based approach (the break-even approach) which we submit gives rise to an estimate of expected inflation which is consistent with market expectations, most particularly those implicit in the nominal WACC, as reflected in bond rates and gives rise to the best estimate of expected inflation possible in the circumstances.

9.7.2 Legislative Framework and the operation of the PTRM

Under Rule 76 of the NGR, the annual building block revenue requirement for each regulatory year of a regulatory control period must be determined using a building block approach, under which the building blocks include a "return on the projected capital base" and "depreciation on the projected capital base" (return of capital).

Pursuant to the rate of return rules, the allowed rate of return is to be determined on a nominal vanilla basis.[188] This nominal rate of return is applied to an indexed regulatory asset base (**RAB**). However, the effect of this combination is a double compensation for inflation, once through the nominal rate of return and once through the indexation of the RAB across regulatory periods. The AER addresses this in the PTRM by taking expected inflation (estimate) out of the annual revenue requirement for the forthcoming period (through the depreciation building block), and then returning it by indexing prices to actual inflation through the forthcoming period, and indexing the RAB to actual inflation at the commencement of the next AA period.

Importantly, any estimates, including the estimate of expected inflation, must be arrived at on a reasonable basis and must represent the best forecast of estimate possible in the

[188] NGR Rule 87(4(b)).

circumstances. (NGR 74(2)). Rule 89(1) of the NGR governs the design of the depreciation schedule. As noted above, the AER's approach in its PTRM is to make the negative adjustment to revenue using the estimate of expected inflation through the depreciation building block. The AER's discretion under Rule 89(1) is limited. The effect of this is that, by application of Rule 40(2) of the NGR, the AER must not withhold approval to an element of an AA proposal that is governed by the relevant provision if the AER is satisfied that it complies with applicable requirements of the Law (including the NER), relevantly in this case if it complies with NER 74(2).

As CEG explain,[189] the AER's PTRM and RAB roll forward model work together to deliver compensation for inflation as follows:

1. Take a nominal input for the cost of debt and equity.
2. Deduct the estimate of expected inflation to arrive at a real return which is then embedded in the real regulated revenue path;
3. Provide nominal compensation that is equal to:
    - The real return derived in step 2; plus
    - In the RAB roll forward, compensate for the inflation that actually occurs (out-turn inflation) over the regulatory control period.[190]

The real revenue path in Step 2 is the final output of the PTRM model.

In the AER's Draft Decision for AusNet Services' distribution, the AER recognised that the objective of the expected inflation estimate is to convert the nominal return to a real return (step 2 above).[191] As noted above, this is necessary to avoid a double counting of inflation.

The AER further explained the operation of its PTRM and RFM and the role of expected inflation in its recent Explanatory Statement – Proposed amendments to electricity distribution roll forward model released on 31 August 2016:

A nominal WACC, not a real WACC, is the input to the PTRM at the start of each AER final decision. The real WACC (which drives PTRM outcomes) is derived from the nominal WACC by deducting the expected inflation rate. Hence, an overestimate of inflation means the real WACC will be too low (and vice versa). However, the forecast inflation and the nominal WACC are jointly estimated on consistent terms.[192] Directly using the real WACC in the model means we have assumed that this pair of inputs is correctly matched. For example, if forecast inflation is overestimated, but this overestimate of inflation is already included in the nominal rate of return, the real WACC will still be correct. Hence, the construction of the model means we isolate changes in revenue outcomes that reflect the difference between forecast and actual inflation, not errors in the forecast inflation embedded in the WACC.

In this statement the AER acknowledges that if expected inflation is overestimated, the real rate of return delivered in the current period (by way of the negative adjustment to the building block using expected inflation) will be too low and vice versa. In other words, if the estimate of expected inflation does not reflect market expectations of inflation built in to the nominal rate of return, the deduction from annual revenues will be too high and the network under-compensated for inflation.

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189 *CEG Best estimate of expected inflation,* September 2016, section 3.

190 This is compensated primarily in the RAB roll forward used to set the opening RAB at the beginning of the next regulatory period but also (to a small extent) in the form of price escalation for inflation during the regulatory period.

191 AER, Draft decision AusNet Services transmission determination 2017-18 to 2021-22: Attachment 3 – Rate of return, July 2016, pp. 3-154.

192 The AER's footnote 8 reads "As noted above, this is why forecast inflation in the PTRM is a constant inflation rate with a 10 year horizon."

Finally and by way of context, we note that, although the National Electricity Rules mandate the use of the PTRM, which includes a methodology for estimating expected inflation, no such requirement exists in the National Gas Rules. NGR 73(1) requires only that service providers provide financial information on a nominal, real or some other recognised basis that deals with the effects of inflation, that the basis must be stated in the Access Arrangement Information (NGR 73(2)) and be consistent across all financial information (NGR 73(3)). This is important in the context of the recent SA Power Networks decision by the Australian Competition Tribunal, where the Tribunal found that the AER had not erred because under the National Electricity Rules, the PTRM (which specifies the AER's method for estimating expected inflation) was binding on SAPN and the AER such that the AER could not consider inflation outside of the PTRM.[193] This is not the case under the NGR.

The AER's estimate is inconsistent with inflation expectations and implies negative real returns for bonds which have positive real returns in the market

CEG explain that the expected inflation input to the PTRM determines, in combination with the nominal cost of capital inputs to the PTRM, a real rate of return that is delivered to the regulated entity. The AER's current methodology is to estimate the nominal cost of capital inputs based on:

- Nominal corporate bond yields for the cost of debt; and
- Nominal government bond yields as the risk free rate used to determine the cost of equity.

The key issue is whether the AER's estimate of expected inflation which it uses in the PTRM to make a negative adjustment to the total revenue is consistent with inflation embedded in the nominal WACC. As noted above, the nominal WACC is derived using corporate bond yields for debt and government bond yields for equity. It is logical that the same market data should be used to derive inflation expectations in both places.

As explained above, if the subtraction of expected inflation in the PTRM to avoid the double counting of inflation at the outset of an AA Period does not match and is inconsistent with market expectations about inflation, then the subtraction from total revenue will be too large (meaning a loss compared to market expectations) or to small (meaning a gain). It is therefore critical that the estimate of expected inflation is consistent with market expectations.

Under normal market conditions, the mid-point of the RBA target range may be a reasonable proxy of inflation expectations in the market at large. The RBA is generally considered to be a credible monetary authority able to meet its targets under normal market conditions. However, current market conditions are not normal,[194] and Australia is arguably in a "low inflation trap".

As CEG explain, monetary policy loses its power to lift inflation back to target levels when interest rates approach the "zero lower bound".[195] This is because monetary policy's most direct effect on the economy and therefore on inflation is through lower interest rates. However, the RBA cannot set a cash rate below zero (or at least not materially below zero) because at those levels, businesses and households will prefer to hold cash; delivering a zero rate of interest. It follows that the potential for monetary policy to stimulate economic activity diminishes as interest rates approach zero.

There are various pieces of evidence that Australia is presently facing this low inflation trap, including:

- RBA cash rates are at record low levels of 1.5%.[196]

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193 See Application by SA Power Networks [2016] ACompT 11 [553-619].

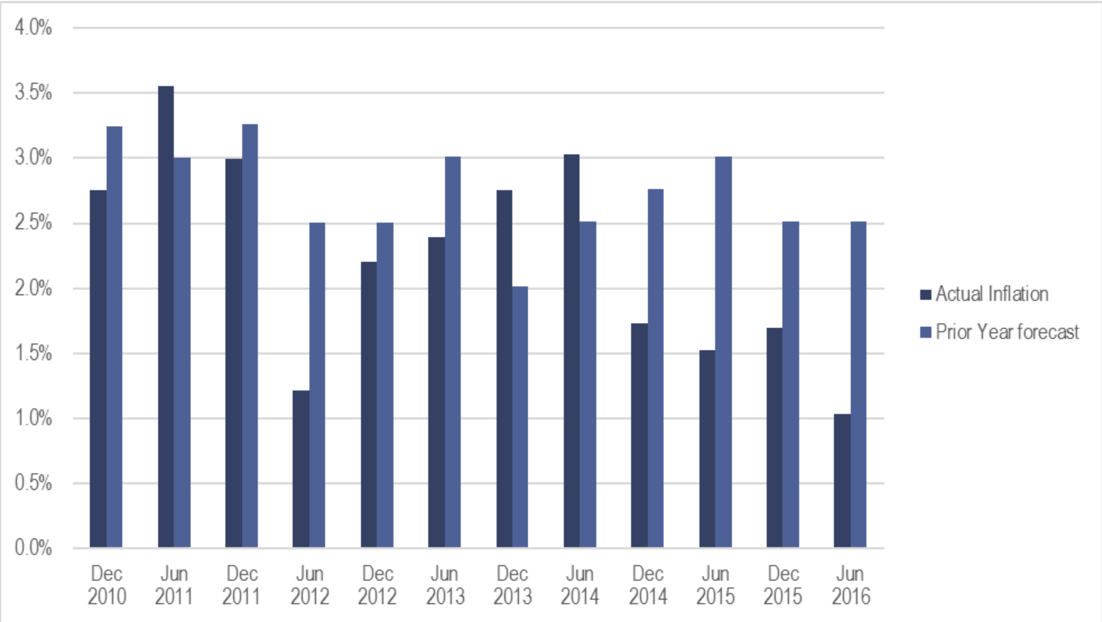
194 CEG: Measuring expected inflation for the PTRM, June 2015 section 2 and 2.1, *CEG: Best estimate of expected inflation,* September 2016 section 5.5, 5.6 Appendix A..

195 Ibid.

196 CEG: *Best estimate of expected inflation*, September 2016 at [68].

- Average inflation for the past two years has been 1.3%, with the June Qtr 2015 to June Qtr 2016 CPI being 1%.[197]
- In its May 2016 Statement of Monetary policy, the RBA dramatically reduced its range for forecast inflation from 2-3%, to 1.5-2.5%.[198] The RBA's August and November 2016 SoMP forecasts December 2016 CPI to be 1.5% and year ended forecast to December 2018 in the range of 1.5 to 2.5%.[199]
- Break-even inflation estimates are well below AER forecasts even at a horizon of 10 years.
- The RBA itself is forecasting inflation out to December 2018 to be below the bottom of its target range out to the end of the RBA forecast horizon.[200]
- Commentary from the RBA Governor and commentators that Australia faces a "protracted" period of "persistent" low inflation.[201]
- Evidence that in recent years inflation has been below target levels in all developed countries, including Australia.[202] This can be seen from the following chart.

Figure 9-11: Year break-even inflation vs RBA range [203]



Source: CEG: Best estimate of expected inflation, September 2016*, p. 20.*

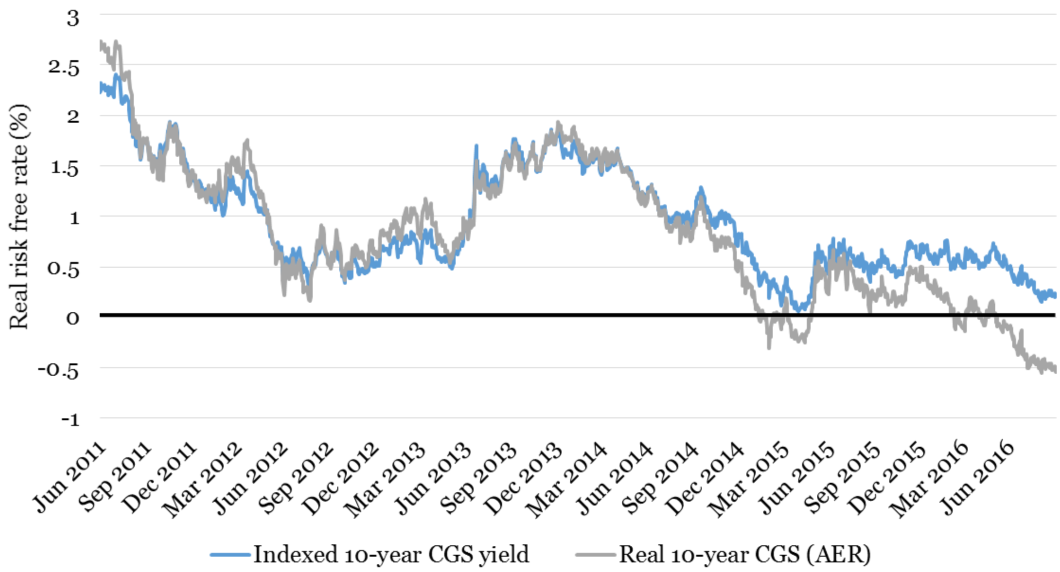
The AER acknowledges that if monetary policy loses its effectiveness to influence economic activity, inflation expectations may deviate from the mid-point of the inflation target range.[204] Given current market conditions inflation should be expected to be below the midpoint of the RBA target range. The AER's approach is not a direct estimate of inflation expectations prevailing at the current time.

197 ABS, *CPI Australia*, June 2016, released 27 July 2016.
198 RBA, *Statement of Monetary Policy*, May 2016, Table 6.1.
199 RBA, Statement of Monetary policy, August 2016, table 6.1, p. 67, *RBA Statement of Monetary policy, November 2016, table 6.1*.
200 CEG: *Best estimate of expected inflation*, September 2016.
201 CEG: *Best estimate of expected inflation*, September 2016, section5.6 and Appendix A [189].
202 CEG: *Measuring expected inflation for the PTRM*, June 2015, paragraphs 27-33.
203 CEG: *Best estimate of expected inflation*, September 2016, Figure 6, p. 20.
204 AER, *Draft decision AusNet Services transmission determination 2017-18 to 2021-22*: Attachment 3 – Rate of return, July 2016, Table 3-19, pp. 3-132.

It must also be recalled that the AER is seeking to estimate inflation expectations during the access arrangement period, over a 10 year horizon. In this context, the actual inflation environment that persists at present and during the forthcoming averaging period is highly relevant to investors' expectations of inflation over the forthcoming 10 year term. This is explained further in the supplementary note from CEG.[205]

A key issue associated with the AER's inflation estimate in the PTRM is that, if it were to be applied consistently across a decision, it would imply a negative real interest rate on bonds, which is not consistent with the positive rates actually available on indexed bonds, and thus cannot be reflective of market expectations of inflation. The yield on 10-year indexed CGS over the last 5 years is provided in the below figure extracted from the CEG report.[206] It is relevant to compare this yield with the estimated real risk free rate applying the AER's current methodology, which is to deduct its estimate of expected inflation from the yield on 10-year nominal CGS.

Figure 9-12: Competing 10-year real risk free rate estimates (last 5 years)



Source: CEG: Best estimate of expected inflation, September 2016, *p. 14.*

It can be seen that until late 2014, the AER's methodology implied a real risk free rate that was similar to the yield on indexed CGS. However, since then the AER's estimate of the real risk free rate has fallen significantly and is currently negative 0.5 (at the time of CEG's analysis above). That is, the AER's estimate implies that investors are expecting to lend to the Australian government in return for receiving less in purchasing power after 10 years than they invested originally.

This is inconsistent with the fact that the indexed CGS are offering guaranteed positive real returns and there is no logical explanation for this.

Given the negative real rates implied by the AER's approach to inflation, and the inconsistency between these implied rates and positive indexed bond rates actually available in the market, it is clear that the AER's approach in the PTRM using RBA mid-rates cannot form a suitable estimate of inflation for consistent use across a regulatory determination, and the result of implying it in one part of the decision (the PTRM) will be to deliver an expectation of under-

[205] CEG: *Inflation compensation – addendum to September report,* 14 December 2016, section 2.3

[206] CEG: *Best estimate of expected inflation*, September 2016, Section 5.1.

recovery (given market expectations of inflation) of the RAB and thus an inability to recover efficient costs.

This motivates the use of a different approach to the estimation of inflation, and we believe that the most appropriate approach is the breakeven approach. The break-even approach produces inflation forecasts which are based on the same market data and consistent with market expectations which inform the nominal WACC. We now turn to a discussion of this breakeven approach, including the reasons why the AER's criticisms of the approach are unfounded

9.7.3 The Breakeven Approach

Until 2008 the AER used the break-even approach to expected inflation. This approach measures inflation by reference to the difference between the yields on nominal and real Commonwealth government bonds. After 2008, the AER changed to its current method due to concerns that post the global financial crisis, a scarcity of indexed bonds meant the results from the breakeven approach were not reliable. We agree that during this time, it was appropriate to move to a different methodology.

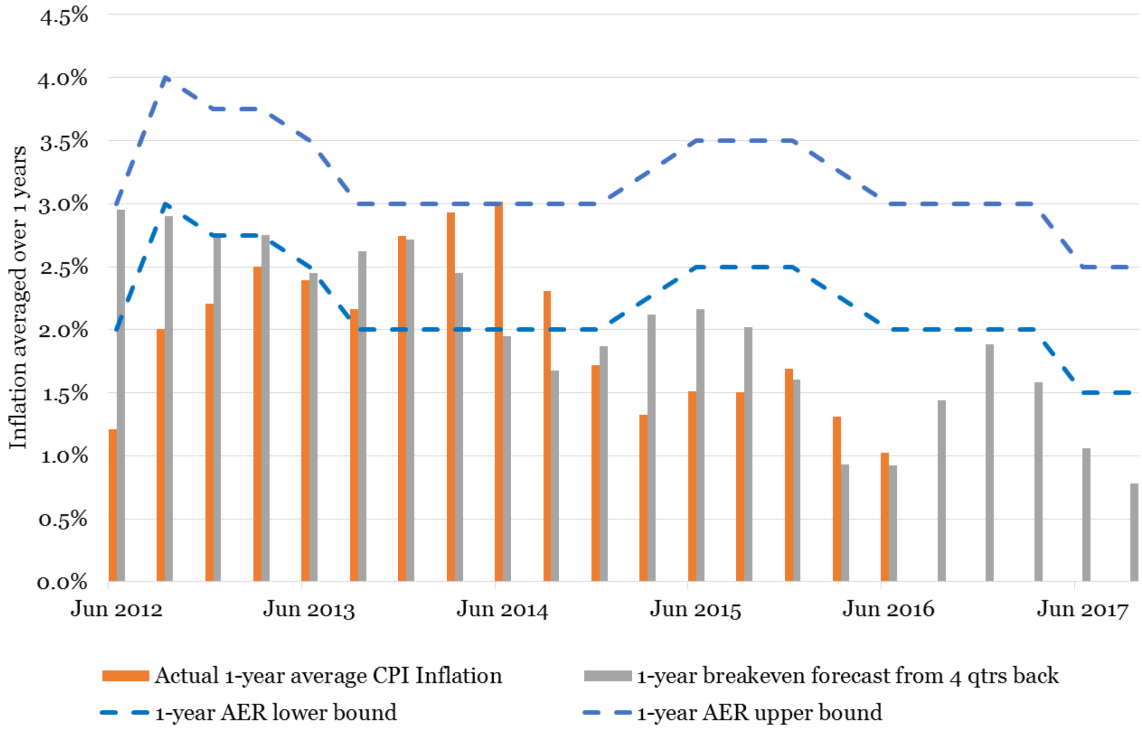
Equally, we contend that market conditions are now such that the AER's method relying (primarily) on RBA target inflation, in circumstances where current market conditions hamper the effectiveness of monetary policy to achieve those targets, does not represent an appropriate estimate of expected inflation and there should be a change in approach.

As noted above, it is bond investors' expectations of inflation which are relevant and break-even inflation provides a measure of those expectations. This section explains the basis for estimating expected inflation using the break-even approach and why the AER's concerns with that approach in recent decisions are unfounded.

If the break-even approach was a very poor predictor of expected inflation, then this ought to give pause before considering it further; particularly if it were markedly worse as a forecast compared with the RBA target band approach. However, far from being a poor predictor, CEG's report demonstrates that since 2011, break-even inflation estimates have more accurately predicted actual inflation than the RBA forecast ranges relied upon by the AER. CEG show that using a 1 year, 2 year and 3 year break-even inflation rate, break-even inflation rates have typically performed best.[207]

[207] CEG: *Best estimate of expected inflation*, September 2016, section 5.3.

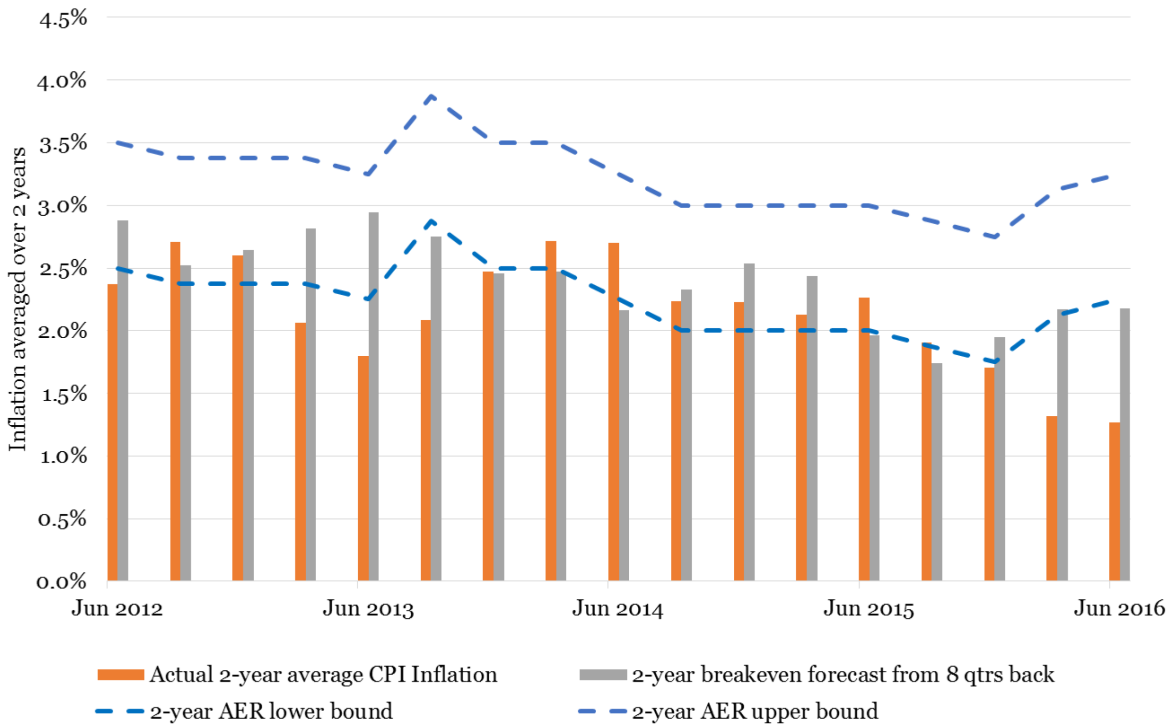
Figure 9-13: 1 year break-even inflation vs RBA range



Source: CEG: Best estimate of expected inflation, September 2016, *p. 19*

A similar story exists using 2 year inflation estimates. Once more, break-even inflation has performed materially better than the mid-point of the RBA range for the most recent years:

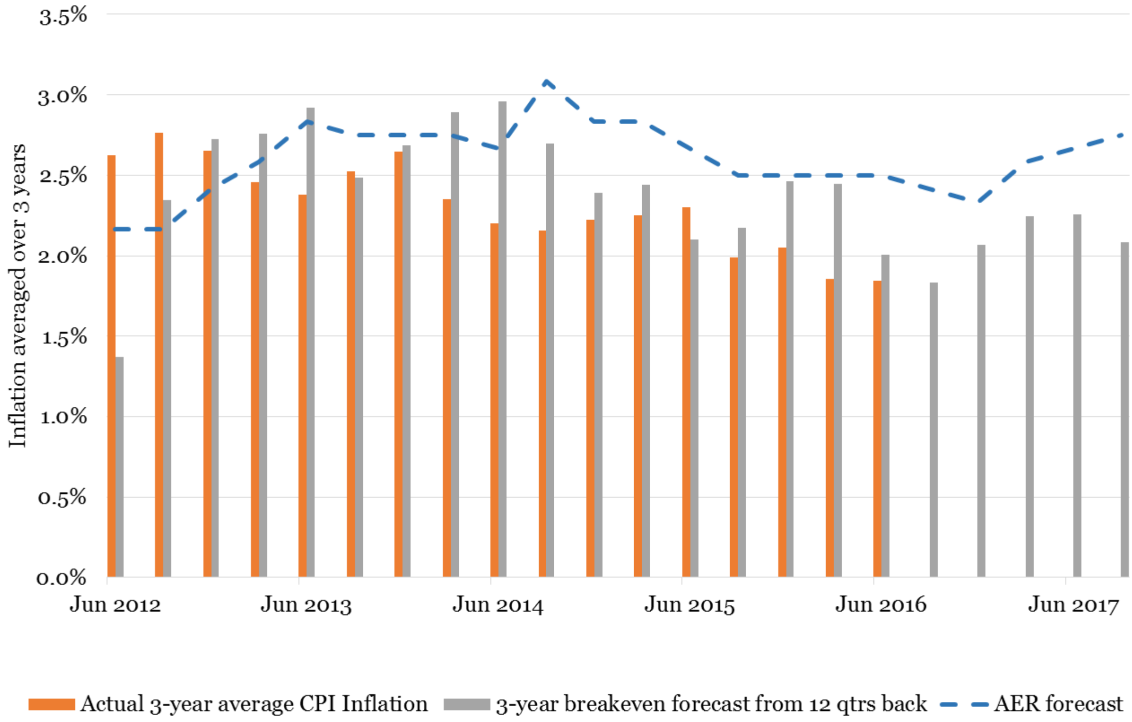
Figure 9-14: 2 year break-even inflation vs RBA range



Source: CEG: Best estimate of expected inflation, September 2016, *p. 21*

The same can be seen from the 3 year inflation estimates:

Figure 9-15: 3 year break-even inflation vs RBA range

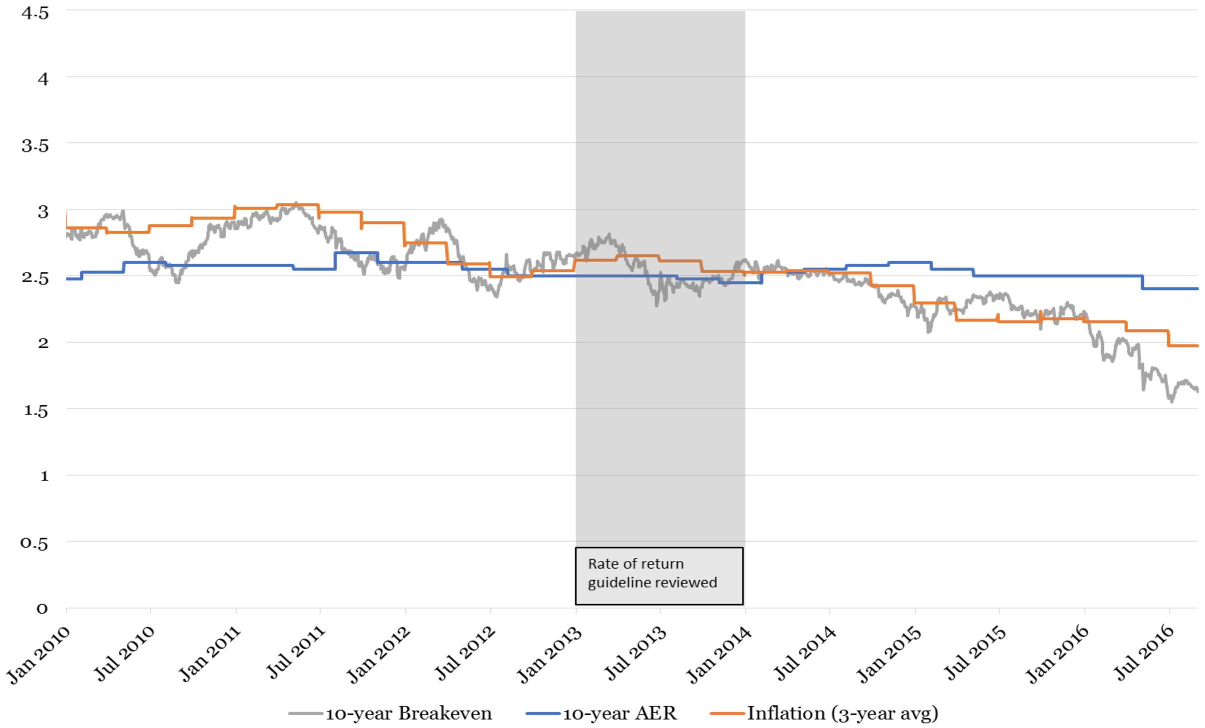


Source: CEG: Best estimate of expected inflation, September 2016*, p. 22*

The breakeven approach also meets the AER's requirement of flexibility and allowing market conditions to be reflected in regulatory outcomes.[208] Again, it arguably performs better than the RBA target-band approach in this respect. CEG has shown in the following chart that break-even inflation has responded quickly to actual inflation falling well below RBA targets from late 2015.[209] By contrast, the AER's measure of inflation does not respond quickly. Over the next five year period, this is likely to lead to an under-recovery of the RAB for service providers, but during the previous period (see Figure 9-16) it is likely to have led to an over-recovery. For consumers, therefore, prices are more volatile, too high and then too low, than they would be if the breakeven approach were used.

[208] AER, *Rate of Return Guidelines*, December 2013, p. 6.
[209] CEG: *Best estimate of expected inflation*, September 2016, section 5.2.

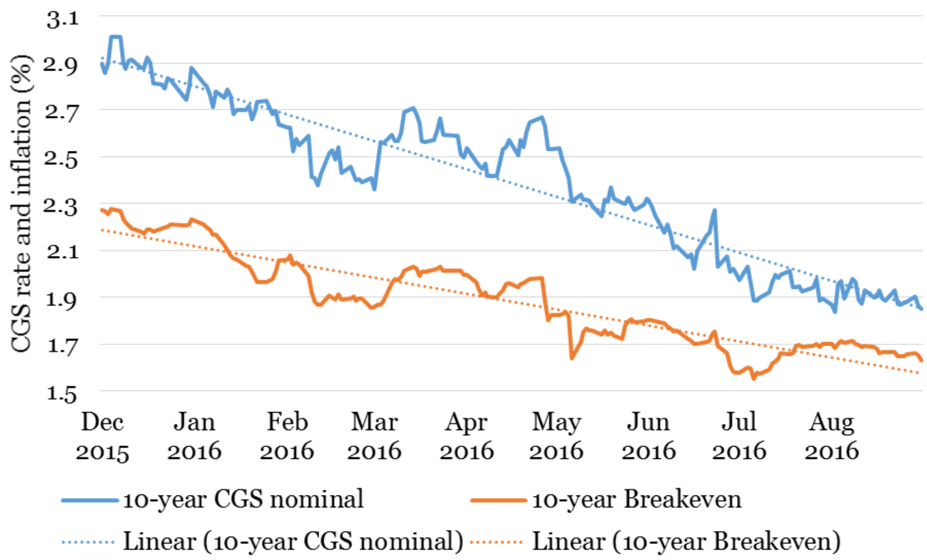
Figure 9-16: Break-even inflation vs AER inflation (10 years) vs actual inflation (1 year) less 2.5%



Source: CEG: Best estimate of expected inflation, September 2016, *p. 16*

Further, CEG's expert opinion is that falls in CGS yields over the previous 12 months have been associated with a similar fall in inflation expectations, rather than falls in real yields. This can be seen from the figure below which shows nominal CGS yields and 10 year breakeven inflation:

Figure 9-17: 10-year nominal CGS rates and 10-year breakeven inflation



Source: CEG: Best estimate of expected inflation, September 2016, *p. 29*

If inflation is assumed to have remained constant around 2.5% over the December 2015 to August 2016 period, this would imply that real CGS yields have fallen by the same magnitude as nominal CGS yields and that relative yields have in fact become negative. This is an anomalous result and demonstrates the issues with the AER's estimate.[210]

CEG conclude that, based on its analysis, the AER's estimate of inflation is unrealistically stable and has not responded to a dramatically changing inflation environment and leads to an overestimate of expected inflation.[211] The CEG report establishes that break-even estimates of inflation have better predicted actual inflation than the AER's method relying on RBA forecast and target ranges and we submit that the break-even approach will better estimate inflation expectations of investors.

AER's concerns with the break-even approach

CEG show that most of the problems the AER has suggested exist in respect of the breakeven approach do not withstand closer scrutiny.[212]

Firstly, the AER say that the size and liquidity of the indexed CGS is still limited. Further, increased absolute liquidity in the indexed CGS market does not necessarily imply that this market has become more liquid relative to the nominal CGS market.[213]

However, the smaller size (short supply) of the indexed CGS market was previously attributed as a reason for break-even inflation overstating expected inflation (not understating it). If these 'distortions' still exist then they imply that the actual expected inflation is even lower than the break-even rate.[214]

The AER states that the size and liquidity of the indexed CGS market is still limited referencing a Treasury paper from 2012. The AER references page 7 where the following quote can be found:

> *"The use of bond market break-evens is also made somewhat problematic by the limited size and liquidity of the indexed bond market in Australia."*

However, it is clear from the context that this statement applies to the historical data being used in the paper – not necessarily to the data at the time of writing.

Further, since 2012 there has been significant new issues of indexed bonds. For example, the Treasury paper states "In late 2009, however, the AOFM resumed its indexed bond issuance program and the market has since grown to just over $16 billion outstanding. There are currently five indexed bond lines on issue, with maturities ranging from 2015 to 2030."

The AER states "*Liquidity bias can be material and difficult to identify and remove from the breakeven rate—particularly as evidence indicates that it can vary considerably over time*." However, of the two papers that the AER cites one is from 2001 – when the TIPS market was in its infancy (a period when all of the rest of the AER's cited articles agrees that there was a newness/strangeness/liquidity premium) and the other paper similarly covers the period 1999 to 2008 which include the infancy of the indexed bond market and the GFC.

In relation to CPI swaps as an estimate of expected inflation, Appendix B to the CEG report shows that this measure will tend to be biased upwards to account for risk premiums and capital costs for the banks providing these products. Consistent with that, inflation swap estimates of expected inflation remain above break-even estimates and AusNet Services submits they are not an appropriate basis on which to estimate forecast inflation.

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[210] CEG: Best estimate of expected inflation, September 2016, section 5.7.
[211] CEG: *Best estimate of expected inflation*, September 2016, section 5.8.
[212] See AER, Draft decision AusNet Services transmission determination 2017-18 to 2021-22: Attachment 3 – Rate of return, July 2016, p3133 to 3-136 for the AER's criticisms.
[213] AER: Draft Decision, AusNet Services at 3-136.
[214] CEG: *Best estimate of expected inflation*, September 2016, at [105]-[106].

Secondly, the AER has alleged four *potential* aspects of bias in the breakeven approach. The AER relies upon a number of articles in support of its position. CEG has undertaken a review of the literature relied upon by the AER as well as papers not cited by the AER. CEG's literature review shows an overwhelming conclusion that there is no evidence to suggest the potential bias in the breakeven methodology currently exist or that if they exist, they would result in an underestimate of inflation.[215] To the contrary, CEG's opinion is that the overwhelming evidence in the literature is that any bias is likely to be positive such that breakeven inflation overstates expected inflation. In relation to the specific bias referred to by the AER:

- Convexity bias – this is said to exist because of two phenomena. Firstly, it is said that nominal security (bond) yields are more volatile than indexed bond yields, and therefore the difference between the two is not purely the inflation expectation of holders.[216] Secondly, it is said that bond investors are more sensitive to reductions in yield than to increases in yield. Therefore, it is argued, there is a bias which tends to raise nominal bond prices (and so depress their yields), relative to indexed bond prices, narrowing the spread in yields between them and so tending to underestimate the inflation estimate produced by the break-even / methodology. The source the AER cites in support of this potential bias is not an empirical study, but is a brief, high-level Bank of England Quarterly article from 2002 (Scholtes 2002). It does not set out any data on which the convexity bias theory might be based and does not attempt to estimate the impact of the convexity bias.[217] CEG note that Grishchenko and Huang (2012) cite literature that puts this bias at less than -1bp.[218]
- Inflation risk premium bias – the AER note this generally results in an overestimate of inflation rather than an underestimate. This is confirmed by CEG's review of the Grishchenko and Huang (2012) paper cited by the AER.[219]
- Liquidity premium bias – this is said to exist because nominal bonds have a premium in them for liquidity essentially arising from the fact that indexed bonds are relatively less liquid. The AER contends therefore that the difference between nominal and indexed bonds is not purely based on inflationary expectation.[220] The AER relies on Shen and Corning [2001]. CEG find that the article provides little, if any, support for the AER's propositions[221] in support of the existence of this potential bias. However, that paper is old and relates to the US securities market.
- Inflation Indexation lag bias – this is said to potentially be an underestimate or overestimate and it is potentially small.

Only the convexity and liquidity premium issues are said to result in a potential downward bias of expected inflation forecasts and even if such a downward bias existed, the quantum of any such bias has not been identified by the AER. CEG's review of the literature is more extensive than the AER's and confirms that breakeven inflation is more likely to overestimate expected inflation than under estimate it.[222] As CEG also point out, the AER itself did not make adjustments for any perceived bias when using the breakeven approach to estimate expected inflation prior to late 2008[223] and when it later did adjust for bias, it adopted an estimate of

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215 CEG, *Best estimate of expected inflation*, September 2016, Section 6. CEG: *Inflation compensation – addendum to September report* 14 December 2016, section 1, in particular 1.1 and 1.6.

216 See the AER's explanation in AER, Draft decision AusNet Services transmission determination 2017-18 to 2021-22: Attachment 3 – Rate of return, July 2016, Table 3-20 at 3-155.

217 Scholtes, C., 'On market-based measures of inflation expectations', *Bank of England Quarterly Bulletin*, Spring 2002, p. 71, CEG, 6.1.3.

218 *CEG: Inflation compensation – addendum to September report, 14 December 2016, section 1 and Appendix B*

219 CEG, *Best estimate of expected inflation*, September 2016, Section 6.2.4.

220 See the AER's explanation in AER, Draft decision AusNet Services transmission determination 2017-18 to 2021-22: Attachment 3 – Rate of return, July 2016, Table 3-20 at 3-133.

221 CEG, *Best estimate of expected inflation*, September 2016, Section 6.2.5.

222 *CEG: Inflation compensation-addendum to September report, 14 December 2016, section 1* - Supporting Submission 16.29, Section 6.3.

223 *CEG: Inflation compensation-addendum to September report, 14 December 2016, section 1.2*

expected inflation that was lower than breakeven inflation. That is, consistent with adjusting for an upward bias.[224] CEG also explain that the existence of positive bias is confirmed by the existence of CPI indexed bonds.[225]

Finally, CEG find that there is clear evidence that the AER's methodology results in an upward biased estimate given that in the current low inflation and low interest rate environment, investor expectations are that there is an asymmetry of risk in inflation being less than the midpoint of the RBA's forecast and target inflation bands over 10 years than exceeding it.[226]

9.7.4 Summary

The AER's methodology for estimating 10-year inflation results in an estimate that is currently much higher (around 70bp) than expectations implied in bond market prices. It also results in a significantly negative real risk free rate (around -50bp at the time of CEG's analysis). This is contrary to investors being able to earn a positive guaranteed real return on inflation indexed Commonwealth Government Securities (CGS). The AER's approach is not a direct measure of inflation expectations, is not a good estimate of the expected inflation in the marketplace and is likely to lead to under-recovery of compensation for inflation.

Break-even inflation is a better estimate of expected inflation and thus a better basis for consistent inflation estimation across the different building blocks of the regulatory decision; particularly the WACC and PTRM. The AER's methodology assumes that investors expect that inflation will be in the middle of the RBA target range (2.5%) at horizons beyond 2 years. While this may have been a reasonable assumption historically (and may be in future years) it:

- cannot always be presumed to be reasonable; and
- is not a reasonable assumption in current market circumstances.

As CEG's report shows, in current circumstances the AER's estimate of expected inflation, in particular the assumption that investors expect inflation to average 2.5% beyond 2 years, is at odds with all of the available evidence. Namely:

- The AER's estimate of expected inflation implies that investors expect a negative real return on the risk free rate. The fact that they can achieve a positive guaranteed real risk free return simply by buying inflation indexed CGS demonstrates this is clearly not the case.
- Break-even inflation estimates (roughly 1.7%) are well below AER forecasts (2.4%) even at a horizon of 10 years. The RBA itself is forecasting inflation out to December 2018 to be below the bottom of its target range out to the end of the RBA forecast horizon.
- In the current monetary policy environment, where policy rates are close to the zero lower bound, the greatest risks to inflation are to the downside. This risk is not theoretical, all Western developed countries currently have monetary policy settings with policy rates close to zero and all are currently undershooting inflation targets.
- Expected inflation is the actuarially expected inflation (average of all possible inflation outcomes weighted by their probability). So, even if investors perceived that the most likely expected inflation was 2.5%, expected inflation would be below this once the greater downside risks were appropriately weighted.
- Break-even inflation forecasts have been more reliable than the AER's forecasting methodology in recent years. Break-even inflation forecasts accurately predicted the recent fall in inflation below the bottom of the RBA's target range while the AER's methodology did

224 *CEG: Inflation compensation-addendum to September report, 14 December 2016 –section 1.3*
225 *CEG: Inflation compensation-addendum to September report, 14 December 2016 – section 1.5*
226 *CEG: Inflation compensation-addendum to September report, 14 December 2016 – section 1.6*

not. They have also responded more quickly to recent changes in actual inflation than the AER approach.

- An expectation that Australian inflation will jump to 2.5% at the end of the RBA forecast period is inconsistent with the fact that Australian (and global) inflation rates have been persistently below target for many years, with instances of deflation in Australia (March quarter CPI), US, Japan, the UK and the Eurozone.
- Falling 10-year break-even inflation is a statistically significant explanatory variable when regressed against nominal CGS yields – suggesting that most of the recent fall in nominal CGS yields is due to falling inflation expectations (not falling required real returns as implicitly assumed by the AER).

Finally, CEG has shown that the AER's perceived limitations of the breakeven approach and its finding that it is not satisfied it would improve its estimate of expected inflation are unfounded and incorrect.

Based upon the considerations above, we have used breakeven inflation being the only direct and consistent measure of inflation expectations in the market, to estimate inflation for the forthcoming AA period. Based upon data on straddling indexed and non-indexed CGS instruments and the Fisher equation,[227] and using the indicative period of 5th September 2016 to 30th September 2016 (to be updated for the Final Decision) this gives a ten-year inflation estimate of 1.65%. AusNet Services submits that this is the best estimate of expected inflation possible in the circumstances as required by NGR 74(2).

9.7.5 Potential Alternative Approaches

The AER has expressed the view that it is preferable to consider the methodology for estimating expected inflation by way of an industrywide review rather than on a decision-by decision basis.[228]

AusNet Services supports a review of the AER's approach to estimating inflation as identified in its PTRM because, for the reasons set out in this section, the AER's current methodology does not give rise to an appropriate estimate of inflation expectations. There are potentially a number of ways that the current issue that arises from the inconsistency between the estimate produced by the AER's method and inflation expectations in the nominal could be addressed. As is clear from the above, AusNet Services' position is that the best method currently available is the breakeven approach.

Set out in the box below are some alternative approaches that could be considered further by the AER and networks in a review of the issue. In presenting these alternatives, AusNet Services does not submit that any of them are a better alternative to the break-even approach or that they do not suffer from limitations. Rather, the box below is presented to advance the AER's consideration of this complex issue. CEG also raise some potentially important issues in terms of how the regulatory regime compensates for deviations between actual inflation and expected inflation at the time of a regulatory determination which should also be considered further.[229]

[227] The ERA uses a breakeven inflation approach, and we have simply adapted the ERA's Fisher equation spreadsheet model to different dates. This spreadsheet model is available upon request.

[228] See for example AusNet Services Transmission Determination Draft Decision Attachment 3 Rate of Return, p. 3-137.

[229] *CEG: Inflation compensation – addendum to September report, 14 December 2016,* section 2.

Table 9-5: Potential alternative approaches to inflation

Potential Alternative Approaches to Inflation
Updating the Estimate of Expected Inflation in the PTRM each year for actual inflation – This would involve replacing the estimate of expected inflation in each year of the access arrangement period with the actual CPI (out-turn inflation) for the relevant year. For example, at the same time the return on debt is updated each year. We understand that this alternative approach has already been proposed by APA in respect of its Roma to Brisbane Access Arrangement Proposal.
Rolling forward the regulatory asset base in the roll forward model using the same estimate of expected inflation instead of actual inflation – this would prevent the current mismatch that applies when the estimate of expected inflation used in the PTRM differs from actual inflation used to roll forward the RAB. Under the National Gas Rules there is no limitation to such an approach being used in the roll forward model.
Derive nominal WACC by estimating the real rate of return directly and adding AER inflation estimate – this alternative approach was proposed (as an alternative) by AusNet Services' transmission in its Revised Regulatory Proposal submitted in September 2016 and a worked example is included in section 7 of the CEG report attached *Best estimate of expected inflation,* September 2016.
Annual update of the AER's methodology – a further (less desirable than market based approaches) alternative may be for the AER to update its own estimates of expected inflation using RBA short term inflation forecasts for each year of the regulatory period as they become available, rather than relying on the long term RBA target bands. That is, at the same time that the return on debt is updated each year, the RBA's latest statement of monetary policy short term forecasts of inflation for the relevant year would replace in the PTRM the RBA target number used in the 10 year term.

As noted above, none of these approaches are necessarily perfect but AusNet Services encourages the AER to explore and consult on alternative methods if the break-even approach is not adopted.

9.8 Proposed WACC parameter values

For the reasons set out in this chapter, AusNet Services' Proposal departs from the AER's Rate of Return Guidelines in the following respects:[230]

- **Return on Equity –** in the Guideline, the AER established a method for estimating the MRP which was to estimate a range and then select a point estimate from within the range. The AER developed its December 2013 range using the two methods on which it placed greatest reliance. At the time of the Guideline the range was:
  - Historic excess returns supporting a range at the time of the Guideline of 5% to 6.5%.
  - The DGM method supporting a range of 6.1% to 7.5%.[231]
- The AER then selected a point estimate from within the range which as at December 2013 was 6.5%.[232] The AER noted this point estimate lies between the (then) historical average range and the range of estimates produced by the DGM.

[230] It is noted that the AER's Guideline did not specify a method for forecasting inflation, so there is no departure in that regard.
[231] AER Rate of Return Guideline, Explanatory Statement, pp. 95-97.
[232] Ibid at 135.

- In this proposal AusNet Services has updated the evidence on which the AER relied in forming its range for the MRP in its Guideline (and subsequent decisions). Consistent with the Guideline approach, AusNet Services then selects a point estimate from within that range. For the reasons set out below, AusNet Services' proposal is to adopt a point estimate of 7.5%.
- **Return on Debt** – The AER's Rate of Return Guideline approach was to apply a transition from the previous "on the day" approach to a trailing average return on debt. AusNet Services applies the AER's transition to a trailing average approach to the return on debt.
- AusNet Services departs from the AER's approach to the third party data source insofar as it proposes to estimate the return on debt using the RBA dataset exclusively, as compared to the AER's approach relying on a simple average of Bloomberg data and the Reserve Bank of Australia data to calculate the return on debt. AusNet Services also departs from the AER's proposed benchmark credit rating of BBB+ and proposes a credit rating of BBB.

For the reasons set out in this chapter, AusNet Services' AA Proposal adopts the Rate of Return and Forecast Inflation estimates shown in the Table below.

Table 9-6: AA Proposal Rate of Return and Forecast Inflation

Parameters	Proposal
Return on equity	7.3%
Return on debt	4.52%
Inflation	1.65%
Leverage	60%
Gamma	0.25
Corporate Tax rate	30%
Nominal vanilla WACC	5.63%

** In the PTRM the cost of debt included for each year of the regulatory period reflects the path of historical rates that will be applied under an immediate debt transition.*

9.9 Annual return on capital allowance

Applying the WACC to AusNet Services' projected capital base produces the forecast return on capital set out in the table below.

Table 9-7: Forecast return on Capital

($M Nominal)	2018	2019	2020	2021	2022
Return on capital	88.73	91.71	95.16	98.39	101.13

Source: AusNet Services

9.10 Value of imputation credits (gamma)

9.10.1 Key Messages

The AER's conceptual approach, relying on the pre-personal tax and pre-personal costs value of imputation credits, and the evidence on which it relies to derive its gamma estimate, has not changed from its NSW/ACT decisions made in October 2015. In its most recent decisions[233] the AER has continued to apply an estimate of the value of imputation credits of 0.4, selected from within a range of 0.3 to 0.5.

There have been a number of recent merits and judicial reviews of the AER's approach to gamma which have resulted in conflicting outcomes. At the time of this proposal a number of legal reviews in respect of gamma remain unresolved.[234]

For the reasons set out in this section and the accompanying expert reports, AusNet Services remains of the view that the correct estimate of the value of imputation credits is 0.25 (the product of a distribution rate of 0.7 and theta of 0.35[235]) and that estimate is adopted in this proposal. The estimate is based on the post-personal tax and personal cost market value of imputation credits to shareholders, consistent with the correct interpretation of the National Gas Rules and the most up to date and best estimate of the value of imputation credits.

The AER's approach to estimating gamma results in an overestimate of the "value of imputation credits" to equity investors and is inconsistent with the ordinary meaning of the National Gas Rules. The deduction from revenues for the value of imputation tax credits is too large with the effect that the return to equity holders will be too small. As a result, AusNet Services will not be able to recover at least its efficient costs (including a return to equity holders).

9.10.2 Background

Under Australia's dividend imputation tax system, dividends that are paid out of company profits that have been taxed in Australia have imputation credits attached to them. A proportion of those credits will be redeemed against the domestic personal tax obligations of shareholders who receive them. However credits distributed to non-resident shareholders cannot be redeemed. Further, not all credits distributed to resident shareholders are in fact redeemed.

The National Gas Rules provide for the value of imputation credits to be taken into account in estimating the cost of corporate income tax building block, rather than by an adjustment to the return on equity.[236] Gamma is the factor used to adjust the estimate of the taxable income (ETI) of the benchmark efficient entity (**BEE**) for the value attributed to imputation credits.

Frontier Economics explains the role of gamma in the regulatory settings as follows:

> *In the Australian regulatory setting, the regulator estimates the return that investors would require to provide equity capital to the firm and then allows the firm to charge prices so that it is able to pay that return to the investors. In the absence of imputation, this process is straightforward.*
>
> *Consider, for example, a firm with $1,000 of equity in is RAB and a required return on equity of 7%. In this case, the equity investors require a return of $70.237 The regulator will allow*

[233] For example, in the AER's Draft Decision: Powerlink transmissions determination 2017-18 to 2021-22.

[234] Including the AER's judicial review application in respect of the Australian Competition Tribunal's decision in *Applications by Public Interest Advocacy Centre Ltd and Ausgrid* [2016] ACompT 1 (***Ausgrid***), SA Power Networks judicial review application in respect of the Tribunal decision in *Application by SA Power Networks* [2016] ACompT11 (***SAPN decision***) and the merits review applications by the Victorian Electricity distributors and ActewAGL Gas, currently reserved by the Tribunal.

[235] Based on an update of the SFG dividend drop off study to 2016; Frontier Economics: *An updated dividend drop-off estimate of theta,* September 2016. We also rely upon Frontier Economics: *Perspectives for the estimation of gamma*, December 2016**.**

[236] NGR 87A .

[237] 7% × $1,000 = $70.

> *the firm to earn a pre-tax profit of $100, from which it will pay $30 corporate tax,238 leaving $70 to return to shareholders, as required.*
>
> *Now consider the same example with imputation, and where the regulator has determined that gamma should be set to 0.4, as the AER has done in its recent decisions. In this case, the regulator will allow the firm to earn a pre-tax profit of $85.37, from which it will pay $25.61 corporate tax (30%), leaving $59.76 to distribute to shareholders. The $25.61 of corporate tax will create $25.61 of imputation credits that are assumed to have a value of 0.4 × 25.61 = $10.24. Thus, the shareholders receive $59.76 from the firm plus imputation credits that are assumed to have a value of $10.24, providing the total return of $70.00 that is required.*
>
> *In summary, the return that shareholders would otherwise receive from the firm ($70.00) is reduced by the regulator's estimate of the value of imputation credits ($10.24).*[239]

It is common ground that the value of imputation credits is calculated using the Monkhouse approach, as the product of a distribution rate (payout ratio or *F*) and theta (which the AER terms the "utilisation rate"). What is not common ground is the approach and evidence relied upon to derive those two parameters.

This section sets out our approach to estimating the value of imputation credits for the BEE and explains why this approach differs from the AER's Guidelines, and recent decisions by the AER.

AusNet Services relies on the following expert evidence to support its proposed value for gamma of 0.25 which are submitted with this Proposal:

- SFG Consulting (March 2011): Dividend drop-off estimate of theta Re Application by Energex Limited (No 2) [2010] ACompT7.
- SFG Consulting (June 2013): Updated dividend drop-off estimate of theta, Report for the Energy Networks Association.
- SFG Consulting (May 2014): An appropriate regulatory estimate of gamma.
- Frontier Economics (September 2016): An updated dividend drop-off estimate of theta.
- Frontier Economics (September 2016): Issues in the estimation of gamma.
- Frontier Economics (December 2016): Perspectives for the estimation of gamma

9.10.3 Legislative Framework

National Gas Rule (**NGR**) 76 provides that one of the building blocks for determining the revenue requirement is the estimated cost of corporate income tax to be determined in accordance with NGR 87A.

NGR 87A specifies the following manner by which the cost of tax is to be estimated:

> The estimated cost of corporate income tax of a service provider for each regulatory year of an access arrangement period (ETC_t) is to be estimated in accordance with the following formula:
>
> $ETC_t = (ETI_t \times r_t)\ (1 - \gamma)$
>
> Where
>
> ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of reference services if such an entity, rather than the service provider, operated the business of the service provider;
>
> r_t is the expected statutory income tax rate for that regulatory year as

[238] Assuming a 30% corporate tax rate.
[239] Frontier Economics: *An updated dividend drop off estimate of theta,* September 2016, at [12] to [15].

determined by the AER; and

γ is the value of imputation credits.

NGR 87(4)(b) also requires the allowed rate of return to be determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in Rule 87A.

In relation to the estimate of gamma, the AER is required to make its decision in a manner that will or is likely to contribute to the achievement of the national gas objective (**NGO**).[240] Further, where there are two or more possible decisions that will or will be likely to contribute to the achievement of the NGO, the AER must make the decision that it is satisfied will or is likely to contribute to the NGO to the greatest degree and specify the reasons as to the basis on which that is the case.[241]

The AER must also take into account the revenue and pricing principles (**RPP**) set out in section 24 of the National Gas Law.

Also of relevance to gamma is NGR 74(2) which requires that an estimate must be arrived at on a reasonable basis and must represent the best forecast or estimate possible in the circumstances.

9.10.4 Proposal and Departure from Guidelines

AusNet Services proposes to apply a value of imputation credits of 0.25, calculated as the product of:

- a distribution rate of 0.70, based on market wide ATO data; and
- a theta of 0.35, based on the (updated) dividend drop off study performed by Professor Stephen Gray and updated to 2016.[242]

This approach reflects the correct approach to estimating the value of imputation credits which is consistent with the Rules and gives rise to the best estimate of gamma presently available.

This proposal is a departure from the AER's Rate of Return Guidelines. The reasons for the departure are set out in detail in this section, and are summarised as follows:

- the Guideline approach misinterprets NGR 87A and in particular the "value" of imputation credits required to be determined by that Rule;
- consequently the Guideline estimates the wrong thing, being the utilisation rate;
- even the AER's estimate of the utilisation rate exceeds the maximum upper bound of theta reflected in tax statistics;
- the Guideline approach incorrectly and unreasonably places no, or low, reliance on market value studies, which provide a direct estimate of the value of distributed credits consistent with the Rules; and
- consequently the Guideline approach gives rise to an estimate of gamma which is an overestimate of the value actually placed on imputation credits by shareholders.

In recent decisions the AER has also changed from its Guideline approach to the distribution rate. This proposal departs from the AER's approach to the distribution rate in its recent decisions insofar as the AER has regard to a listed equity subset of estimates.

[240] Section 28(1)(a) of the National Gas Law.
[241] Section 28(1)(b)(iii) of the National Gas Law.
[242] Frontier Economics: *An updated dividend drop off estimate*, September 2016.

9.10.5 The AER's approach to Gamma

In September 2016 the AER published its Draft Decision in respect of the Powerlink transmission determination for 2017-18 to 2021-22 and TasNetworks (formerly Aurora Energy) distribution determination for 2017-18 to 2018-19.

The AER's range for gamma of 0.3 to 0.5 and estimate of the value of imputation credits of 0.4 remains unchanged from previous decisions (although it is a departure from the point estimate in the Rate of Return Guidelines of 0.5). While the AER has updated its estimates of the distribution rate and its utilisation rate and obtained a new report from Dr Lally, its approach remains the same as that applied in its October 2015 decisions the subject of the Tribunals' decision is *Ausgrid* and the in *SAPN decision*, also the subject of review.[243] The updated evidence relied upon by the AER in its Powerlink Draft Decision is set out in Table 9-8 and Table 9-9 reproduced below:

Table 9-8: Estimates of the value of imputation credits—evidence from all equity

Evidence on utilisation rate	Utilisation rate	Distribution rate	Value of Imputation Credits
Equity ownership approach	0.56 to 0.68	0.7	0.40 to 0.47
Equity ownership approach (Lally recommended distribution rate)	0.56 to 0.68	0.83	0.46 to 0.56[244]
Tax statistics	0.48	0.7	0.34
Tax statistics (Lally recommended distribution rate)	0.48	0.83	0.40

Source: AER analysis; Lally, Gamma and the ACT Decision*, May 2016, p. 6*

Table 9-9: Estimates of the value of imputation credits—evidence from listed equity

Evidence on utilisation rate	Utilisation rate	Distribution rate	Value of Imputation Credits
Equity ownership approach	0.38 to 0.55	0.75	0.28 to 0.41 [a]
Implied market value studies	0 to 1	0.75	0 to 0.75
SFG dividend drop off study	*0.35 (0.4)*[a]		*0.26 (0.30)*[b]

Source: AER analysis

The central planks of the AER's approach, as reflected in its recent decisions, are as follows:

1. The AER continues to apply a conceptual approach to estimating gamma which assumes the value of imputation credits reflects a pre-personal tax and pre-personal cost valuation exercise. This approach assumes one dollar of claimed imputation credits has a post company tax value of one dollar to investors before personal taxes and transaction costs. In other words, investors value imputation credits at their full face value. This conceptual definition leads the AER to derive the estimate of gamma as the product of the distribution rate and the utilisation value to investors in the market.
2. In respect of the distribution rate, the AER now considers three subsets of information:

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243 In *Ausgrid*.

244 Lally recommends a gamma estimate of at least 0.5 which is based on a distribution rate of at least 0.83 and a utilisation rate of 0.6. See: M. Lally, *Gamma and the ACT Decision*, May 2016, p. 6.

   a. a market wide (all equity) distribution rate based on the cumulative payout ratio of 0.7 – this is not contentious;
   b. a listed equity only distribution rate of 0.75; and
   c. a rate of 0.83 recommended by Dr Lally on the basis of the top 20 ASX firms.

3. In respect of theta (the AER's "utilisation rate"), the AER:
   a. continues to place most reliance on the equity ownership approach;
   b. places some reliance on taxation statistics;
   c. does not accept that these approaches provide nothing more than an upper bound estimate of theta; and
   d. places very little, if any, weight on market value studies which directly estimate theta.
4. The AER pairs estimates of the distribution rate and its utilisation rate using subsets of all equity and listed equity estimates.
5. The AER also now introduces into its range an estimate of the gamma preferred by Dr Lally, combining a distribution rate of 0.83 with its equity ownership and tax statistics estimates.
6. The AER derives a range for gamma of 0.3 to 0.5.
7. The AER chooses a point estimate of 0.4 from its range of 0.3 to 0.5. This point estimate is said to be based primarily on the equity ownership approach, which suggests a value of 0.28 to 0.47. Less reliance is placed on evidence from tax statistics which suggests a value around 0.34. Even less reliance is placed on market value studies which the AER says suggest a value between 0 and 0.75.[245]

The AER and AusNet Services remain divided on these issues and each is addressed below.

9.10.6 Conceptual Approach

The AER continues to base its approach to estimating gamma on a conceptual framework which considers that the value of imputation credits is a post-tax value before the impact of personal taxes and personal costs. The AER considers this conceptual approach to be consistent with the Officer framework and it leads it to view the value of imputation credits as the proportion of company tax returned to investors through the utilisation of imputation credits (the utilisation rate approach).[246]

The AER approach assumes that, once the effects of personal tax and costs are excluded, an equity investor who is able to fully utilise imputation credits will value each credit at its full face value.

The AER's conceptual approach was recently considered by the Tribunal in the *Ausgrid* decision. The key findings of the Tribunal were:

- The proper concern is not the extent to which imputation credits may be translated into real money. Instead it involves a determination of the cost of taxation to a network service provider, and the extent to which that cost must be reduced to reflect the impact of the dividend imputation system on the network service provider. The reduction in the cost of income tax represented by gamma reflects the personal taxation benefits (as opposed to other benefits such as dividends) gained by shareholders from holding equity in the network

[245] AusNet Services Transmission Draft Decision2017-18-2021-22 (AusNet Transmission Draft Decision), Attachment 4-29, 4-30, Powerlink transmission determination Draft Decision 2017-2018-2021-22, (Powerlink Transmission Draft Decision) Attachment 4-27, 4-28.

[246] For example see AusNet Transmission Draft Decision, Attachment 4-22, Powerlink Transmission Draft Decision 4-20.

service provider and the value of those benefits as ascribed by shareholders. Consequently it is necessary to consider both the eligibility of investors to redeem imputation credits and the extent to which investors determine the worth of imputation credits to them.[247]

- The parties agreed that gamma may be significantly less than the face amount of the distributed credit because they cannot always be utilised by an investor, e.g. foreign investors. However, the networks' position was that shareholders who utilise imputation credits may not value them at their full face amount for reasons such as the time value of money, transaction costs and portfolio effects.
- Such costs are characterised by the AER as personal costs that should not be taken into account because of the requirements for consistency in the Officer framework.248
- The difficulty with the AER's approach is that:
    - Market value studies of imputation credits suggest that investors may not value cash dividends and eligibility to reduce their income tax liabilities equally.
    - The AER's approach ignores the fact that other parameters in the WACC calculations are market values that already incorporate the effects of the differences in investors' tax positions and transaction costs.
    - There is no inconsistency between the use of market studies to estimate the value of imputation credits and the methods used to calculate other parameters of the costs of debt and equity from market data.
- Importantly: "…the Tribunal does not accept the AER's approach that imputation credits are valued at their claimable amount or face value… The value is not what can be claimed or utilised, but what is claimed or utilised as demonstrated by the behaviour of the shareholder recipients of the imputation credits."249
- The Tribunal found that the AER had not satisfied it that its conception and estimated methods were consistent with the requirements of the NER, including the RPP.[250]

AusNet Services submits that, consistent with the Tribunal's decision in *Ausgrid*, the "value of imputation credits" required to be estimated under NGR 87A should be given its ordinary meaning that reflects its role in the regulatory framework, namely to prevent an over-estimate of the required return to investors in light of the benefit of imputation credits. The value to equity holders of imputation credits is impacted by personal costs and personal taxes which cause investors to value imputation credits at less than their full face value. This must be reflected in the estimate of the value of imputation credits.

Frontier Economics illustrate the consequence of applying an approach which does not reflect the "value" to investors as follows:

> *To illustrate the key point of contention in relation to gamma, suppose that the regulator estimates that 40% of all credits that are created will be redeemed and sets gamma on that basis, whereas imputation credits are only valued (in aggregate by the equity market) at 25% of the face amount. In this case, the regulator will reduce the return that the shareholders would otherwise receive by $10.24, but the credits received by those shareholders would only have a value to them of 0.25 × 25.61 = $6.40. This would result in shareholders being under-compensated as their return is reduced by $10.24 in relation to credits that are only worth $6.40 to them.*[251]

[247] *Ausgrid*, [1061].
[248] *Ausgrid*, [1065]-[1067].
[249] *Ausgrid*, [1081].
[250] *Ausgrid*, [1084].
[251] Frontier Economics; *An updated dividend drop-off estimate of theta*, September 2016, at [16].

AusNet Services considers the decision of the Tribunal in *Ausgrid* in respect of gamma to be correct and that the only approach to estimating gamma which complies with the Rules is one which estimates the value equity holders place on imputation credits, after personal tax and after personal costs. This gives rise to an estimation of theta which is based on market value studies only, as addressed further below.

It is acknowledged that the decision in *Ausgrid* is under review by the Full Federal Court. It is also acknowledged that the Tribunal in the *SAPN decision* also considered the AER's conceptual approach to gamma and came to a different conclusion to the Tribunal in *Ausgrid*, finding no error in the AER's approach. However, the *SAPN decision* did not resolve the proper construction of NGR 87A, in particular what needs to be estimated under that Rule. Rather the Tribunal deferred to the AER's judgment.

The Tribunal's decision in the *SAPN decision* is now also subject to a judicial review application.[252] For the reasons set out later in this section AusNet Services considers the Tribunal's approach in the *SAPN decision* to be incorrect.

9.10.7 Distribution Rate

The distribution rate reflects the proportion of imputation credits distributed to equity holders. In its recent decisions the AER changed its approach to estimating the distribution rate from its historic approach and from the approach set out in the Rate of Return Guideline.

In particular, the AER has departed from its estimate of 0.7 as set out in its Guidelines. In its Draft Decision on Powerlink's transmission determination, the AER now relies on three different estimates of the distribution rate which it uses in its range for gamma:

- a market wide (all equity) distribution rate of 0.7;
- a listed equity only distribution rate of 0.75; and
- a listed equity distribution rate 0.83 derived by Dr Lally from the financial reports of the top 20 ASX listed firms.

As can be seen from table 4.4 extracted above, the AER pairs its listed equity distribution rate of 0.75 with its estimates of theta using the equity ownership approach and implied market value studies. The AER combines the Lally ASX listed distribution rate of 0.83 with its equity ownership and tax statistics estimates of the utilisation rate.

It is agreed between the AER and network businesses that the market wide (all equity) distribution rate is 0.7. What is in dispute is whether regard should be had to a subset of listed equity only distribution rates.

The AER obtained a new report from Dr Lally published with its Draft Decision.[253] The AER sought Dr Lally's advice on whether estimates of the distribution rate should be based upon the same data as that for theta. Dr Lally advised that, because the distribution rate is a firm specific parameter whereas theta is a market parameter, theta must be estimated using market wide data, while the distribution rate could be estimated using firm, industry or sector wide data according to which was judged to provide the best estimate. Consequently it is not essential to combine or pair the estimates as the AER has done.[254] However, the AER continues to hold the view that it is open for it to do so.

The AER's reliance on a listed equity subset of the distribution rate is in error because:

- What is required for the purpose of estimating the value of imputation credits under NGR 87A is the best estimate of the distribution rate for the BEE.

[252] By Application for Judicial Review filed on 25 November 2016, NSD 2032/2016,

[253] Dr Martin Lally: *Gamma and the ACT Decision*: 23 May 2016.

[254] At pp. 25-26.

- The rate is firm specific and different types of firms will have different distribution rates. It follows that all entities should be taken into account in order to derive a market wide distribution estimate.
- The AER's listed equity estimates are dominated by a small number of large multinational firms that are able to attach imputation credits to dividends that are distributed out of foreign sourced income. Firms with significant foreign operations will have higher distribution rates than firms without such operations.
- By definition, the BEE is an Australian firm with no access to foreign income. The AER's reliance on listed equity only is inconsistent with estimating the distribution rate for the BEE. This includes in relation to the estimate provided by Dr Lally of 0.83 based on the top 20 ASX listed firms.
- Frontier Economics demonstrate that the 20 companies in the Lally sample are predominantly large multinationals with a material amount of foreign sourced income which can be used to distribute imputation credits.[255] Dr Lally's report relied upon by the AER examines 7 of the 20 firms and concludes that, among the 7 firms, those with relatively more foreign profits had lower imputation credit distribution rates. However, the relevant question is whether large multinationals have higher imputation credit distribution rates than other firms. Further, Frontier Economics show that the analysis of the top 7 firms by Dr Lally did not control for differences in dividend payout ratios.
- Frontier Economics conclusion is that:
    - "a.Mathematically, for any given dividend payout ratio, the imputation credit distribution rate is an increasing function of the proportion of foreign profits; and
    - b. The evidence clearly supports the proposition that large multinationals are able to distribute a higher proportion of the imputation credits that they create (83%) relative to the average Australian firm (70%).[256]"
    - An approach which relies on a subset of listed equity estimates of the distribution rate does not give rise to an estimate which is appropriate for or reflective of the BEE and gives rise to an overestimate of the distribution rate. The sample of all equity is less affected by the multinational firms (which comprise a smaller proportion of all equity than of listed equity) and so is more appropriate when estimating the distribution rate for the BEE.

The AER now accepts that it is not "necessary" to match estimates of distribution rates and theta (its utilisation rate) from the same data sets, but it considers the choice is open to it and continues to rely on listed equity only estimates.

In the *SAPN decision*, the Tribunal found that there was no compelling reason to believe that the average unlisted company is any better or worse proxy than the average listed company for the purposes of estimating the distribution rate for the BEE.[257] This does not address the issue that estimates for listed only entities are influenced by foreign earnings.

AusNet Services' view is that the market wide distribution rate of 0.7 is the only approach that can reflect an estimate of the rate for the BEE and which can be used to estimate the value of imputation credits for the purposes of NGR 87A.

[255] Frontier Economics: *Issues in the estimation of gamma*, September 2016, section 2.
[256] Frontier Economics: *Issues in the estimation of gamma*, September 2016 at [36].
[257] SAPN decision at [184].

9.10.8 Theta

As noted above, the AER's conceptual approach to gamma leads it to estimate the parameter theta (what it terms the "utilisation rate") based on the extent to which investors can utilise the imputation credits they receive to reduce their tax or obtain a refund. This approach assumes imputation credits expected to be utilised are valued at full face value on a post company pre personal tax basis.[258] This interpretation leads the AER to rely primarily on the equity ownership approach to estimate theta and, to some extent, on taxation statistics of redemption rates and to place little, if any, reliance on market value studies.

The issue between the AER and networks is whether the Rules require the estimation of gamma by reference to "value" to shareholders or their assumed ability to redeem or utilise imputation credits. This issue was considered carefully by the Tribunal in *Ausgrid*. In contrast, the Tribunal in the *SAPN decision* did not decide this central question.

The Ausgrid decision

The Tribunal in *Ausgrid* noted that the change in the definition of gamma in the National Electricity Rules in 2012 from "*assumed utilisation of imputation credits*" to "*value of imputation credits*" did not change gamma's meaning. Rather the issue in *Ausgrid* was what "*value of imputation credits*" in (equivalent) Rule 6A.6.4 meant.[259]

The Tribunal found that it is how shareholders act in the market place (as analysed by market studies and dividend drop-off studies), in relation to the utilisation of franking credits available to them, which informs the value of imputation credits.[260]

There are a number of explanations as to why the value of distributed imputation credits as identified from market-based studies that is reflected in share prices may be less than the face value of those credits: [261]

- some of the credits that are distributed to shareholders are never redeemed, including because:
    - credits distributed to non-resident investors cannot be redeemed under the dividend imputation legislation;
    - credits distributed to resident investors who sell the shares within 45 days of their purchase cannot be redeemed (i.e. the 45 day rule); and
    - some credits distributed to resident investors are not redeemed because some investors fail to keep the required records and simply do not claim them;
- there is a time delay (which can be up to two years or more) in obtaining any benefit from imputation credits – whereas dividends are available to the investor as soon as they are paid, the imputation credits that are attached to that dividend only have value after the investor's end-of-year tax return is filed and processed;
- due to the administrative costs involved in the redemption of imputation credits;
- due to the costs of loss of diversification in resident investors' portfolios who hold more domestic dividend-paying shares than they otherwise would because they are attracted by the possibility of receiving imputation credits.

This difference (between "face value" and "market value") was acknowledged by the Tribunal and it noted that neither:

- tax statistics, which:

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258 AusNet Transmission Draft Decision, at 4-35,Powerlink Transmission Draft Decision at 4-98.
259 *Ausgrid*, [1025].
260 *Ausgrid*, [1079], [1080].
261 As set out in SFG Consulting (May 2014): *An appropriate regulatory estimate of gamma, section 2.*

- assume a dollar value for each dollar of imputation credits redeemed; and
- measure the actual rate of redemption of distributed imputation credits by eligible investors from information reported in tax returns; nor

- the equity ownership approach, which:
  - seeks to calculate a value-weighted proportion of domestic investors in the Australian equity market as a reasonable estimate of theta;[262]
  - assumes that an investor that is eligible to fully utilise imputation credits they receive has a utilisation rate of 1 (i.e. they gain 100 percent of the "value" of the imputation credits) whereas an investor that is ineligible to redeem imputation credits has a utilisation rate of 0 (i.e. they gain no "value" from the imputation credits);[263]
  - uses this dollar value of imputation credits to a relevant class of investors to attempt to estimate the proportion of those investors in the total;[264] and
  - assumes the value of imputation credits rather than deriving it from market data,[265]

make any attempt to assess the value of imputation credits to shareholders[266] or consider the likely existence of factors, such as the 45 day rule, which reduce the 'value' of imputation credits to shareholders[267] and accordingly can do nothing more than provide upper bounds on the estimate of theta.[268]

The Tribunal found that the estimate of theta produced by tax statistics (and to some extent market value studies) was in fact evidence that Australian investors do *not* value imputation credits at their face amount, including because they may be unable to use them.[269]

The Tribunal accordingly rejected the AER's submission that it is the amount which is "claimable" or their "face value" or which is "available" for redemption.[270] Overall, the Tribunal concluded that it is necessary to consider both the eligibility of investors to redeem imputation credits and the extent to which investors determine the worth of imputation credits to them.[271]

The AER's approach does not estimate the "value" of imputation credits.

The AER's utilisation rate approach on a pre-personal tax and personal cost basis does not reflect the "value of imputation credits" required to be estimated by NGR 87A because it does not account for the matters that cause equity holders to value imputation credits at less than their face value. As the Tribunal in *Ausgrid* confirmed, the only method that does take account of such factors and is therefore consistent with the "value" of imputation credits referred to in NGR 87A is a market based approach. This can be seen from the following summary table.

262 *Ausgrid*, [1038].
263 *Ausgrid*, [1039].
264 *Ausgrid*, [1039].
265 *Ausgrid*, [1043].
266 *Ausgrid*, [1095].
267 *Ausgrid*, [1042], [1046], [1095].
268 *Ausgrid*, [1048], [1095].
269 *Ausgrid*, [1092].
270 *Ausgrid*, [1100].
271 *Ausgrid,* [1061].

Table 9-10: Summary of approaches to value of imputation credits

Factor	Equity ownership approach	Tax statistics approach	Market value studies
Not all imputation credits that are created when companies pay tax are distributed. This is because some company profits are not paid out in dividends, but are instead reinvested in the business.	✓	✓	✓
Foreign investors are unable to redeem imputation credits that they receive.	✓	✓	✓
Some domestic investors are unable to redeem imputation credits, for example due to the 45-day holding rule.	×	✓	✓
Some domestic investors who are eligible to redeem imputation credits do not redeem them. The cost or administrative burden for some shareholders (such as small shareholders) may deter redemption.	×	✓	✓
Some investors who do redeem imputation credits may not value them at their full face value. This may be due to various factors, such as time delays, transactions costs or portfolio effects.	×	×	✓

As Frontier Economics explains[272], the AER's approach using the post-tax revenue model requires an estimate of gamma in two steps:

- In the estimate of the total required return on equity, which includes the benefits of imputation credits.
- As a deduction for the value of imputation credits (through the corporate tax building block).

The effect of these steps is to produce an ex-imputation required return on equity.

In the first step, the AER estimates the total required return on equity using the SL-CAPM. The AER's primary estimate of the MRP is the mean of historical excess returns over various long historical periods beginning in 1883. These estimates take the return on a broad stock market index each year and subtract the risk-free rate that was available to investors in that year.

Prior to the introduction of imputation in 1987, the observed stock market return already reflected the total return.[273] However, post-imputation the observed market return is not the total return to equity holders – since it reflects only dividends and capital gains, the estimated value of imputation credits must be added via a process that the AER calls "grossing-up."

Frontier Economics explain why this grossing-up must reflect the market value of credits. The stock market index reflects the market value of dividends and capital gains, so the market value of imputation credits must be added to it. Adding anything other than the market value of credits would result in apples being added to oranges, producing a mish-mash that has no economic meaning.[274] Frontier Economics worked example demonstrates this clearly.[275]

In the second step above, the PTRM removes the estimated value of imputation credits to produce an estimate of the ex-imputation required return on equity, which then flows into the revenue allowance. Frontier Economics explain why step must also be done on a market value basis[276].

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[272] *Frontier Economics: Perspectives for the estimation of gamma*, December 2016, section 2.1.

[273] That is, prior to 1987, shareholders received returns in the form of dividends and capital gains, both of which are reflected in the observed market index.

[274] Frontier Economics*: Perspectives for the estimation of gamma,* December 2016, section 2.2.

[275] Frontier Economics*: Perspectives for the estimation of gamma,* December 2016, section 2.2

[276] Frontier Economics*: Perspectives for the estimation of gamma,* December 2016, section 2.3.

The SAPN decision

In the *SAPN decision*, the Tribunal characterised the issue by reference to a consideration of the differences between the average investor and the marginal investor. The Tribunal stated that different theoretical models, all of which are simplifications of reality, with different strengths and weaknesses, and with different degrees of support among experts, may suggest differing approaches. Judgment about the weight to be given to alternative approaches is required, with resulting consequences for judgements about the subsequent issues.[277]

The Tribunal referred to two alternative theoretical approaches, being the “average investor” and the “marginal investor” approaches. The Tribunal considered that that the market based (dividend drop-off study) approach taken by SA Power Networks appeared to align with a “marginal investor” approach, while the AER’s approach appeared to align with the “average investor” approach.[278] The Tribunal took the view, reflected in what it considered to be the diversity of expert opinion, that there is no generally accepted theoretical model for explaining the valuation of imputation credits. It found that the available empirical evidence is inadequate to enable confident discrimination between the two alternative perspectives of the average and marginal investor.

Ultimately the Tribunal found that the AER made no error in giving most weight to the “utilisation” approach. The Tribunal’s view was that the AER considered the range of alternative approaches, recognised the diversity of views of experts on their merits (both theoretical and empirical), and made a judgment call.[279]

However, the debate between the AER and networks in relation to gamma is not in relation to the definition of the relevant investor. As Frontier Economics explains, estimating gamma does not in fact involve a choice between the theoretical “average” and “marginal investor” perspectives. Under certain theoretical asset pricing models, the value of imputation credits that is reflected in stock prices will be a complex weighted average (by investor wealth and risk aversion) of the ability of each investor to utilise imputation credits. Under the assumptions of the theoretical representative investor models, there would be an equivalence between the complex weighted-average and the observed market price. [280]

However, in practice estimates of the market value differ from the AER’s estimates of the average utilisation rate. Frontier explains that is because (a) the assumptions of the theoretical model do not hold in practice, and (b) in any event, the AER estimates a simple average of utilisation rates rather than the complex weighted average that is required by those models.[281] Therefore it is not correct to say there is a choice between theoretical “average investor” and “marginal investor” perspectives. Rather, the choice is between:

- An estimate of what the value of credits would have been if the assumptions of the theoretical model did hold in the real world, and if the simple average was the same as the complex weighted average; or
- An estimate of the market value of credits, which reflects the outworking of the process by which a market-clearing price is obtained, even where that process is too complex to be captured by a simple economic model.[282]

The marginal investor analysis in the Tribunal’s decision in SAPN is not relevant to the central issues between networks and the AER on gamma. As noted above, the Tribunal in the *SAPN decision* did not determine that central issue being the correct interpretation of NGR 87A and

[277] SAPN decision, [138].
[278] SAPN decision at [144].
[279] SAPN Decision, [159].
[280] Frontier Economics: *Perspectives for the estimation of gamma,* December 2016 section 1.1.
[281] Frontier Economics: *Perspectives for the estimation of gamma,* December 2016, paragraph 4.
[282] Frontier Economics: *Perspectives for the estimation of gamma,* December 2016, section 1.

what it requires to be estimated. That issue is a question of legal interpretation and, with respect to the Tribunal, cannot accurately be described as a "judgment call". It is also not a matter which is to be (or can be) resolved by reference to expert opinion.

The *SAPN decision* is the subject of an application for judicial review, including on grounds that the Tribunal failed to determine the correct question, being the construction of the "value of imputation credits" in the Rules, and that the Tribunal considered matters which it was not entitled to consider, such as the marginal investor and average investor analysis.[283] SAPN's application for judicial review of the Tribunal's decision is yet to be heard.

AusNet Services submits that the meaning of "value" of imputation credits in the National Gas Rules is clear and, as found by the Tribunal in *Ausgrid,* requires an estimate of gamma that reflects the value, as in worth, of imputation credits to investors.

Best Method for determining 'Value'

The Tribunal in *Ausgrid* noted that the valuation in question may be a complex exercise depending on the inference to be drawn from a range of data sources.[284] Ultimately, the Tribunal concluded that because tax statistics and equity ownership approaches could be no better than providing "upper bounds" of the estimate of theta, the assessment must rely on market studies.[285] The Tribunal noted this as consistent with methods used for calculating other parameters of the cost of debt and equity from market data.[286]

The Tribunal concluded that the AER had erred in that it had not satisfied the Tribunal that its conception (as to value) or estimation (as to method) was consistent with the National Electricity Rules, including the revenue and pricing principles.[287]

Having rejected the conception and estimation of gamma by the AER, the Tribunal adopted the theta estimate in the 2013 SFG Study.[288] The Tribunal noted that that study represented only one view and that it was faced with selecting between competing views.[289] The Tribunal was satisfied that the SFG point estimate of 0.35 for theta was the best estimate.[290]

The Tribunal in the SAPN decision also noted a number of positive attributes of the methodology employed in the SFG dividend drop-off study:

> *"The Tribunal notes that the SFG study is very clear about the data used and econometric techniques employed. Different specifications (reflecting statistical considerations required to achieve unbiased, efficient estimates) of the basic relationship estimated generate similar results. That basic relationship links the fall in stock price on the ex-dividend date (the drop-off) to the amount of the cash dividend and the amount of the franking (imputation) credit. Because the study includes dividend events which may involve no, partial, or full franking, it is able to estimate the sensitivity of the drop-off to both the size of dividend and the size of the franking credit in a regression relationship:*[291]

However, the Tribunal in the SAPN Decision then noted a number of concerns that had been raised by the AER in relation to dividend drop-off studies. The Tribunal considered only one of the AER's concerns to be substantive, given the Tribunal's view that the methodology and

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283 Originating application for judicial review, SA Power Networks v Australian Competition Tribunal & Anor NSD 2023/2016, filed 25 November 2016, paragraphs 1 to 6.

284 *Ausgrid*, [1082].

285 *Ausgrid*, [1096].

286 *Ausgrid*, [1097].

287 *Ausgrid*, [1084].

288 *Ausgrid*, [1118].

289 *Ausgrid*, [1118]. As set out at [1053], the Network Applicants' preferred value of gamma was based on the theta estimate of 0.35 from the 2013 SFG Study, which was intended to update the previous 2011 SFG Study, reported and relied upon in *Gamma (No 5)*, which in turn was produced in response to the Tribunal's concerns with previous studies as expressed in *Gamma (No 2)*.

290 *Ausgrid* , [1103].

291 SAPN decision at [163].

approach of the SFG study relied on by SAPN is generally acceptable (or “state-of-the-art”)[292]. The substantive concern was said to be whether valid tax related valuation parameters can be reliably inferred from the results of dividend drop-off studies.[293] AusNet Services submits there are a number of answers to this concern:

- The Tribunal refers to a passage of the AER’s final decision for SAPN where it is said that the value of imputation credits as estimated through a dividend drop-off study is not necessarily a correct post company tax value before personal taxes and personal transaction costs. However the concern expressed by the AER was that the estimates of theta from dividend drop-off studies did not conform to its conceptual approach. For the reasons stated noted above, it is submitted that personal costs and taxes are relevant and elsewhere in the SAPN Decision it appears to be accepted as such and that the only issue is measuring their precise effect.[294]
- The Tribunal’s reasons are affected by the misconception (as explained by Frontier Economics[295]) that dividend drop-off studies only measure the value of imputation credits to the notional “marginal investor”.
- The estimation of parameters in the regulatory context routinely involves consideration and use of empirical estimation methodologies which are imperfect and subject to limitations. The regulatory task is to find the most reliable empirical estimate of those that are available. In this context, the method’s relied upon primarily by the AER (the equity ownership approach and tax statistics can only provide upper bound estimates) and as the Tribunal found in Ausgrid, the assessment of theta must be based on market value studies.

For these reasons, AusNet Services contends that the correct approach was that adopted by the Tribunal in *Ausgrid.* That decision was based on a 2013 update of the SFG dividend drop off study which had previously been endorsed by the Tribunal in *Application by Energex Limited (Gamma) (No 5)*.[296] The author of the dividend drop off studies was Professor Stephen Gray (now at Frontier Economics).

Professor Gray has further updated the 2013 dividend drop off study to June 2016. Professor Gray followed the approach adopted in the 2011 and 2013 SFG Reports for compiling the dataset and performing statistical analysis on the dataset. Professor Gray has extended the dataset from the 2013 update through to June 2016 and having undertaken the same analysis concludes that the updated dataset supports an unchanged estimate of theta of 0.35.[297]

The dividend drop off study updated to 2016 reflects the most up to date market value study available using the same approach as endorsed by the Tribunal in previous decisions. AusNet Services submits that it is the best estimate of theta currently available and adopts an estimate of 0.35 in this proposal.

9.10.9 AER estimates of the Equity Ownership Rates

The AER places significant reliance on the equity ownership approach in estimating the utilisation rate because it says:[298]

- it is well aligned with the definition of the utilisation rate in the Monkhouse framework;
- it employs a simple and intuitive methodology;

[292] SAPN decision at [165].
[293] SAPN decision at [171].
[294] For example at [146], [174], [178].
[295] Frontier Economics *Perspectives for the estimation of gamma*, December 2016, section 1.
[296] [2011] A CompT 9.
[297] Frontier Economics, *An Updated Dividend Drop Off Estimate of Theta*, September 2016, Section 5.
[298] AusNet Services Transmission Draft Decision Attachment 4-36, Powerlink Transmission Draft Decision, Attachment 4-141.

- it uses a reliable and transparent source of data; and
- it provides estimates of the utilisation rate for investors in both all equity and listed only equity.

The AER's current estimated ranges are:

- 0.56 to 0.68 (all equity); and
- 0.38 to 0.55 (listed equity only).

The AER accepts that there are limitations to the equity ownership approach but does not consider them significant.[299] AusNet Services disagrees. The AER's estimates derived from the equity ownership approach are above the maximum upper bound for theta which is derived from tax statistics (0.48), as confirmed by the Tribunal in *Ausgrid.* This of itself shows error. The AER does not accept that tax statistics do form an upper bound and this is addressed in the following section.

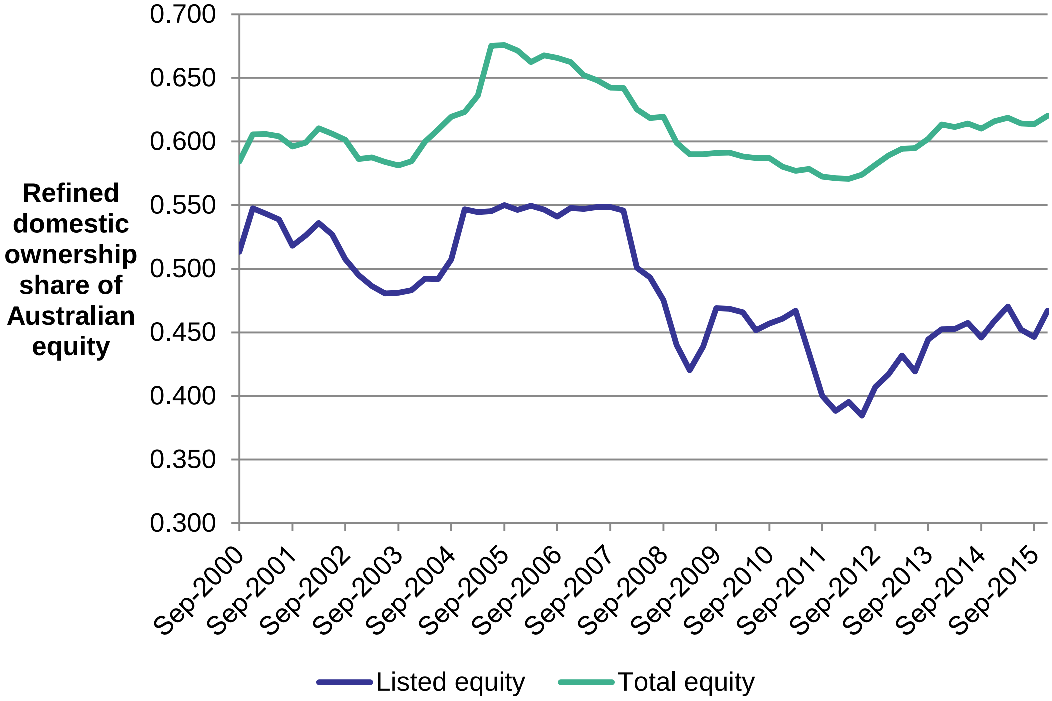
The above estimates are slightly lower than the AER's estimates in its Rate of Return Guidelines and earlier decisions. The AER's change in ranges since its November 2014 decisions is said to be in part a response to submissions from the networks, SFG and the advice from Handley. The AER:

- no longer relies on estimates of the single domestic ownership share (on the advice of Handley); and
- now considers only the period since September 2000 rather than data going back to the 1980s.[300]

In the Powerlink transmission draft decision published in September 2016, the AER presented its updated domestic ownership share of total equity in Figure 4.3:[301]

299 AusNet Services Transmission Draft Decision Attachment 4-142. Powerlink Transmission Draft Decision, Attachment 4-141.
300 AusNet Services Transmission Draft Decision at 4-148, Powerlink Transmission Draft Decision 4-147.
301 Powerlink Transmission Draft Decision, Attachment 4-147.

Figure 9-18: Refined domestic ownership share of Australian equity



Source: Australian National Accounts: Finance and Wealth (ABS cat. 5232.0), tables 47 and 48.

The equity ownership estimates in the AER's recent decisions are still 16 years old, and as such, could not reflect prevailing conditions in the market. Further:

- the most recent estimate for listed Australian equity appears to be approximately is 47% domestic ownership. As can be seen from Figure 4.3 extracted above, the estimate has not been materially above that since the GFC; and
- the most recent estimate using all equity appears to be approximately 0.62. The all equity estimate has only been above that during the pre GFC bull market.

9.10.10 Tax Statistics

The AER places "a degree" of reliance on tax statistics in arriving at its estimate for gamma but, given limitations with the statistics, less reliance than on equity ownership rates but more than market value studies.[302]

As confirmed by the Tribunal in *Ausgrid* and set out above, redemption rates derived from tax statistics do not take into account factors that result in investors valuing redeemed credits at less than their full face value. The reasons why an investor will value a redeemed credit at less than its full face value were identified by the Tribunal and are addressed above. To summarise, tax rules, transaction costs, the time value of money and the portfolio effect mean that the true value of redeemed credits could be less than their full face value.

The Tribunal in *Ausgrid* has confirmed that for these reasons redemption rates derived from tax statistics can only ever indicate the upper bound for the utilisation rate and do not provide direct evidence of the "value" of distributed credits to equity holders.

The AER now estimates the redemption rate from tax statistics to be 0.48, based on updated statistics to the 2014 tax year.[303] The AER disputes the Tribunal's findings in *Ausgrid* that tax

[302] AusNet Services Transmission Draft Decision, 4-38. Powerlink Transmission Draft Decision 4-37.

statistics can only provide an upper bound and remains of the view that a point estimate can be used.

The premise for the AER's position is that, based on Professor Hathaway's advice, tax statistics are unreliable and uncertain and therefore do not reflect an upper bound, nor is the current estimate inconsistent with a higher estimate of gamma than 0.4

However, as Frontier Economics explains (in the attached report which was not before the Tribunal in the *SAPN decision*), the reliability issue relates to the statistics of credits distributed. Under the AER's conceptual approach, the relevant terms for the purposes of estimating gamma are credits redeemed and credits created and no reliability issues are raised with respect to those terms. The 0.34 upper bound derived from tax statistics is relevant evidence of that upper bound which is unaffected by concerns about the reliability.[304]

It is also noted that the AER relies on tax statistics in seeking to demonstrate that the 45 day tax rule has no effect.[305] However the analysis undertaken by the AER relies upon the ATO data which Professor Hathaway considers to be unreliable. The result is an illogical result that implied imputation credits received are slightly less than imputation credits utilised. That result is impossible. The fact that the redemption rate is significantly below the domestic equity ownership rate shows that the 45 day rule is affecting the eligibility of some domestic investors to redeem imputation credits.

Market Value Studies

AusNet Services remains of the view that the only method that provides an estimate of the value, as in worth, of distributed imputation credits to equity investors, as required by NGR 87A, is the use of market value studies. This is the approach that complies with the Rules, and results in an estimate of gamma that is consistent with the achievement of the NGO and the considerations required by the RPP. The Tribunal has firmly found that: "*Given that two of the three approaches adapted by the AER are considered no better than upper bounds, it follows that the assessment of theta must rely on market studies*".[306]

The AER says that its re-definition of gamma and re-evaluation of its approach to the utilisation rate has led it to a position of not relying exclusively on market value studies. The AER prefers equity ownership and tax statistic estimates because they provide more direct and simpler evidence of the utilisation rate than market value studies.[307]

Further, the AER says it does not consider it reasonable to rely exclusively on the results of the SFG dividend drop-off study. The AER has identified what it considers to be a number of limitations on market value studies. In particular:[308]

- the studies can produce nonsensical estimates (i.e. greater than one or less than zero);
- the results from market value studies can reflect factors, such as differential personal taxes and risks, which are not relevant to the utilisation rate;
- the results may not be reflective of the value of imputation credits to investors in the market as a whole;
- the studies can be data intensive and employ complex and problematic estimation methodologies; and
- it is only the value of the combined package of dividends and imputation credits that can be observed using dividend drop-off studies and there is no consensus on how to separate the

303 AusNet Services Transmission Draft Decision; 4-150, Powerlink Transmission Draft Decision 4-149.
304 Frontier Economics: *Issues in the estimation of gamma*, September 2016, section 3.
305 See Powerlink Transmission Draft Decision, 4-107 to 4-112.
306 *Ausgrid*, [1095].
307 AusNet Services Transmission Draft Decision 4-40, Powerlink Transmission Draft Decision 4-39.

value of dividends from the value of imputation credits (often referred to as the allocation problem).[308]

SFG Consulting provided a response as to why the AER's concerns in its November 2014 decisions do not apply to its 2011 dividend drop off study.[309]

In its 2015 decisions, the AER concluded that "*there is reasonable evidence to suggest that several of the limitations do apply to SFG's dividend drop off study*".[310] Professor Gray responded again to those alleged limitations in his February 2015 report (Frontier Economics).[311]

The AER also asserts that Professor Gray's drop off studies should be 'recalibrated' by dividing them upwards by an amount of 0.05, giving rise to an estimate of around 0.40. The idea of making an adjustment arises from the possibility that investors may value not only imputation credits but also dividends at less than their "face value". Professor Gray has provided further analysis of whether this is an appropriate adjustment to make. In his June 2015 report (pg. 37), Professor Gray reaffirms why no adjustment should be made. The Tribunal in *Ausgrid* accepted that explanation.[312]

The AER continues to hold the view that dividend drop off studies are subject to a number of limitations, including Professor Gray's study, and that any such estimates need to be adjusted to convert to a pre-personal cost and tax basis. Professor Gray has shown that no such adjustments are necessary.[313]

The Tribunal's consideration of Professor Gray's dividend drop-off study in both *Ausgrid* and the *SAPN decision* are addressed above and AusNet Services contends that it continues to be the best available approach to estimating theta.

As noted above, Professor Gray has further updated the dividend drop off study endorsed by the Tribunal to 2016. Professor Gray concludes that the updated dataset supports an unchanged estimate of theta of 0.35.[314]

9.11 Corporate tax allowance

9.11.1 Methodology

The estimated cost of corporate income tax (ETCt) for each regulatory year (t) has been calculated by AusNet Services in accordance with the following formula:

$$ETC_t = (ETI_t \times r_t)(1 - \gamma)$$

where:

ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of services if such an entity, rather than AusNet Services, operated the business of AusNet Services,

r_t is the statutory income tax rate for that regulatory year; and

γ is the assumed utilisation of imputation credits.

AusNet Services' corporate tax allowance for the current regulatory control period was calculated using an approach established by the Essential Services Commission (ESC). This approach calculated tax depreciation expenses using a combination of reducing-balance

308 AusNet Transmission Draft Decision 4-40. Powerlink Transmission Draft Decision 4-39.
309 AusNet Transmission Draft Decision 4-40. Powerlink Transmission Draft Decision 4-39.
310 SAPN, Preliminary Decision 4-84, JGN Final Decision 4-86.
311 Section 5.3.
312 At [1103].
313 Frontier Economics: *Issues in the estimation of gamma,* September 2016, section 4 and 5.
314 Frontier Economics: *An updated dividend drop-off estimate of theta,* September 2016, at [100]

method (applied to historical capex) and straight line depreciation (applied to this period's capex).

For the forthcoming period, AusNet Services proposes to calculate its tax allowance using the straight-line method of tax depreciation applied in the PTRM for historic and forecast capex. AusNet Services also proposes to update the standard tax lives to align these with the standard economic lives of the assets. It is noted that this method was approved by the AER in the recent Victorian electricity distribution determinations.

The methodology requires the following inputs:

- Opening tax asset base (TAB) as at 1 January 2018;
- Standard tax lives;
- Remaining tax lives;
- The value of gamma; and
- The corporate income tax rate.

This section sets out AusNet Services' proposed approach to the calculation of the first three of these inputs.

The value of gamma, which is estimated at 0.25, is discussed in detail in section 9.10. The corporate income tax rate is assumed to remain at 30 per cent for the forthcoming regulatory period.

9.11.2 Opening TAB as at 1 January 2018

In determining its opening TAB as at 1 January 2018, AusNet Services used the AER's RFM to roll forward the approved opening TAB as at 1 January 2013.

In the most recent determination, the opening TAB as at January 2013 was based on a combination of actual and forecast expenditure and depreciation. In this AAI, AusNet Services has applied actual 2012 capex and depreciation in place of the forecast values to calculate a revised opening TAB as at 1 January 2013. The updated opening TAB as at January 2013 is $504.4 million (nominal) compared to $ 491.9 million (nominal), which was calculated in the previous determination.

The following table shows the roll forward of the updated opening TAB as at January 2013 using actual and forecast net capex and depreciation from 2013 to 2017 to determine the opening TAB as at 1 January 2018.

Table 9-11: AusNet Services' TAB roll forward ($m, nominal)

	2013	2014	2015	2016	2017
Opening TAB	504.4	542.9	606.4	645.3	669.7
Gross capex	93.8	119.1	95.7	83.4	101.8
Less: tax depreciation	55.3	55.6	56.8	58.9	62.4
Closing TAB	542.9	606.4	645.3	669.7	709.2

Source: AusNet Services

9.11.3 Standard tax lives of assets

Tax asset classes do not match RAB asset classes, so it is necessary for AusNet Services to calculate standard tax lives which are used to determine depreciation charges for new assets during the forthcoming period.

For this purpose, AusNet Services has adopted the standard tax lives set out in ATO Tax Ruling 2015-2 (TR 2015/2) to assign standard lives to each tax asset class. The lives proposed by AusNet Services are appropriate because they closely reflect the lives prescribed by the ATO in TR2015/2.

The table below shows the standard tax lives proposed by AusNet Services.

Table 9-12: AusNet Services' proposed standard tax lives

Tax asset class	Standard tax life (years)
Transmission Pipelines	50
Distribution Pipelines	50
Service Pipes	50
Cathodic Protection	50
Supply Regulators/Valve Stations	40
Meters	15
SCADA and remote control	10
Buildings	35
Other – IT	4
Other – non IT	4
Land	n/a
Equity Raising Costs	5

Source: AusNet Services

9.11.4 Remaining tax lives of assets

The approach applied by AusNet Services to estimate remaining tax lives involves:

- dividing RAB remaining lives by RAB standard lives to calculate remaining lives as a proportion of standard lives for assets in the RAB; and
- multiplying these proportions by the tax standard lives.

The table below shows the remaining lives determined using AusNet Services' proposed approach.

Table 9-13: AusNet Services' proposed remaining tax lives

Tax asset class	Remaining tax life (years)
Transmission Pipelines	18.42
Distribution Pipelines	27.66

Tax asset class	Remaining tax life (years)
Service Pipes	32.27
Cathodic Protection	21.43
Supply Regulators/Valve Stations	28.73
Meters	9.40
SCADA and remote control	6.35
Buildings	17.70
Other – IT	2.88
Other – non IT	3.25
Land	n/a

Source: AusNet Services

9.11.5 Corporate tax allowance

Applying the methodology described above, and adopting a value for gamma of 0.25, AusNet Services' corporate tax allowance is set out in the table below.

Table 9-14: Allowance for the Estimated Cost of Corporate Tax, 2018 to 2022

($M Nominal)	2018	2019	2020	2021	2022
Tax Allowance	17.5	12.9	13.1	18.8	18.7

Source: AusNet Services

9.12 Interrelationships

Return on equity and the value of imputation credits

There is a recognised interrelationship between the return on equity and the value of imputation credits. Some estimates of the MRP need to be grossed up for the value of imputation credits and a higher theta estimate implies a higher required return on equity. This interrelationship is explicitly recognised in NGR 87(4)(b).

AusNet Services' proposed MRP of 7.5% takes into account this interrelationship. Frontier Economics conclude that the current evidence supports an estimate of at least 7.5% based on calculations of the MRP which assume a theta value of 0.35 as proposed.[315]

If the AER were to adopt an estimate of theta of 0.35, as proposed, while maintaining its current approach to estimating the MRP (which is submitted to be incorrect), no adjustment to the AER's MRP estimate of 6.5% would be necessary. This is because the historic excess returns

[315] Frontier Economics, *The market risk premium*, September 2016, section 8.6 and [284].

estimates on which the AER primarily relies for its MRP are relatively insensitive to the estimate of theta.[316]

Interrelationship between the rate of return and the inflation forecast

As noted in the submissions on Inflation above, there is an interrelationship between:

1. The method for an estimate of expected inflation and the amount that is deducted from the annual revenue requirement. As explained above, if actual inflation turns out to be materially lower than had been forecast, the deduction from the annual revenue requirement will be too large. This will lead to under-recovery of costs over the long-term.
2. The allowed rate of return and the estimate of expected inflation. The deduction from the annual revenue requirement for indexation is needed to avoid a "double counting" of inflation. This results from the application of a nominal rate of return to an indexed capital base. It is therefore important that the forecast of inflation that is being deducted from the annual revenue requirement is consistent with expectations which are built in to the nominal rate of return.

AusNet Services' proposal to adopt a market-based estimate of expected inflation ensures consistency with how the allowed rate of return is estimated, and in current market conditions, will provide for a more accurate forecast of inflation expectations.

9.13 Supporting documents

The following documentation and expert reports are provided in support of this chapter:

- **Appendix 9A: Historic reports on Gamma**
    - SFG Consulting: *Dividend drop-off estimate of theta Re Application by Energex Limited (No 2) [2010] ACompT7* (March 2011)
    - SFG Consulting: *Updated dividend drop-off estimate of theta, Report for the Energy Networks Association* (June 2013)
    - SFG Consulting: *An appropriate regulatory estimate of gamma* (May 2014)
    - SFG Consulting: *Estimating gamma for regulatory purposes* (February 2015)
    - Frontier Economics: An updated dividend drop-off estimate of theta (September 2016)
    - Frontier Economics: *Issues in the estimation of gamma* (September 2016)
- **Appendix 9B: Frontier Economics: Perspectives for the estimation of gamma** (December 2016)
- **Appendix 9C: Historic reports on Inflation**
    - CEG: *Best estimate of expected inflation* (September 2016)
    - CEG: *Measuring expected inflation for the PTRM* (June 2015)
    - CEG: *Measuring expected inflation for the PTRM* (January 2016)
- **Appendix 9D: CEG: *Inflation compensation- addendum to September report*** (December 2016)
- **Appendix 9E: Historic reports on Return on Debt**
    - CEG: *Debt staggering of Australian businesses* (December 2014)
    - CEG: *The AER's current interpretation of the ARORO* (September 2016)

[316] Ibid, section 8.7.

  - CEG: *Criteria for assessing fair value curves: an update* (September 2016)
- **Appendix 9F: Historic reports on Return on Equity**
  - CEG: *Replication and Extension of Henry's beta analysis* (September 2016)
  - Frontier Economics: *The market risk premium* (September 2016).

10 Revenue Requirement

10.1 Key points

- AusNet Services has calculated its revenue requirements in accordance with the building block approach and the AER's post tax revenue model (PTRM). Each component of the building block is explained in other chapters of this access arrangement proposal.
- AusNet Services proposes a smoothed revenue requirement that produces a real revenue decrease of 5% in year one, with increases of 2.0% in each subsequent year. The revenue will be recovered through the provision of Haulage Reference Services and Ancillary Reference Services.
- The revenue proposal maintains existing service and safety outcomes for customers, consistent with the NGO and revenue and pricing principles in the NGL.

10.2 Introduction

The Rules require total revenue to be determined for each regulatory year of the access arrangement period using the building block approach, in which the building blocks are:

(a) a return on the projected capital base;

(b) depreciation on the projected capital base;

(c) the estimated cost of corporate income tax;

(d) increments or decrements resulting from the operation of an incentive mechanism to encourage gains in efficiency; and

(e) a forecast of operating expenditure.

Each of these building block components is explained in other chapters of this AAI. Those chapters and the referenced supporting documents demonstrate that the building block proposal complies with the requirements of the NGR and the NGL, including the revenue and pricing principles and the NGO. Furthermore, AusNet Services' consumer engagement process has indicated support for the each element of the proposal.

Conceptually, the revenue requirement calculation is a mechanical modelling exercise that reflects the sum of the building block components. However, AusNet Services has considered price impacts and consumer feedback wherever possible, and has sought to keep prices stable for customers.

The remainder of this chapter is structured as follows:

- Section 10.3 sets out the unsmoothed and smoothed revenue for the forthcoming period;
- Section 10.4 presents the revenue allocation to Haulage Reference Services; and
- Section 10.5 presents the revenue allocation to Non-Reference Services.

10.3 Total Revenue Requirements – Unsmoothed and Smoothed

AusNet Services' total revenue requirement is $1,141.7 million (unsmoothed). The various revenue components are set out by year in Table 10-1 below.

Table 10-1: AusNet Services' Total Revenue Requirement (Unsmoothed)

(Nominal $M)	2018	2019	2020	2021	2022
Return on Capital	88.7	91.7	95.2	98.4	101.1
Return of Capital	56.6	45.6	48.5	52.1	56.2
Operating Expenditure	59.3	61.5	63.9	66.8	68.8
Efficiency Benefit Sharing Scheme	4.0	-0.3	1.3	1.1	-
Benchmark Tax Liability	17.5	12.9	13.1	18.8	18.7
Unsmoothed Revenue Requirement	**226.2**	**211.5**	**222.0**	**237.2**	**244.8**

Source: AusNet Services

Further information on each of these components is provided in the following chapters:

- the required return on capital is explained in Chapter 9;
- the proposed return of capital is explained in Chapter 8;
- opex forecasts are set out in Chapter 7;
- the operation of the Efficiency Benefit Sharing Scheme in relation to the current regulatory period is detailed in Chapter 11; and
- the benchmark tax liability is explained in Chapter 9.

AusNet Services has smoothed the revenue requirement to deliver a stable annual revenue profile over the forthcoming access arrangement period. In accordance with the requirements of rule 92(2), the revenues defined by the smoothed profile return the same net present value as the unsmoothed revenue shown in Table 10-1 above. AusNet Services' smoothed revenue requirement is set out in Table 10-2 below.

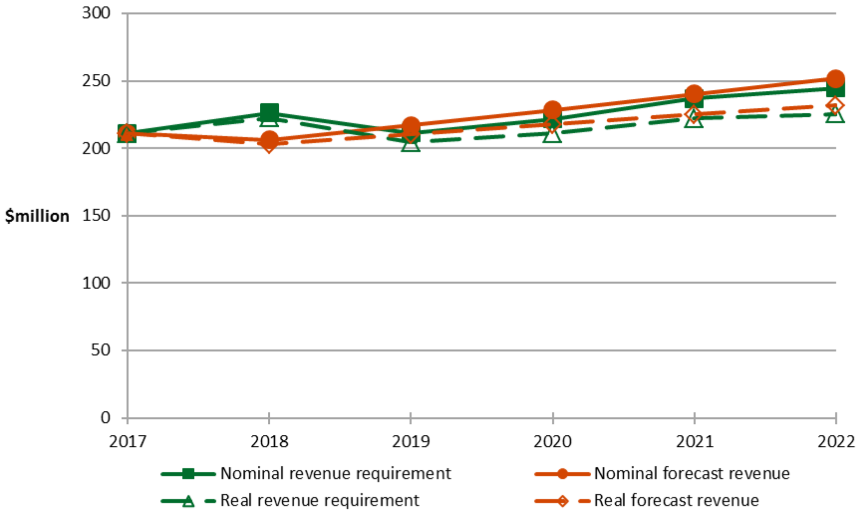
Table 10-2: Total Smoothed revenue requirement ($m, nominal)

	2018	2019	2020	2021	2022
Total Revenue Required	206.3	217.3	228.7	240.5	251.7
Price change (per cent)	-5.00%	2.06%	2.06%	2.06%	2.06%

Source: AusNet Services

In real terms, the changes in revenue are a decrease of 5% in year one, with increases of 2.0% in each subsequent year. The figure below presents the revenue proposal alongside the regulated revenue for the current access arrangement period, expressed in real terms.

Figure 10-1: AusNet Services Proposed Revenue ($m, real 2017)



For the reasons set out in this access arrangement proposal, AusNet Services considers that the revenue proposal is consistent with the NGR and NGL, including the revenue and pricing principles and the NGO.

10.4 Revenue Allocation to Haulage Reference Services

AusNet Services proposes to maintain its existing Haulage Reference Services (Tariff V, Tariff M and Tariff D), which are distribution use of system services. Further information on the Haulage Reference Services is provided in Chapter 13.

Rule 93 of the NGR requires total revenue to be allocated between reference and other services in the ratio in which costs are allocated between reference and other services. In accordance with this requirement, the table below shows the $1,129.9 million of total smoothed revenue that is to be recovered from Haulage Reference Services by year.

Table 10-3: Haulage Reference Service Smoothed Revenue ($m, nominal)

	2018	2019	2020	2021	2022
Haulage Reference Service Revenue	203.6	214.4	225.8	237.5	248.6

Source: AusNet Services

The revenue allocation approach means that the annual percentage change in smoothed revenue for Haulage Reference Services is identical to the annual percentage changes for total smoothed revenue.

10.5 Revenue Allocation to Ancillary Reference Services

Ancillary Reference Services comprise:

- Disconnection Services;
- Meter and Gas installation test;
- Reconnection Services; and
- Special Meter Reading Services.

In contrast to Haulage Reference Services, only a very small percentage of AusNet Services' costs relate to the provision of these services. The table below shows the annual nominal revenue allocated to Ancillary Reference Services (in accordance with the requirements of rule 93) each year.

Table 10-4: Ancillary Reference Services – Revenue Requirements ($m, nominal)

	2018	2019	2020	2021	2022
Ancillary Service Revenue	2.8	2.8	2.9	3.0	3.1

Source: AusNet Services

As noted above, the annual percentage change in revenue for Ancillary Reference Services is the same as the annual changes for total smoothed revenue.

In addition to Haulage Reference Services and Ancillary Reference Services, it should be noted that there is a small annual cost associated with the provision of Non-Reference Services. These services are charged on a recoverable works basis to the particular customers requesting the services. The forecast costs of providing Non-Reference Services have been excluded from the building block calculation.

11 Incentives

11.1 Key points

- AusNet Services strongly supports incentive regulation and the application of well-designed incentive schemes. Effective incentive schemes can align the interests of network service providers with the long-term interests of consumers and drive better customer outcomes, in accordance with the National Gas Objective.
- AusNet Services' sound performance under the opex efficiency incentive scheme over successive regulatory periods demonstrates that incentive schemes have delivered value for consumers.
- The scope of the incentive arrangements that apply to gas distribution networks is currently much narrower than the arrangements for electricity. As well-designed incentive schemes have the potential to drive better efficiency and performance outcomes, extending the application of incentive schemes to gas distribution is in the long term interests of consumers.
- AusNet Services undertook a stakeholder consultation process which explored potential changes to the incentive mechanisms that could be introduced in the forthcoming access arrangement period. There was broad support for the strengthening of the incentive framework that applies to gas networks with recognition that this could lead to improvements in efficiency and service performance.
- For the forthcoming regulatory period, AusNet Services proposes to apply:
    - The AER's Efficiency Benefit Sharing Scheme (EBSS), which provides incentives to make operating expenditure efficiency improvements;
    - A Capital Expenditure Sharing Scheme (CESS), which provides constant incentives to make capital expenditure efficiency gains;
    - A Network Innovation Scheme, which provides an allowance for small scale innovative projects which have the potential to deliver benefits to network customers.
    - Guaranteed Service Levels (GSLs), which compensate customers who have experienced service performance below the expected standard.
- The Network Innovation Scheme and CESS would apply to Victorian gas distribution networks for the first time. The rationale for introducing these schemes includes:
    - The CESS is similar to that which the AER applies to electricity transmission and distribution networks. There are sound reasons to apply the scheme to gas distribution. A capex carryover mechanism, similar to the CESS was applied to AusNet Services by the ESC during the 2008-12 period. The proposed CESS includes a counterbalancing asset performance parameter on an asymmetric sliding scale. This means that if AusNet Services achieves capex savings at the expense of not meeting agreed network performance targets, a deflator applies to the CESS reward.
    - The Network Innovation Scheme is intended to overcome the barriers to innovation expenditure that arise as a consequence of the resetting of costs on a periodic basis. Its design is based on the AER's Demand Management Incentive Scheme (DMIS) and Ofgem's UK Gas Network Innovation Scheme.
- The proposed incentive schemes are consistent with good regulatory practice and comply with the Rules requirements. Our consumer and stakeholder engagement program indicates support for the strengthening of the incentives framework.

11.2 Introduction

In preparing its incentive scheme proposal, AusNet Services has carefully considered the outcomes from its consumer and stakeholder engagement and the Rules requirements. To summarise:

- Customers and stakeholders expressed strong support for extending the existing incentive arrangements to better align with those applying to electricity networks;
- Rule 98 allows for the inclusion of additional incentive mechanisms, providing that they are consistent with the revenue and pricing principles in the NGL; and
- Rule 72(1)(l) requires AusNet Services to explain the rationale for its proposed incentive mechanisms.

In relation to incentive mechanisms, the following revenue and pricing principle is particularly relevant:

> *"A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes—*
>
> *(a) efficient investment in, or in connection with, a pipeline with which the service provider provides reference services; and*
>
> *(b) the efficient provision of pipeline services; and*
>
> *(c) the efficient use of the pipeline."*[317]

For the reasons set out in this chapter, AusNet Services' incentive mechanisms will promote economic efficiency in accordance with the above principle.

The remainder of this chapter is structured as follows:

- Section 11.3 sets out the process and outcome of stakeholder consultation undertaken by the Victorian gas distributors on potential changes to incentive mechanisms for the forthcoming access arrangement period;
- Section 11.4 calculates the EBSS carryover amount from the current access arrangement period, and sets out the proposed application of the EBSS for the forthcoming period;
- Section 11.5 proposes the application of a CESS with a counterbalancing parameter;
- Section 11.6 presents the Network Innovation Scheme; and
- Section 11.7 sets out AusNet Services' Guaranteed Service Levels (GSLs).

11.3 Summary of consultation process

In mid-2016, as part of the stakeholder engagement program, AusNet Services, along with Australian Gas Networks (AGN) and MultiNet Gas, explored potential changes to the incentive mechanisms for the forthcoming AA period. This consultation process reflects AusNet Services' commitment to undertaking high quality consultation with its stakeholders.

The consultation comprised the following steps:

- An Issues Paper was released on 10 June 2016 which explored potential changes to the incentive mechanisms that could be introduced for the forthcoming access arrangement period.

[317] National Gas Law, section 24(3).

- A Joint Stakeholder Forum was held on Incentive Mechanisms on 11 July 2016 which was attended by 27 stakeholder representatives including: consumer advocates, retailers, the AEMC, AER, Energy Networks Australia and gas distributors.
- Stakeholders were invited to make written submissions by 30 August 2016.

The consultation process provided a basis for engagement with stakeholders including:

- assisting stakeholders to understand the background and key issues;
- assisting the businesses to understand stakeholders' views; and
- providing input to the businesses for developing their proposed incentive arrangements that might be included in the access arrangement proposal for the forthcoming regulatory period.

The consultation process explored potential changes to the incentive mechanisms including:

- Retaining the Efficiency Benefit Sharing Scheme (EBSS) framework and considering changes to its operation.
- Including up to two new incentive mechanisms including a Capital Expenditure Sharing Scheme (CESS) and a Network Innovation Scheme (NIS).

A summary of the stakeholder views on each of these topics is provided in Box 1.

Box 1: Summary of stakeholder consultation findings on incentives framework

Efficiency Benefit Sharing Scheme

There was agreement amongst stakeholders that the EBSS should continue to apply to the Victoria gas distributors in its current form.

Capital Efficiency Sharing Scheme

It was agreed that an absence of a CESS was likely to cause inefficiency because of:

- uneven incentives for distributors to achieve capital efficiency through time; and
- unbalanced incentives for distributors to choose an efficient mix of capex and opex.

There was qualified support for introducing a CESS. The primary concern with introducing a CESS related to unintended consequences, in particular incentives for inefficient capex deferral.

The AER's most recent Statement of Intent[318] set out its commitment to introducing a CESS for gas distributors. The AER in the Joint Stakeholder Forum indicated its view that appropriate monitoring of service performance would be needed to counterbalance stronger incentives for expenditure cost reduction arising from any introduction of a CESS.

The AER considered that the introduction of a CESS would need to be accompanied by a sufficient performance incentive to counter-balance incentives for inefficient cost reduction. It appeared there was general agreement from stakeholders with this view.

Network Innovation Scheme

There was support for the proposition that network innovation is likely to promote the long-term interests of consumers. In particular, one stakeholder stated that it "recognise(d) the value of innovation to develop further efficiencies to deliver benefits for distributors and their customers through lower prices."

318 AER, *Statement of Intent for 2016–17*, 30 June 2016.

The findings of this consultation process have been considered when developing AusNet Services' proposed incentives framework for the forthcoming access arrangement period.

11.4 Efficiency Benefit Sharing Scheme

The Efficiency Benefit Sharing Scheme (EBSS) provides the network business with a consistent incentive to deliver opex efficiencies throughout the five year regulatory period. In the absence of the EBSS, over the course of the regulatory period the network business would face diminishing incentives to deliver efficiency gains. The combination of the EBSS and the AER's 'revealed cost' forecasting methodology ensures that opex efficiencies are shared with customers over time.

In summary, the rationale for applying the EBSS is that it improves the incentive properties of the regulatory framework and, in doing so, promotes the long-term interests of customers in accordance with the NGO.

The EBSS[319] has applied to AusNet Services' gas distribution network since 1 January 2003. AusNet Services' operating cost performance since 2003 demonstrates the effectiveness of the scheme in driving efficiency improvements. Customers support the continued application of the EBSS.

The remainder of this section sets out:

- The calculation of the current period's efficiency carryover amount, which will be recovered during the forthcoming period; and
- AusNet Services' proposed operation of the EBSS for the forthcoming period.

11.4.1 The current period carryover amount

AusNet Services has calculated the efficiency carryover amount to be recovered during the forthcoming period in accordance with clause 6.4, Part B of the current Access Arrangement. In accordance with these provisions, the following costs are excluded from the operation of the efficiency carryover:

- costs associated with complying with any retailer of last resort requirements;
- opex amounts for approved Cost Pass Through Events;
- expenses arising from Unaccounted For Gas;
- licence fees;
- debt raising costs; and
- movements in provisions.

The efficiency gain for 2013 – the first year of the current access arrangement period – has also been calculated in accordance with the requirements of the current Access Arrangement. The calculation of the efficiency gain for this year makes an adjustment for the difference between forecast and actual opex in 2011 and 2012.

The following table sets out the calculation of AusNet Services' incremental efficiency gains and losses in the current period.

319 A similar scheme, known as the efficiency carry over mechanism, was applied by the Essential Service Commission in Victoria prior to the current access arrangement period.

Table 11-1: Calculation of incremental efficiency gains / losses ($m, real 2017)

	2013 Actual	2014 Actual	2015 Actual	2016 Estimate	2017 Estimate
Total opex (incl. debt raising costs)	59.12	53.10	53.49	53.57	54.24
Less: Debt raising costs	-	-	-	-	-
Less: Cost Pass through events	1.98	1.82	1.17	1.17	1.17
Less: Licence fees	-	-	-	-	-
Less: Movements in provisions	9.03	(0.45)	0.01	-	-
Actual opex for EBSS purposes	47.02	50.86	51.50	51.59	52.26
Benchmark opex for EBSS	52.35	54.67	55.54	-	-
Incremental efficiency gain (loss)	4.23	(1.51)	0.22	1.02	-

It is noted that 'retailer of last resort event' costs, opex for cost pass through events, and UAFG costs are not included in the total opex presented above.

The following table shows how the above incremental efficiency savings have been used to determine the carryover amounts to be included in AusNet Services' revenue allowance for the forthcoming period.

Table 11-2: Calculation of incremental efficiency gains / losses ($m, real 2017)

	2018	2019	2020	2021	2022	Total
Carryover of efficiency gain/loss made in:						
2013	4.23	-	-	-	-	4.23
2014	(1.51)	(1.51)	-	-	-	(3.02)
2015	0.22	0.22	0.22	-	-	0.65
2016	1.02	1.02	1.02	1.02	-	4.07
Efficiency carryover amount	3.96	0.28	1.24	1.02	-	5.94

11.4.2 Proposed application of the EBSS

A key issue in relation to the application of the EBSS is to define those cost categories that are excluded from its operation. For the purpose of the forthcoming access arrangement period, AusNet Services proposes the following exclusions, which align the approaches in gas and electricity distribution in Victoria:

- debt raising costs; and
- losses on scrapping of assets.

In relation to debt raising costs, the exclusion of these costs is predicated on the AER continuing to adopt a benchmark approach. As explained in our electricity proposal, if debt raising costs are forecast on a revealed cost basis, there is no reason to exclude these costs from the EBSS. AusNet Services maintains its view that there is considerable merit in forecasting debt raising costs on a revealed cost basis. However, on the assumption that the AER will continue to adopt a benchmark approach, we propose the exclusion of debt raising costs from the EBSS.

In addition to the specific exclusions set out above, the AER also proposed the following generic adjustments in relation to electricity distribution in Victoria:

- adjust forecast opex to add (subtract) any approved revenue increments (decrements) made after the initial regulatory determination. This may include approved pass through amounts;
- adjust actual opex to add capitalised opex that has been excluded from the RAB; and

- exclude categories of opex not forecast using a single year revealed cost approach for the next regulatory period (commencing 1 January 2023).

AusNet Services proposes to adopt the same generic exclusions in relation to gas distribution.

In summary, AusNet Services' proposed application of the EBSS is consistent with the AER's approach in electricity distribution. This approach will continue to promote efficient outcomes for the long term interests of consumers in accordance with the NGO. The continued application of the EBSS will also promote the achievement of the pricing and revenue principles in section 24 of the NGL, and section 24(3) in particular.

11.5 Capital Efficiency Sharing Scheme

The CESS provides an analogous incentive in relation to capex as the EBSS provides in relation to opex. The rationale for the introduction of the CESS to gas distribution is the same as the AER's reasoning for applying the CESS to electricity networks:

> *"A CESS will provide additional financial rewards for a NSP that improves its efficiency and additional financial penalties for a NSP that becomes less efficient. In most circumstances we will apply a CESS, in conjunction with forecast depreciation to roll forward the RAB.*
>
> *These two mechanisms will work together to provide a NSP with a reward of 30 per cent of any underspend during a regulatory control period. Similarly, a NSP's penalty for overspending will be 30 per cent of any overspend. As a NSP would face the same reward and penalty in each year of a regulatory control period, this addresses one of the AEMC's key concerns with the previous capex incentives which declined over the period. This approach will help to further encourage a NSP to pursue efficient capex by:*
>
> - *Encouraging more efficient capex – particularly towards the end of a regulatory control period.*
> - *Encouraging more efficient substitution between capex and opex. NSPs already currently receive a reward/penalty of about 30 per cent of any efficiency gain/loss in opex. We have decided to also set the reward and penalty for capex at 30 per cent to achieve better balance between opex and capex. We expect this will further encourage NSPs to seek the most efficient solution when deciding whether to incur capex or opex."*[320]

AusNet Services concurs with the AER's reasoning. In particular, introducing a CESS will promote efficient investment in accordance with the NGO and the revenue and pricing principles by:

- strengthening the incentives to deliver capex efficiencies;
- ensuring that the incentive to make efficiency gains is the same irrespective of the year in which an investment is made; and
- providing stronger and balanced incentives for the efficient trade-off between capex and opex.

The AER's most recent Statement of Intent[321] set out its commitment to introducing a CESS for gas distributors. The AER in the Joint Stakeholder Forum indicated its view that appropriate monitoring of service performance would be needed to counterbalance stronger incentives for expenditure cost reduction arising from any introduction of a CESS.

AusNet Services notes that the AER decided not to introduce the CESS for Australian Gas Networks' (AGN) recent South Australian Access Arrangement. The AER's reasons included:

[320] AER, *Capital Expenditure Incentive Guideline for Electricity Network Service Providers*, November 2013, p. 8.
[321] AER, *Statement of Intent for 2016–17*, 30 June 2016.

- Concerns that historical underspending of capex relative to approved forecasts suggests an incentive to act efficiently already exists. The AER, therefore, questioned whether an additional efficiency incentive provided by the CESS is required.[322]
- In the electricity sector, the CESS is counterbalanced by a complementary scheme providing incentives for NSPs to maintain or improve network reliability levels—the Service Target Performance Incentive Scheme (STPIS). Given no scheme equivalent to the STPIS exists for gas, the CESS should not apply.[323]
- For the electricity CESS, there was an extensive consultation period in the lead up to its introduction. The AER considered that development of a CESS for gas businesses should ideally occur through a similar consultative, informed and industry-wide process.[324]

While AusNet Services acknowledges the AER's concerns, AusNet Services considers that the proposed CESS should be introduced for its access arrangement because:

- AusNet Services is proposing including a counterbalancing service parameter to the CESS on an asymmetric sliding scale. This means that if AusNet Services achieves capex savings at the expense of not meeting its agreed key performance indicators (KPIs), a deflator applies to the CESS reward. This approach addresses the AER's concerns in relation to counterbalancing expenditure efficiency incentives and customer concerns around inefficient capex deferral (more details below).
- AusNet Services' extensive consumer consultation exercise indicates support for the introduction of the CESS.

Importantly, the reasons that the AER provides for introducing the CESS in relation to electricity networks are equally valid to AusNet Services' gas distribution network. As such, it would be a lost opportunity if the AER delayed the extension of the CESS to Victorian gas distributors until the subsequent access arrangement period, which commences on 1 January 2023.

11.5.1 CESS design and options for counterbalancing parameters

A CESS provides ex ante incentives for NSPs to undertake efficient capex during a regulatory control period. The overarching objective of the CESS is to provide NSPs with an incentive to undertake efficient capex during a regulatory control period. It achieves this by rewarding NSPs that outperform their capex allowance and penalising NSPs that spend more than their capex allowance.[325]

The proposed CESS is similar to the CESS applied by the AER to Electricity Networks. That is, it claws back 'return on' on underspent capex collected over the period, is continuous over time and is not limited by the five year regulatory period. AusNet Services is also proposing to apply a sharing factor of 30% to the total efficiency gain/loss. This means that AusNet Services will bear 30% of any loss and will retain 30% of any gain. The remaining 70% will go to customers.

In order to take into account the AER's concerns regarding the balancing of incentives, AusNet Services engaged Farrier Swier Consulting to design an incentive scheme that could counterbalance the possible service performance incentive implications of applying a CESS to gas networks. Farrier Swier Consulting considered two options to counterbalance the possible service performance incentive implications including:

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322 AER, *AER, Draft Decision, Australian Gas Networks Access Arrangement 2016 to 2021, Attachment 14 – Other incentive schemes, November 2015, pp. 14-11.*

323 Ibid, pp.14-11.

324 Ibid. pp.14-13.

325 AER, *Capital Expenditure Incentive Guideline for Electricity Network Service Providers*, November 2013.

1. Developing a gas service incentive scheme based on that which the AER applies to electricity networks through the Service Target Performance Incentive Scheme (STPIS); and
2. Developing an alternative counterbalance that is self-contained within the CESS design (**conditional CESS approach**). This option would make earning incentive rewards conditional on the network meeting specified asset condition targets.

Having regard to the requirements of Rule 98 and stakeholder feedback, Farrier Swier Consulting recommend that the conditional CESS approach is preferable for addressing the AER's concerns for a CESS applying in the next access arrangement period as it is:

- *proportionate* – the conditional CESS approach only scales down efficiency rewards rather than creating additional service incentive payments;
- *efficient* – the conditional CESS approach penalises the business for reductions in expenditure that result in a decline in asset performance;
- *targeted* – the conditional CESS approach has a clear link to attributes that are important to meeting customer expectations;
- *auditable* – robust and auditable data is available to accurately measure the asset performance indicators; and
- *an appropriate allocation of risk* – the conditional CESS approach provides manageable opportunity for AusNet Services to avoid the penalty, and therefore incentivise efficient behaviour to manage risk.

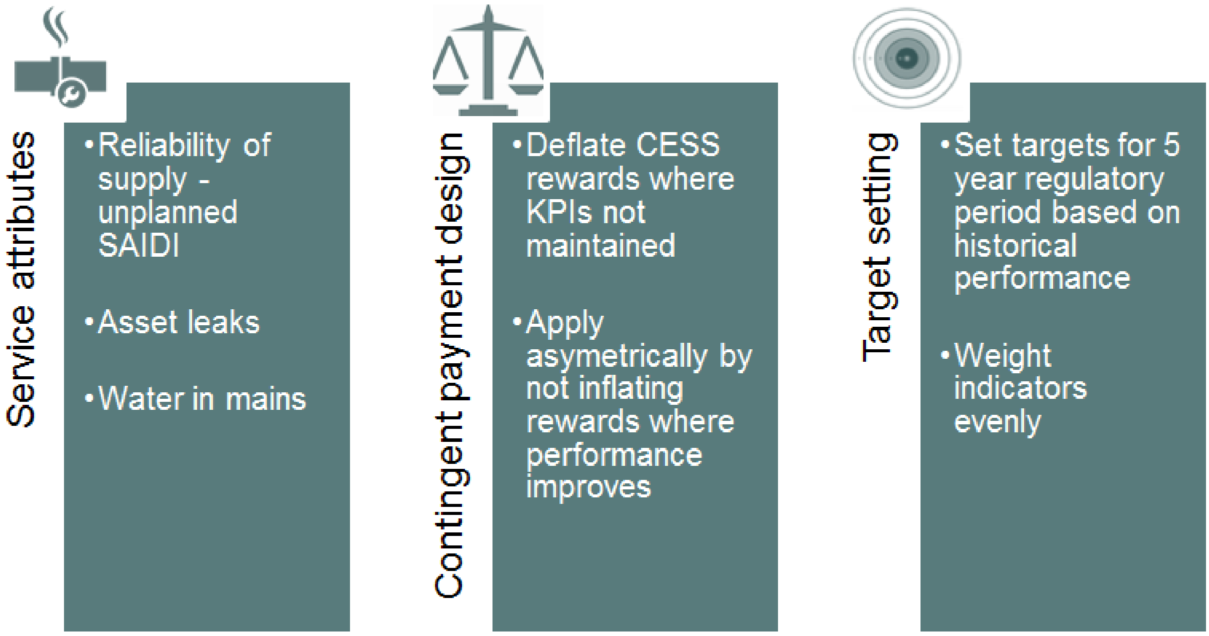
11.5.2 Proposed counterbalancing parameters to the CESS

This approach makes payments of CESS incentive reward amounts conditional on meeting specified KPI targets. CESS penalties for overspending capex would remain unaffected. The conditional CESS is designed to offset incentives to reduce costs in a way that undermines service outcomes, and reflects customer's stated preference to maintain rather than improve reliability.

The proposed CESS has the following characteristics, as summarised in Figure 11-1:

1. CESS penalties remain un mitigated by good asset performance outcomes (that is, the scheme is asymmetric);
2. full CESS rewards are only payable where asset performance outcomes do not drop below historical levels; and
3. to the extent CESS rewards are being earned at the expense of asset performance outcomes, they are discounted accordingly.

Figure 11-1: Summary of recommended contingent payments design



Source: Farrier Swier Consulting

The proposed asset performance indicators to apply over the 2018–22 regulatory period reflect those that AusNet Services' management uses for monitoring asset integrity and performance. These are:

- **Unplanned SAIDI per customer** – which measures the average duration (in minutes) of unplanned service disruptions. Reliability of supply is a direct measure of service reliability and can be measured using readily available data regularly reported to the ESV.
- **Gas leaks** – which measures the number of reported gas leaks that require corrective works. Monitoring leaks is consistent with the findings of the customer engagement, which observed that customers view gas as a reliable and safe source of energy and value the current standard of reliability and safety.
- **Water in mains** – which measures the number of instances of water seeping into the network through degraded pipe assets. Water in mains in a key integrity measure for the low-pressure network. This system is the target of the AusNet Services' mains replacement programs. The mains replacement programs are the largest discretionary element of the capex forecasts in the next period. This measure, therefore, provides a targeted counterbalance incentive for investment deferral within the five-year period.

The asset performance indicator calculation would be performed at the subsequent access arrangement review when determining the value of any CESS amounts. This calculation would rely on the targets in Table 11-3.

Table 11-3: Proposed asset performance indicator targets to apply over 2018–22

Measure	Data source	Calculation method	Indicative target
Unplanned SAIDI	Gas supply lost (in minutes) and total number of customers as reported to the ESV quarterly or captured in internal records. The time period covers July 2010 to June 2016.	Aggregate the monthly data into July to June financial year values and divide the gas supply lost (in minutes) by the average number of customers for each year to get an annual unplanned SAIDI. A simple average across available years is then used to determine the target.	0.914 minutes per customer
Reported gas leaks	AusNet Services data provided for the Australian Energy Council's annual gas distribution benchmarking report. This report reports data on a July to June financial year basis. The time period is July 2010 to June 2015.	Aggregate all leaks reported across mains, services, and meters for the relevant financial year. A simple average across available years is then used to determine the target.	12,341 leaks per year
Water in mains	AusNet Services' water in main data provided for the Australian Energy Council's annual gas distribution benchmarking report. Main length data is sourced from ANS' internal asset management system. The time period is July 2010 to June 2015. Main length data reported as at 31 December for the relevant financial year.	Aggregate water in main incidents for a given July to June financial year divided by total pipeline length as at mid-point of that year (i.e. 31 December). A simple average across available years is then used to determine the target.	0.071 water in mains incidents per km or mains per year

Source: Farrier Swier Consulting

Further information on the design of the conditional CESS approach and Farrier Swier Consulting's analysis is provided in Appendix 11D.

11.6 Network Innovation Scheme

11.6.1 The need for stronger innovation incentives

- The argument for stronger incentives is more cogent where a business is operating at or close to the efficiency frontier where achieving further efficiencies gains are more challenging, and greater managerial effort and investment in innovation may be required. As demonstrated by independent analysis undertaken by Economic Insights, AusNet Services is amongst the most efficient gas distributors in Australia. Further, in recent years there has been a flattening in the rate of productivity growth (see discussion in Chapter 7).

- Currently there is no specific network innovation incentive for gas distribution businesses within the regulatory framework, nor any specific guidance to the AER in the Rules on the factors it should consider with respect to promoting innovation. The AER has a broad discretion about how to consider proposals for network innovation schemes and must consider them in terms of whether they would promote the NGO (promote efficiency for the long-term interest of customers with respect to price, reliability, safety and quality).
- AusNet Services believes that the regulatory framework should encourage businesses to invest in innovation in the long-term interest of consumers to the extent that the expected commercial benefits across the portfolio of innovation activities align with the benefits that the business retains under any operating and/or capital expenditure efficiency sharing mechanism. This will depend on the power of the incentive – that is, the per cent of any efficiency gain/loss that the business retains.
- Ofgem has considered that in terms of the quantum of innovation, network companies may be slow to deliver the amount required, or not deliver within the required timescales, for a variety of reasons including:
    - *the company may not take account of all the benefits from innovation that accrue to a wide range of parties as they consider the relative merits of innovations;*
    - *the upfront costs of innovation may be significant;*
    - *the long-term private cost to network companies from choosing not to innovate may not be significant because the costs associated with continuing to deploy existing technologies are generally funded under a price control; and*
    - *network companies may discount the future benefits of innovation to facilitate a low carbon energy sector if the carbon price is low or they doubt the political commitment to meet the targets.*[326]
- These factors also apply in the Australian regulatory context. Due to the current regulatory framework, AusNet Services does not pursue innovations as it is not incentivised to find and fund innovations that have long term, multi-period benefits or where the benefits are industry-wide.
- There is considerable national and international precedent for the use of incentives to facilitate the development of innovative networks solutions.
- In Australia, the NER provide that electricity distributors may develop and publish an incentive scheme that provides incentives to implement non-network alternatives to meet demand, or to manage the expected demand for network services in some other way or to efficiently connect embedded generators to the network. Incentives under the Demand Management Incentive Scheme (DMIS) have generally been in the form of an additional funding allowance.
- The UK's RIIO framework includes an innovation stimulus package to fund innovation where the commercial benefits may be uncertain, and as such, gas and electricity distributors are not willing to fund research and development projects speculatively. The innovation stimulus in the UK includes an innovation allowance which allows for the recovery of costs to fund small-scale innovative projects (up to 0.5% of annual revenue on a 'use-it-or-lose-it' basis).

[326] Ofgem Regulating Energy Networks for the Future: RPI-X@20 Emerging Thinking – A Specific Innovation Stimulus", January 2010, p. 2.

- The UK's innovation allowance aims to provide a financial catalyst for innovation in electricity and gas distribution and transmission networks. Since 2014 it has led to innovations in the following areas:
  - emergency and leaks;
  - low temperature separation of gas and storage;
  - pressure management and maintenance;
  - new and renewable gas sources including bio-methane, CNG vehicles and CO2 capture and storage solutions; and
  - alternative jointing and asset management techniques.[327]

11.6.2 Design of the Network Innovation Scheme

o AusNet Services proposes that the Network Innovation Scheme (NIS) be structured in a similar way to Ofgem's Gas Network Innovation Allowance. More specifically, AusNet Services proposes that the NIS include the following features:

- An ex-post Network Innovation Allowance to be provided as a fixed amount of revenue at the completion of the regulatory control period. Therefore customers do not pay until after the allowance is spent.
- The total amount recoverable under the 'use it or lose it' allowance within a regulatory control period is capped at an amount broadly proportionate to the average annual revenue requirement in the current regulatory period.
- The Network Innovation Allowance be provided on a cost recovery basis.

o Projects and programs eligible for approval under this NIS should meet the following criteria, based on Ofgem's Gas Network Innovation Allowance criteria:[328]

1. The NIA project must have the potential to have a direct impact on a NSP's network or the operations of the network and involve the research, development and demonstration of at least one of the following:
   a) A specific piece of new equipment in Australia (unproven in Australia);
   b) A specific novel arrangement or application of existing equipment;
   c) A special novel operational practice directly in relation to the operation of the Australian gas transportation system; or
   d) A specific novel commercial arrangement.
2. The NIA project has the potential to develop learning that can be applied by all relevant NSPs.
3. The NIA project has the potential to deliver net financial benefits to gas customers.
4. No duplication of costs – costs recovered under the NIS:

   (a) must not be recoverable under any other jurisdictional incentive scheme

   (b) must not be recoverable under any other Commonwealth or State/Territory Government scheme and

   (c) must not be included in forecast capital or operating expenditure approved in the distribution determination for the regulatory control period under which the NIS applies, or under any other incentive scheme in that determination.

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[327] UK Energy Networks Association, Smarter Networks Portal, Network Innovation Allowance and Competition Project Details

[328] Ofgem, *Gas Network Innovation Allowance Governance Document*, version 2, 2 April 2015.

- The introduction of a NIS promotes the NGO, as it will encourage long-term research and development into means for improving the provision and cost efficiency of services, which might not otherwise occur.

11.6.3 Proposed projects under the NIS

AusNet Services proposes four projects under the NIS totalling $4.93M during the forthcoming access arrangement period including:

- Drone pipeline inspection and leak detection – which has the potential for topographic detailed analysis of pipelines, which are not monitored on a regular basis.
- Hydrogen network assessment – identifying the potential for the gas network to be converted to transport hydrogen fuel.
- Water extraction cameras – which monitor and control water ingress and, can improve the internal condition assessment of pipelines.
- Portable storage systems – which minimises customer outages and could be used for demand management purposes.

Each of these projects and how they comply with the NIA criteria set out above is discussed in more detail below.

Project 1: Drone pipeline inspection and leak detection

Drones have become one of the most economical types of platform for the inspection of the thousands of kilometres of pipelines transporting gas around the world. These infrastructures must constantly be monitored to reduce potential third party damage and leaks, which in the past have caused life threatening fires and explosions. Drones can be fitted with thermal detection capabilities and as such they can detect the temperature differences between fluid/gas and soil to identify gas leaks. Operators can fly drones and hover at low altitudes over the pipelines with special cameras and sensors, sending information to the assessor showing the pipe alignment. A further benefit of closely monitoring the imagery is that AusNet Services will be able to monitor flora and fauna in line with the environmental line list requirements, and to ensure there is minimal impact to the pipelines. The estimated cost for this project is $2 million.

Project 2: Hydrogen network assessment

This project is a research project that involves identifying the constraints and barriers to the introduction of hydrogen to existing gas transmission and distribution networks. The project will focus on three areas:

- **availability of hydrogen supply** – where a hydrogen plant is likely to be located and its size;
- **transport of hydrogen** – using the gas network to transport hydrogen; and
- **use of hydrogen** – converting appliances to burn hydrogen.

The evaluation of the feasibility of *transporting* hydrogen through existing pipelines is of very limited value unless *hydrogen supply* is available and consumers can *use* the fuel. As such, the supply and use of hydrogen have been included in this project.

The project is intended to create a platform for further detailed examination of hydrogen as a substitute for natural gas in Victoria. The research will identify the likely nature and location of hydrogen supply, the scale of investment necessary to transport the fuel to end users, and the feasibility of converting appliances to utilise hydrogen. The estimated cost for this project is $0.6 million.

Project 3: Water extraction system

There is new technology being investigated to minimise the time and disruption caused by outages from water. Water extraction cameras are able to identify the location of the water blockage in the pipeline, as well as extract the water with the attached suction pump. The estimated cost for this project is $1.1 million.

Project 4: Portable storage system

Portable natural gas storage systems are to be used for planned works where there is likely to be outages to customers, or to support identified networks that are impacted by pressure loss on high EDD days. The estimated cost of this project is $1.2 million.

Each project has been assessed against the NIS criteria set out above.

Table 11-4: Assessment of Network innovation projects against NIS criteria

NIS Criteria	Project 1: Drone pipeline inspection and leak detection	Project 2: Hydrogen network assessment	Project 3: Water Extraction Camera	Project 4: Portable Storage System
***Criteria 1:** Direct impact on a NSP's network or the operations of the network and involves the research, development and demonstration of:*	b) Existing technology, that has not been adapted to gas network operation.	b) A specific novel arrangement or application of existing equipment.	b) Existing technology, that has not been adapted to gas network operation.	c) A special novel operational practice directly in relation to the operation of the Australian gas transportation system.
***Criteria 2:** Potential to develop learning that can be applied by all relevant NSPs.*	The technology has the potential for topographic detailed analysis of pipelines. This technology has the potential of operational savings, and greater visibility of pipeline inspections. It will also further develop our understanding of leakage analysis on high risk pipelines.	Research directly applicable to other NSPs as the conversion of gas networks to transport hydrogen is likely to involve converting other NSP networks.	This technology has the potential to be utilised by all relevant NSP, to monitor and control water ingress. The camera also has the potential to improve internal condition assessment of pipelines.	The portable gas storage has the potential learnings for demand management purposes.
***Criteria 3:** Potential to deliver net financial beneficial to gas customers.*	Improve on safety, through minimisation of third party impact, leak detection, and reduction in opex.	Benefit arises through ongoing use of gas network to transport fuel and elimination of need to augment electricity network.	Minimisation of customer outages, less disruption to customer and ground covering, improved condition assessment of pipelines.	Minimisation in customer outages, reduction in augmentation works, avoids reactive fixes.
***Criteria 4:** Duplication of costs*	No	No	No	No
Project cost (2018-22)	**$2M**	**$0.6M**	**$1.1M**	**$1.2M**

More details on the Network Innovation Allowance Projects are provided in Network Innovation Program of Works (Appendix 11A).

11.7 Guaranteed Service Levels

AusNet Services provides GSLs in relation to appointment times, connection services and interruptions. The purpose of the GSLs is to compensate specific customers if our performance falls beneath the required standard. The GSLs therefore also provide AusNet Services with incentives to deliver efficient services (in accordance with the revenue and pricing principles).

The GSLs are specified in Schedule 1, Part E of the Victorian Gas Distribution Code, which continues to be regulated by the ESC. AusNet Services proposes that the existing GSLs should be maintained for the forthcoming access arrangement period.

For ease of reference the current GSLs are reproduced in the table below.

Table 11-5: Guaranteed Service Levels

Service Area	Threshold to incur GSL payment	Amount
Appointments	Failure to attend appointment within agreed appointment window: • Customer present – 2 hours • Customer absent – agreed date	$50 per event
Connections	Failure to connect a customer within 1 day of agreed date	$80 per day (subject to a maximum of $240)
Repeat interruptions	Unplanned interruptions to a customer in a calendar year period resulting from faults in the distribution system • Upon fifth interruption • Upon tenth interruption	$150 Additional $150
Lengthy interruptions	Gas supply interruption to a customer not restored • within 12 hours • within 18 hours	$150 Additional $150

Source: Schedule 1, Part E of the Victorian Gas Distribution Code

For full details of the terms and conditions that apply to GSL payments, please refer to clause 2.2 and Schedule 1, Part E of the Victorian Gas Distribution Code, which is available at: http://www.esc.vic.gov.au/getattachment/5fd17324-e37d-4ce0-9f07-8ec3a6f42d8a/Gas-Distribution-System-Code.pdf.

11.8 Supporting documents

The following documentation is provided in support of this chapter:

- Program of Works for Network innovation projects (Appendix 11A);
- Farrier Swier Consulting, Issues Paper – Incentive Mechanism for the Victorian Distributions Businesses (Appendix 11B);
- Farrier Swier Consulting, Findings Paper – Incentive Mechanism for the Victorian Distributions Businesses (Appendix 11C);
- Farrier Swier Consulting, Design of Incentive Schemes (appendix 11D).

12 Proposed Pass Through Arrangements

12.1 Key points

- Pass through arrangements recognise that a service provider may be exposed to events beyond its control which materially affect the cost of providing pipeline services. From an efficiency perspective, it is preferable that cost increases be recovered from customers (or, in the case of a cost saving, returned to customers) if and when such an event occurs, rather than being factored into the expenditure forecasts.
- AusNet Services' current access arrangement includes a number of pass through events. The purpose of this chapter is to set out and explain AusNet Services' rationale for:
    - proposing a new pass through event to apply in the 2018-22 access arrangement period; and
    - amending or deleting pass through event definitions contained in the current access arrangement.
- AusNet Services is proposing a new pass through event definition in response to a risk that incurs material costs if it is required to purchase a substantial number of Australian carbon credit units in order to comply with its obligations under the *National Greenhouse and Energy Reporting Act 2007* (Cth).
- The AER has iteratively refined its approach to pass through arrangements in consecutive regulatory determinations since AusNet Services' last gas access arrangement review. In its most recent decision for AGN, the AER commented that it prefers a consistent approach to pass through arrangements across gas and electricity networks.
- In response to the AER's stated preference, AusNet Services proposes a number of changes to the pass through event definitions in its current access arrangement to align the definitions accepted by the AER in its most recent regulatory decisions.
- AusNet Services proposes to remove the Main Replacement Event, which addressed the risk that replacement volumes exceeded the forecast volumes for the 2013-17 access arrangement period. This pass through event is unnecessary in the forthcoming period because AusNet Services has prepared an efficient expenditure forecast for the project using actual data.

12.2 Chapter structure

This chapter concerns pass through events that AusNet Services proposes apply during the 2018-22 access arrangement period. The remainder of the chapter is structured as follows:

- Section 12.3 outlines the regulatory framework applicable to pass through arrangements;
- Section 12.4 describes the new pass through event definition proposed for the 2018-22 access arrangement period and explains AusNet Services' rationale for the event;
- Section 12.5 summarises AusNet Services' proposed amendments to or deletion of existing pass through event definitions and the rationale for the changes.

12.3 Regulatory framework and review approach

12.3.1 Regulatory framework

Rule 97(1) permits an access arrangement to include a mechanism to vary a reference tariff during an access arrangement period:

> *(a) in accordance with a schedule of fixed tariffs; or*
>
> *(b) in accordance with a formula set out in the access arrangement; or*
>
> *(c) as a result of a cost pass through for a defined event (such as a cost pass through for a particular tax); or*
>
> *(d) by the combined operation of 2 or more [of] the above.*

This chapter focuses on the third basis for variation: cost pass through events. Sub-rule 91(1)(c) recognises that a service provider may experience an event during an access arrangement period which increases the costs of providing services beyond the level allowed for in the service provider's approved expenditure forecasts. In broad terms, the cost pass through arrangements allow the service provider to recover the difference between its regulatory allowance and its actual costs.

Cost pass through arrangements typically apply in respect of unpredictable, high cost events. The arrangements serve to maintain prices at least cost by excluding the costs imposed by a pass through event from the service provider's regulatory allowance (and therefore from tariffs) unless and until an event occurs. This approach delivers efficient outcomes, which are clearly preferable to the alternative approach of including ex ante allowances in the building blocks to compensate distributors for the expected costs of unpredictable events. By ensuring services are provided at the lowest sustainable cost, the cost pass through arrangements are in the long-term interests of consumers.

12.3.2 AusNet Services' approach

In its recent draft determination for Australian Gas Networks (**AGN**), the AER highlighted the importance of developing a consistent approach to pass through events. For example, the AER made the following observations in response to AGN's proposal to maintain its current definitions for two particular pass through events:

> *"AGN's proposed definition of these events [Regulatory Change Event and Service Standard Event] is consistent with that in its current access arrangement. However, we consider it preferable that these events be defined consistently with those approved by us in more recent decisions, and with the equivalent event that applies to electricity network businesses under the NER. The latter were developed by the AEMC to achieve consistency with the NEO. The NEO and NGO are sufficiently similar that a regulatory change or service standard event that is consistent with the NEO will also be consistent with the NGO. Where a pass through event is approved for multiple service providers to address the same risk, we also consider it preferable that the event be defined consistently."*[329]

AusNet Services concurs with the AER that it is preferable to develop a consistent approach across electricity and gas networks, where appropriate.

Given the AER's stated preference for consistency between regulated business, and in keeping with the practices of a prudent service provider, AusNet Services reviewed its current pass through event definitions against equivalent definitions:

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[329] AER, *Australian Gas Networks Access Arrangement 2016 to 2021, Attachment 11 - Reference tariff variation mechanism*, November 2015, p. 23.

- contained in the National Electricity Rules;
- accepted by the AER in AusNet Services' 2016-20 electricity distribution price review, and the access arrangements for AGN (for 2016-21) and Jemena Gas Networks (**JGN**) for 2015-20.

The comparison exercised indicated there is substantial commonality between the event definitions. However, as is consistent with good regulatory practice, the AER has refined certain definitions over time. The majority of the amendments AusNet Services proposes to make to the pass through event definitions to be included in its 2018-22 access arrangement adopt these refinements.

AusNet Services' proposed amendments to each definition are marked up in Part A of its proposed Access Arrangement. However, for the ease of the AER, each of the amended definitions is reproduced in section 12.4 or 12.5 below, accompanied by the rationale for the amendment(s).

AusNet Services reserves the right to propose new pass through events or make further amendments to its existing Relevant Pass Through Events in its revised access arrangement proposal to promote consistency between the Victorian gas distribution businesses.

12.4 Proposed new pass through event – NGER Event

12.4.1 Policy background

The Emissions Reduction Fund is central to the Government's Direct Action Plan to cut emissions to 5% below 2000 levels by 2020 and up to 28% below 2005 levels by 2030. It comprises:

- an element to credit emissions reductions;
- a fund to purchase emissions reductions; and
- a safeguard mechanism which requires Australia's largest emitters of carbon dioxide equivalence (CO_2-e) to maintain their emissions at or below a baseline level determined by the Clean Energy Regulator.[330]

The safeguard mechanism commenced on 1 July 2016. Its objective is to prevent emissions reductions funded by the Emissions Reduction Fund from being undermined by increases in CO_2-e emissions in other parts of the economy.

The safeguard mechanism applies to designated large facilities. The entity with operational control of a designated large facility is responsible for meeting safeguard requirements, including that the facility must keep net emissions at or below baseline emissions levels.

The legislative framework for the safeguard mechanism is contained in the *National Greenhouse and Energy Reporting Act 2007* (**NGER Act**). Legislative rules and regulations give effect to policy details, including the threshold for what is a designated large facility and methods for setting the baseline emissions level for a designated large facility.

CO_2-e emissions from gas networks occur principally as a result of Unaccounted for Gas (**UAfG**), but also because of the chemicals and gases AusNet Services uses to cool and heat gas for transportation. The emission intensity of any given gas network reflects the network's specific characteristics, including the number of connections per km, the type of connections (e.g. residential or commercial) and the amount of gas being used within the network.[331] While

[330] Australian Government, *The Safeguard Mechanism – Overview*, https://www.environment.gov.au/system/files/resources/8fb34942-eb71-420a-b87a-3221c40b2d21/files/factsheet-safeguard-mechanism.pdf, accessed on 28 November 2016.

[331] Energy Networks Association, *Australia's Gas Networks – Emissions Intensity Benchmark Considerations*, submission, 6 May 2016, p. 2.

direct financial penalties act as an incentive for service providers to reduce UAfG, some loss is an inherent and unavoidable consequence of transporting gas.

The CO_2-e emissions from AusNet Services' gas distribution network are such that the network satisfies the definition of a designated large facility.[332] As the entity with operational control of the facility, AusNet Services[333] is required to meet certain safeguard requirements, including that the facility maintains net CO_2-e emissions at or below a reported-emissions baseline determined by the Clean Energy Regulator. If AusNet Services' emissions exceed the baseline, an "excess emissions situation" ensues, which may expose AusNet Services to penalties.[334]

By 31 October each year, AusNet Services must prepare and submit its NGER report for the previous financial year to the Clean Energy Regulator. If, prior to submitting its report, AusNet Services considers its facility's emissions exceed or are expected to exceed its baseline, AusNet Services has several options to manage the excess emissions and prevent an excess emissions situation from arising:

- apply for a calculated baseline or a variation to its baseline;
- surrender Australian carbon credit units (**ACCUs**) to offset emissions and bring net emissions below the baseline;
- apply for a multi-year monitoring period to allow additional time to reduce emissions; or
- apply for an exemption where emissions are due to exceptional circumstances such as a natural disaster or criminal activity.[335]

It is in AusNet Services' discretion which course it pursues.

12.4.2 Cost impact of avoiding an excess emissions situation

AusNet Services will endeavour to operate, manage and maintain the gas network in such a way that an excess emissions situation does not arise. However, in the event that an excess emissions situation appears likely, AusNet Services will evaluate the options available to it to reduce its net emissions. One factor which will be an important determinant of the preferred course of action is the cost impact, both on AusNet Services in terms of its cost to provide services, and on its customers to the extent that those costs are recoverable through reference tariffs.

The cost impact is likely to be particularly relevant where AusNet Services' preferred option to offset emissions is to surrender ACCUs. Each ACCU issued represents one tonne of CO_2-e stored or avoided. AusNet Services can either purchase enough ACCUs from other businesses to offset its emissions, or participate in the Emissions Reduction Fund and generate its own ACCUs by operating an eligible project which reduces emissions. AusNet Services can hold any ACCUs it generates and later surrender them, or sell them to the government through an ERF contract.

Given that AusNet Services has extremely limited opportunity to reduce CO_2-e emissions from the gas network, the most likely outcome is that AusNet Services will seek to purchase ACCUs or other eligible offsets.

As the safeguard mechanism has only been operative for a number of months, AusNet Services cannot predict with any certainty when it will need to purchase ACCUs, if ever. There also remains considerable uncertainty as to the traded cost of an ACCU. Accordingly, it is prudent

[332] NGER Act, section 22XJ.
[333] The responsible emitter for the facility is AusNet Gas Services Pty Ltd.
[334] NGER Act, section 22XE.
[335] Clean Energy Regulator, *Managing excess emissions*, http://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/Managing-excess-emissions, accessed 28 November 2016.

for AusNet Services to put in place contingencies in the event that increased demand for gas increases CO_2-e emissions from the network beyond its reported-emissions baseline.

However, AusNet Services considers the uncertainties about the prospective cost impost of purchasing ACCUs means it not possible to prepare a reliable forecast for inclusion in its total revenue allowance. Therefore, AusNet Services proposes to include a pass through event for the current access arrangement period which enables it to recover the cost of acquiring the ACCUs. The proposed definition is set out in section 12.4.3 below.

AusNet Services considers there is a strong policy argument to support the inclusion of the NGER Event as a Relevant Pass Through Event. As noted above, the volume of carbon dioxide equivalence emitted by the gas distribution network varies according to the volume of gas it transports. If increased customer demand requires greater gas volumes, there will be a corresponding increase in CO_2-e emissions. Given the intuitive correlation between increased demand and increased emissions, it is appropriate that price signals reflect the full cost of a customer's decision to consume gas. This approach is consistent with the 'causer-pays' principles applied in the energy sector. For these reasons, AusNet Services considers it is appropriate that the costs it incurs in purchasing ACCUs be passed through to consumers.

12.4.3 Materiality threshold

AusNet Services proposes that the NGER Event not be subject to the materiality threshold. As discussed above, it is difficult for AusNet Services to mitigate its CO_2-e emissions and thus control the number of ACCUs it is required to purchase. Because AusNet Services must accept the consequences of the emissions created by its customers, it is appropriate to allow AusNet Services to pass through the full costs associated with purchasing ACCUs, without the additional criteria that those costs be material.

12.4.4 Proposed NGER Event definition

AusNet Services proposes the following NGER Event definition as a Relevant Pass Through Event:

> ***NGER Event*** *is an event which occurs when the Service Provider gives notice to the Clean Energy Regulator under section 22XN(1) of the NGER Act that the Service Provider surrenders one or more Australian carbon credit units for the purpose of preventing an excess emissions situation from arising under section 22XE of the NGER Act, and the act of acquiring Australian carbon credit units increases the cost to AusNet Services of providing Reference Services.*

To support NGER Event definition, two additional definitions must be inserted into the Glossary:

> ***Clean Energy Regulator*** *means the Clean Energy Regulator established by the Clean Energy Regulator Act 2011 (Cth) or any successor agency.*
>
> ***NGER Act*** *means the National Greenhouse and Energy Reporting Act 2007 (Cth) and includes the National Greenhouse and Energy Report (Safeguard Mechanism) Rule 2015 and any other rules or regulations made under that Act.*

AusNet Services considers the NGER Event satisfies the criteria the AER applies in assessing whether a proposed cost pass through event:[336]

- the event is not already provided for in the opex allowance, through the WACC, or through any other mechanism or allowance;
- the event is foreseeable;
- the event is uncontrollable because, as explained above, CO_2-e emissions are a function of demand;

[336] AER, *Access arrangement draft decision – SPI Networks (Gas) Pty Ltd 2013-17, Part 1*, September 2012, pp. 224-225.

- the event cannot be self-insured as the potential liability cannot, at this time, be ascertained;
- the trigger event—notice to the Clean Energy Regulator that AusNet Services is surrendering ACCUs—is clearly specified and independently verifiable;
- the risk is borne by customers, who are best able to adjust their consumption decisions in response to efficient price signals;
- passing through the cost of acquiring ACCUs will not undermine the incentive arrangements in the regulatory regime.

12.5 Amendments to existing pass through event definitions

This section sets out the amendments AusNet Services proposes to make to the Relevant Pass Through Event definitions in its current access arrangement. It also identifies the event definition it proposes to delete, and those to which it makes no change.

12.5.1 Declared Retailer of Last Resort Event

The Declared Retailer of Last Resort Event applies in situations where a retailer who is the gas supplier of last resort cannot supply its customers, and its failure to do so impacts AusNet Services' costs in providing Reference Services.

AusNet Services proposes to add the word "materially" to the event definition to clarify that that a reduction in costs brought about by the event must be material before the event is triggered. AusNet Services does not consider this amendment changes the manner in which the definition operates.

The proposed event definition reads:

> ***Declared Retailer of Last Resort Event*** *means the occurrence of an event (of the type contemplated in Division 6, Part 3 of the GIA or Part 6 of the National Energy Retail Law) whereby an existing User for Customers is unable to continue to supply gas and Customers of that User are transferred to, as applicable, the relevant supplier of last resort (as that term is used in the GIA) or the relevant designated RoLR (as that term is used in the National Energy Retail Law), and as a result the Service Provider incurs materially higher or* <u>*materially*</u> *lower costs in providing Reference Services than it would have incurred but for that event.*

12.5.2 Insurance Cap Event

An Insurance Cap Event allows AusNet Services to pass through costs that exceed the maximum payout it receives from its insurer when an insured risk eventuates.

AusNet Services' proposal to change the name of the event from Insurance Event to Insurance Cap Event, and to include additional text in paragraph (a) and an explanatory note is a direct response to the AER's preference for aligning the pass through event definitions applicable to network service providers to the extent possible.

The amendments in paragraph (d) to substitute the term "Regulator" is a stylistic change to ensure consistency with the drafting style of the Access Arrangement. Changes in paragraphs (d) and (3) to refer to the Fifth Access Arrangement Period are necessary to maintain the integrity of the event definition.

AusNet Services also proposes to include a new paragraph (f). This paragraph does not form part of the equivalent event definition in AusNet Services' EDPR determination or AGN's access arrangement, but it is part of the JGN event definition. AusNet Services considers it is prudent to include paragraph (f) in its Insurance Cap Event definition for the 2018-22 access arrangement period as it reflects the practicalities of the way large corporate groups operate.

The proposed event definition reads:

> *~~An~~* ***Insurance Cap Event*** *means an event whereby:*

(a) the Service Provider makes a claim or claims on a relevant insurance policy and receives the benefit of a payment or payments under that policy;

(b) the Service Provider incurs costs beyond the relevant policy limit; and

(c) the costs beyond the relevant policy limit materially increase the costs to the Service Provider of providing Reference Services.

For the purposes of this Insurance Cap Event:

(d) the relevant policy limit is the greater of the Service Provider's actual policy limit at the time of the event that gives rise to the claim and its policy limit at the time the ~~AER~~ Regulator made its Final Decision on the Service Provider's access arrangement proposal for the ~~Fourth~~ Fifth Access Arrangement Period, with reference to the forecast operating expenditure allowance approved in the ~~AER's~~ Regulator's Final Decision and the reasons for that decision; ~~and~~

(e) a relevant insurance policy is an insurance policy held during the ~~Fourth~~ Fifth Access Arrangement Period or a previous period in which access to the pipeline services was regulated;

(f) the Service Provider will be deemed to have made a claim on a relevant insurance policy if the claim is made by a related party of the Service Provider in relation to any aspect of the Distribution System or the Service Provider's business.

Note in making a determination in making a determination on an Insurance Cap Event, the Regulator will have regard to, amongst other things:

(1) the insurance policy for the event;

(2) the level of insurance that an efficient and prudent Service Provider would obtain in respect of the event; and

(3) any assessment by the Regulator of the Service Provider's insurance in making its access arrangement decision for the relevant period.

12.5.3 Insurer Credit Risk Event

Under this event, AusNet Services can apply to pass through any loss of revenue where an insurer is subject to an insolvency event.

AusNet Services proposes to amend the Insurer Credit Risk Event in several respects. First, for clarity, it proposes to incorporate the definition of Insolvency Event in the Glossary in Part A of the current access arrangement. Second, it makes minor amendments to improve the clarify of that part of the definition that establishes the materiality of the event. Finally, to achieve consistency with the equivalent event definitions in the comparator regulatory determinations, AusNet Services proposes to add the explanatory note which calls attention to certain minimum matters the AER will have regard to in assessing a pass through application for an Insurer Credit Risk Event.

The proposed event definition reads:

Insurer Credit Risk Event *means ~~an event of insolvency of~~ the Service Provider's insurer experiences an Insolvency Event, as a result of which the Service Provider:*

(a) incurs materially higher or materially lower costs for insurance premiums; or

(b) in respect of a claim for a risk that would have been insured by the Service Provider's insurer~~s~~, is subject to a materially higher or materially lower claim limit or a materially higher or materially lower deductible than would have applied under that policy; or

(c) incurs additional costs associated with self funding an insurance claim, which, would have otherwise been covered by the insolvent insurer.

Note: In making its decision to approve or reject a proposed reference tariff variation arising from an Insurer Credit Risk Event, the Regulator will have regard to, amongst other things:

(d) the Service Provider's attempts to mitigate and prevent the event from occurring by reviewing and considering the insurer's track record, size, credit rating and reputation.

(e) in the event that a claim would have been made after the insurer became insolvent, whether the Service Provider had reasonable opportunity to insure the risk with a different insurer.

12.5.4 Natural Disaster Event

AusNet Services proposes to amend the Natural Disaster Event definition and add an explanatory note to align it with the equivalent definitions in AusNet Services' EDPR determination and the AGN access arrangement. The amendments do alter the substantive operation of the definition by excluding events which are a consequence of AusNet Services' acts or omissions. However, AusNet Services considers this exclusion is consistent with good industry practice.

The proposed event definition reads:

> ***Natural Disaster Event*** *means any natural disaster including, but not limited to, ~~major~~ fire, flood or earthquake~~, or other natural disaster beyond the control of the Service Provider (but excluding those events for which external insurance or self insurance has been included within the Service Provider's forecast operating expenditure)~~ that occurs during the ~~forthcoming~~ Fifth Access Arrangement Period and materially increases the costs to the Service Provider of providing Reference Services, provided the fire, flood or other event was not a consequence of the acts or omissions of the Service Provider.*
>
> *Note: In assessing a Natural Disaster Event pass through application, the Regulator will have regard to, amongst other things:*
>
> *(a) whether the Service Provider has insurance against the event;*
>
> *(b) the level of insurance that a prudent Service Provider would obtain in respect of the event.*

12.5.5 Terrorism Event

AusNet Services proposes to add an explanatory note to the Terrorism Event definition to be consistent with the note included in the equivalent definitions in each of AusNet Services' EDPR determination and the AGN and JGN access arrangements. It also proposes to reformat the existing text to improve readability. AusNet Services does not consider its proposed amendments alter the operation of the definition.

The proposed event definition reads:

> ***Terrorism Event*** *means an act (including, but not limited to, the use of force or violence or the threat of force or violence) of any person or group of persons (whether acting alone or on behalf of in connection with any organisation or government), which*
>
> *(a) from its nature or context is done for, or in connection with, political, religious, ideological, ethnic or similar purposes or reasons (including the intention to influence or intimidate any government and/or put the public, or any section of the public, in fear); and*
>
> *(b) which materially increases the costs to the Service Provider of providing Reference Services.*
>
> *Note for the avoidance of doubt, in making a determination on a Terrorism Event, the Regulator will have regard to, amongst other things:*
>
> *(c) whether the Service Provider has insurance against the event;*
>
> *(d) the level of insurance that an efficient and prudent service provider would obtain in respect of the event; and*
>
> *(e) whether a declaration has been made by a relevant government authority that an act of terrorism has occurred.*

12.5.6 Relevant Pass Through Event

AusNet Services proposes to amend the definition of Relevant Pass Through Event to:

- reflect the addition and deletion of certain event definitions;

- reflect the change in the name of the Insurance Cap Event definition; and
- list the pass through event definitions in alphabetical order.

The concluding paragraph of the Relevant Pass Through Event definition explains what is meant when a definition refers to the materiality of the event. In essence, this text has the effect of setting a materiality threshold for a pass through event.

AusNet Services proposes amendments to the threshold to:

- clarify the intended operation of the threshold in relation to the required impact on a decrease in costs, and the calculation and application of the threshold; and
- promote consistency within the Access Arrangement in the way the AER is referred to.

The amended definition AusNet Services proposes is:

> ***Relevant Pass Through Event*** *means:*
>
> *(a) a Change in Taxes Event;*
>
> *(b) a Declared Retailer of Last Resort Event;*
>
> ~~*(c) a Mains Replacement Event;*~~
>
> ~~*(d) a National Energy Customer Framework Event;*~~
>
> *(c~~e~~) an Insurer Credit Risk Event;*
>
> *(d~~f~~) an Insurance Cap Event;*
>
> *(e) a National Energy Customer Framework Event;*
>
> *(f~~g~~) a Natural Disaster Event;*
>
> *(g) an NGER Event;*
>
> *(h) a ~~Terrorism~~ Regulatory Change Event;*
>
> *(i) a Service Standard Event; or*
>
> *(j) a ~~Regulatory Change~~ Terrorism Event;*
>
> *For the purpose of any Relevant Pass Through Event that includes a reference to materiality, an event is considered to materially increase or materially decrease costs where that event has an impact which is equal to or greater than ~~of~~ one per cent of the smoothed forecast revenue specified in the ~~AER's~~ Regulator's Final Decision, in one or more of the years for the Access Arrangement Period ~~that~~ in which the costs are incurred.*

12.5.7 Deletion of Mains Replacement Event

AusNet Services proposes to delete the Mains Replacement Event. The event was included at the last access arrangement review to mitigate the risk that AusNet Services would achieve a volume of mains replacement in the current access arrangement period that exceeded the expenditure allowance for that program. This event did, in fact, occur and the AER approved AusNet Services' application for cost pass through in September 2016.

AusNet Services considers the likelihood that it will need to undertake low pressure to high pressure mains replacement in the 2018-22 access arrangement period beyond the forecast volume is low. It believes its proposed capex forecast, which is calculated based on the actual costs incurred during the current period, is sufficient to fund the mains replacement program in the next period. Accordingly, AusNet Services does not consider it necessary to retain the Mains Replacement Event as a Relevant Pass Through Event in the next access arrangement period.

12.5.8 No changes proposed

AusNet Services confirms that it does not propose to make any changes to the following event definitions:

- Change in Taxes Event;
- National Energy Customer Framework Event (although this definition has been re-located within the Glossary in Part A of the Access Arrangement to ensure definitions appear alphabetically);
- Regulatory Change Event; and
- Service Standard Event.

AusNet Services' review of these definitions reveals they are consistent with the definitions accepted by the AER in other regulatory determinations and/or used in the National Electricity Rules.

13 Reference Services

13.1 Key points

- AusNet Services is proposing to retain its three current Haulage Reference Services, namely its Tariff V Haulage Reference Service, Tariff M Haulage Reference Service, and Tariff D Haulage Reference Service
- AusNet Services also proposes to retain its current suite of Ancillary Reference Services.
- The proposed Ancillary Reference Services and the Haulage Reference Services are likely to be sought by a significant part of the market in the forthcoming regulatory control period. As such, these services are appropriately classified as "Reference Services" in accordance with the NGR.

13.2 Introduction

Rule 48 sets out a number of requirements in relation to pipeline services and reference services, including:

> *"A full access arrangement must:*
>
> *(b) describe the pipeline services the service provider proposes to offer to provide by means of the pipeline; and*
>
> *(c) specify the reference services;*
>
> *(d) specify for each reference service:*
>
> *(i) the reference tariff; and*
>
> *(ii) the other terms and conditions on which the reference service will be provided."*

Rule 101 states:

> *"(1) A full access arrangement must specify all reference services.*
>
> *(2) A reference service is a pipeline service that is likely to be sought by a significant part of the market."*

This chapter describes the reference services offered by AusNet Services, as follows:

- Section 0 outlines AusNet Services' proposed Haulage Reference Services.
- Section 0 outlines AusNet Services' proposed Ancillary Reference Services.

AusNet Services' Reference Tariffs and Reference Tariff Policies are set out in Part B of AusNet Services' Access Arrangement. AusNet Services explains its approach to determining the tariff charging structure and prices in Chapter 15.

13.3 Haulage reference services

AusNet Services is proposing to retain its current Haulage Reference Services, namely:

- **Tariff V Haulage Reference Service:** The Haulage Reference Service where the withdrawal of gas is at a Tariff V Distribution Supply Point. This includes domestic and commercial customers who consume less than 10,000 Gigajoules of gas in a 12 month period, and/or less than 10 Gigajoules in any one hour;

- **Tariff M Haulage Reference Service:** The Haulage Reference Service where the withdrawal of gas is at a Tariff M Distribution Supply Point. To qualify for Tariff M, a customer previously taking supply under Tariff V Haulage Reference Service should be using either more than 10,000 Gigajoules of gas in a 12 month period, or more than 10 Gigajoules in an hour. Tariff M customers are not required to pay any additional charges for O&M or LCC as these have been embedded in the tariff.
- **Tariff D Haulage Reference Service:** The Haulage Reference Service where the withdrawal of gas is at a Tariff D Distribution Supply Point, but does not include Tariff D connection. To qualify for Tariff D, a customer should be using or expecting to use either more than 10,000 Gigajoules of gas in a 12 month period, or more than 10 Gigajoules in an hour. In addition to the tariff charges, customers on Tariff D are also required to pay an operations and maintenance (O&M) charge for any dedicated distribution assets, in particular the meter and regulator set installed at the connection point.

AusNet Services considers that these Haulage Reference Services are likely to continue to be sought by a significant part of the market during the forthcoming access arrangement period. As already noted, these services are unchanged from those currently provided.

13.4 Ancillary reference services

AusNet Services also proposes to maintain its current suite of Ancillary Reference Services as they are commonly requested by users, and are likely to be sought by a significant part of the market. The following services are provided in relation to distribution supply points at which gas is withdrawn by or in respect of a residential customer:

- **Meter and Gas Installation Test**: On-site testing to check the accuracy of a meter and the soundness of a gas installation, in order to determine whether the meter is accurately measuring the quantity of gas delivered.
- **Disconnection Service**: Disconnection by the carrying out of work being:
  - Removal of the meter at a metering installation, or
  - The use of locks or plugs at a metering installation in order to prevent the withdrawal of gas at the distribution supply point.
- **Reconnection Service**: Reconnection by turning on supply, including the removal of locks or plugs used to isolate supply or reinstallation of a meter if it has been removed, performance of a safety check and the lighting of appliances where necessary.
- **Special Meter Reading Service**: Meter reading for a distribution supply point in addition to the scheduled meter readings that form part of the Haulage Reference Services.

14 Price Control Mechanisms

14.1 Key points

This chapter provides an overview of AusNet Services' proposed price control mechanisms. The key points are:

- AusNet Services proposes to continue to use the tariff basket form of price control.
- AusNet Services proposes to retain the AER's approved weighted average price cap (WAPC) formula, with the exception of the carbon tax true up mechanism, which is no longer required.
- The Rules provisions relating to price control mechanisms are unchanged from those that applied during the 2013 GAAR process. The rationale for maintaining the WAPC formula is similarly unchanged and the formula will continue to comply with the Rules.

14.2 Introduction

Rule 92 states:

> *"(1) A full access arrangement must include a mechanism (a reference tariff variation mechanism) for variation of a reference tariff over the course of an access arrangement period.*
>
> *(2) The reference tariff variation mechanism must be designed to equalise (in terms of present values):*
>
> *(a) forecast revenue from reference services over the access arrangement period; and*
>
> *(b) the portion of total revenue allocated to reference services for the access arrangement period."*

Rule 72(1)(k) states that the access arrangement information for a full access arrangement proposal must include the service provider's rationale for any proposed reference tariff variation mechanism.

Rule 97 sets out provisions relating to the mechanics of reference tariff variation as follows:

> *"(1) A reference tariff variation mechanism may provide for variation of a reference tariff:*
>
> *(a) in accordance with a schedule of fixed tariffs; or*
>
> *(b) in accordance with a formula set out in the access arrangement; or*
>
> *(c) as a result of a cost pass through for a defined event (such as a cost pass through for a particular tax); or*
>
> *(d) by the combined operation of 2 or more or the above.*
>
> *(2) A formula for variation of a reference tariff may (for example) provide for:*
>
> *(a) variable caps on the revenue to be derived from a particular combination of reference services; or*
>
> *(b) tariff basket price control; or*
>
> *(c) revenue yield control; or*
>
> *(d) a combination of all or any of the above.*
>
> *(3) In deciding whether a particular reference tariff variation mechanism is appropriate to a particular access arrangement, the AER must have regard to:*
>
> *(a) the need for efficient tariff structures; and*
>
> *(b) the possible effects of the reference tariff variation mechanism on administrative costs of the AER, the service provider, and users or potential users; and*

(c) *the regulatory arrangements (if any) applicable to the relevant reference services before the commencement of the proposed reference tariff variation mechanism; and*

(d) *the desirability of consistency between regulatory arrangements for similar services (both within and beyond the relevant jurisdiction); and*

(e) *any other relevant factor.*

(4) *A reference tariff variation mechanism must give the AER adequate oversight or powers of approval over variation of the reference tariff.*

(5) *Except as provided by a reference tariff variation mechanism, a reference tariff is not to vary during the course of an access arrangement period."*

The information and proposals set out in this chapter accord with all of the applicable requirements of the rules. The remainder of this chapter is structured as follows:

- Section 14.3 sets out the proposed price control formula, rebalancing arrangements and tariff variation process for Haulage Reference Services; and
- Section 14.4 sets out the equivalent information for Ancillary Reference Services.

14.3 Tariff variation for Haulage services

14.3.1 Price control formula

AusNet Services proposes to continue to use the tariff basket form of price control, which is consistent with rule 97(2)(b).

- It transparently provides for the inclusion of the costs associated with changes in Licence Fees. AusNet Services considers that this is consistent with rule 97(1)(c) and (d);
- It relies on actual t-2 quantities, as opposed to estimated quantities, which reduces the administrative costs to all parties and is consistent with rule 97(3)(b); and
- It allows AusNet Services to adjust tariffs within period in order to ensure tariffs remain at cost reflective levels, thus enabling the maintenance of tariffs that are consistent with rule 97(3)(a) and the NGO, and allowing AusNet Services to recover its efficient and prudent costs.

The tariff basket form of control has been applied to the Victorian distribution gas network for three successive regulatory periods. In determining the form of control, the Rules require that the AER must have regard to:

- the previous form of control; and
- the desirability of consistency between regulatory arrangements for similar services (both within and beyond the relevant jurisdiction).

A consideration of these matters indicate that the tariff basket form of control should continue to apply. We note that in AGN's gas determination, the AER noted that:

> *"[..] our final decision maintains our draft decision considerations and the application of weighted average price cap tariff variation mechanism. As noted in our draft decision, all gas distributors in the national gas market are on weighted average price caps. We wish to ensure consistency in regulatory approach."* [337]

AusNet Services therefore proposes the following price control formula, which maintains consistency with the current arrangements in Victoria and other jursidictions:

[337] AER, *Australian Gas Networks Access Arrangement, 2016 to 2021*, Attachment 11 – Reference tariff variation mechanism, May 2016, pp. 11-20.

$$(1+CPI_t)(1-X_t)(1+L_t)(1+A_t) \geq \frac{\sum_{i=1}^{n}\sum_{j=1}^{m} p_t^{ij} * q_{t-2}^{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{m} p_{t-1}^{ij} * q_{t-2}^{ij}}$$

where the Service Provider has n Haulage Reference Tariff categories, each category having up to m Haulage Reference Tariff Components and where:

p_t^{ij} is the proposed Haulage Reference Tariff for Haulage Reference Tariff Component j of Haulage Reference Tariff i in Calendar Year t;

p_{t-1}^{ij} is the Haulage Reference Tariff being charged for Haulage Reference Tariff Component j of Haulage Reference Tariff i in Calendar Year t-1;

q_{t-2}^{ij} is the Quantity of Haulage Reference Tariff Component j of Haulage Reference Tariff;

CPI_t is the CPI for Calendar Year t;

X_t is a value to be determined in accordance with the finalised PTRM;

L_t is the Licence Fee Factor for Calendar Year t; and

A_t is an approved Pass Through Factor for Calendar Year t.

Each of these elements is unchanged from the AER's final decision for the 2013 GAAR.

14.3.2 Rebalancing constraint

In contrast to the National Electricity Rules, which codifies a 2% rebalancing constraint, Rule 97 sets out broad provisions pertaining to the tariff variation mechanism.

In the 2013 GAAR, AusNet Services initially proposed a rebalancing constraint of 5%. The AER set out its reasoning for preferring a lower constraint of 2% as follows:

> *"The AER agrees that increasing the rebalancing constraint would provide greater flexibility to change prices which could be used to achieve greater cost reflectivity. However, it is not apparent that the current balancing constraint of two per cent has materially inhibited SP AusNet's ability to achieve cost reflective pricing in previous regulatory periods. In addition, a higher rebalancing constraint could lead to increased price volatility and potential price shocks to customers within the regulatory period. This would create uncertainty for downstream users which, in turn, may be detrimental to the efficient investment in and utilisation of pipeline assets. The AER considers that a reference tariff control should preferable result in a price path with a reasonable degree of certainty and predictability."*[338]

AusNet Services accepted the AER's preference for a 2% rebalancing constraint to be applied at the tariff component level for years 2-5 of the regulatory period. For the forthcoming regulatory period, AusNet Services proposes to maintain this rebalancing constraint, consistent with the AER's reasoning in the 2013 GAAR. AusNet Services reiterates its earlier view that flexibility in tariff setting is essential if tariffs are to be cost reflective in accordance with the National Gas Objective.

It should also be noted that no rebalancing constraint should apply in January 2018.

[338] AER, *Access Arrangement draft decision SPI Networks (Gas) Pty Ltd 2013–17*, Part 2 Attachments, September 2012, p. 326.

14.3.3 Tariff variation process

In March 2012, AusNet Services proposed to maintain the existing requirement that a proposal to vary a reference tariff should be provided to the AER at least 35 business days prior to the next calendar year. The AER rejected this proposal and imposed a requirement to provide this information at least 50 business days prior to the change.

Unfortunately, the new submission date is prior to the release of the September CPI, which is to be applied for pricing purposes. As a consequence, the AER provided time extensions each year to avoid the need for prices to be updated following the release of the CPI.

To address the practical issues that have arisen during the current regulatory period, AusNet Services proposes that the following process should apply:

- AusNet Services will, at least 50 business days prior to the commencement of the next calendar year, submit proposed Haulage Reference Tariffs to apply from the start of the next calendar year for verification of compliance by the AER;
- The June CPI should apply for tariff variation purposes;
- Where AusNet Services proposes to change a Haulage Reference Tariff within a calendar year, it will submit the proposed Haulage Reference Tariff change for verification of compliance by the AER; and
- Where AusNet Services proposes to introduce a new Haulage Reference Tariff or new Haulage Reference Tariff Component or withdraw an existing Haulage Reference Tariff or existing Haulage Reference Tariff Component within a calendar year it will submit the proposal for verification of compliance by the AER.

AusNet Services will ensure its proposed Haulage Reference Tariffs or proposed changes to Haulage Reference Tariffs comply with the tariff control and rebalancing formulae.

14.4 Tariff variation for ancillary services

14.4.1 Price control formula

AusNet Services proposes to be able to vary its Ancillary Reference Services, initially on 1 January 2018, based on the prices approved as part of the Final Decision, and annually thereafter, based on the following formula.

$$ART_t = ART_{t-1} * CPI_t$$

Where:

ART_t	is the Reference Tariff that will apply to an Ancillary Reference Service in year t.
ART_{t-1}	is the Reference Tariff that applied to that Ancillary Reference Service in year t-1.
CPI_t	is the CPI for Calendar Year t.

14.4.2 Rebalancing constraint

Given that it is proposed that Ancillary Reference Services are to be escalated by CPI annually, AusNet Services does not propose to adopt a rebalancing constraint for Ancillary Reference Services.

14.4.3 Tariff variation process

AusNet Services proposes that this be applied in the same manner as for Haulage Reference Services, as outlined above.

15 Reference Tariffs

15.1 Summary of key points

This chapter provides an overview of AusNet Services' reference tariffs. The key points are:

- AusNet Services proposes to maintain its existing tariff structure, which were approved by the AER for the current regulatory period.
- AusNet Services' proposed tariff structures and levels are consistent with the Rules, which require tariff revenues to sit between standalone and avoidable cost of supply and charging parameters to take into account the long run marginal costs (LRMC) of supply.
- AusNet Services' methodology for setting tariffs is unchanged from the approach described in the AAI for the 2013-18 regulatory period, which was approved by the AER. The key components of AusNet Services' forecast operating expenditure are shown in the figure below alongside the actual and estimated operating expenditure for the current period.

15.2 Introduction

The Rules requirements relating to reference tariffs and AusNet Services' cost allocation approach are unchanged from the previous gas access arrangement review. The relevant Rules provisions are described below:

Rule 72(1) states:

> *"The access arrangement information for a full access arrangement proposal (other than an access arrangement variation proposal) must include the following:*
>
> *(j) the proposed approach to the setting of tariffs including:*
>
> *(i) the suggested basis of reference tariffs, including the method used to allocate costs and a demonstration of the relationship between costs and tariffs; and*
>
> *(ii) a description of any pricing principles employed but not otherwise disclosed under this rule."*

Rule 93 sets out provisions relating to allocation of total revenue and costs as follows:

> *"(1) Total revenue is to be allocated between reference and other services in the ratio in which costs are allocated between reference and other services.*
>
> *(2) Costs are to be allocated between reference and other services as follows:*
>
> *(a) costs directly attributable to reference services are to be allocated to those services; and*
>
> *(b) costs directly attributable to pipeline services that are not reference services are to be allocated to those services; and*
>
> *(c) other costs are to be allocated between reference and other services on a basis (which must be consistent with the revenue and pricing principles) determined or approved by the AER."*

Rule 94 sets out provisions relating to tariffs for distribution pipelines as follows:

> *"(1) For the purpose of determining reference tariffs, customers for reference services provided by means of a distribution pipeline must be divided into tariff classes.*
>
> *(2) A tariff class must be constituted with regard to:*
>
> *(a) the need to group customers for reference services together on an economically efficient basis; and*
>
> *(b) the need to avoid unnecessary transaction costs.*
>
> *(3) For each tariff class, the revenue expected to be recovered should lie on or between:*

(a) *an upper bound representing the stand alone cost of providing the reference service to customers who belong to that class; and*

(b) *a lower bound representing the avoidable cost of not providing the reference service to those customers.*

(4) *A tariff, and if it consists of 2 or more charging parameters, each charging parameter for a tariff class:*

(a) *must take into account the long run marginal cost for the reference service or, in the case of a charging parameter, for the element of the service to which the charging parameter relates;*

(b) *must be determined having regard to:*

(i) *transaction costs associated with the tariff or each charging parameter; and*

(ii) *whether customers belonging to the relevant tariff class are able or likely to respond to price signals.*

(5) *If, however, as a result of the operation of subrule (4), the service provider may not recover the expected revenue, the tariffs must be adjusted to ensure recovery of expected revenue with minimum distortion to efficient patterns of consumption.*

(6) *The AER's discretion under this rule is limited."*

The information and proposals set out in this chapter accord with all of the applicable requirements of the NGR. The remainder of this chapter is structured as follows:

- Section 15.3 describes AusNet Services' cost allocation and tariff setting approach.
- Section 15.4 outlines AusNet Services' interpretation of the pricing principles in the Rules, and AusNet Services' methodology for estimating the LRMC and standalone/avoidable costs.
- Section 15.5 describes AusNet Services' proposed tariffs and why they comply with the Rules.

15.3 Cost allocation and Tariff Setting

To address the cost allocation requirements in Rule 93, AusNet Services applies the following broad principles:

- Wherever possible, operating costs are directly attributed to assets and distribution service categories where the cost is directly related to the management (i.e. operation, maintenance, construction) of the asset or the delivery of the service. In other words, where there is a clear 'line of sight' between the costs incurred and the particular assets and/or service, then these costs are directly attributed to those assets and/or service categories. These cost allocations are set out in AusNet Services' annual regulatory accounts.
- AusNet Services directly attributes costs in its regulatory accounts to:
    - Haulage Reference Services;
    - Ancillary Reference Services; and
    - Pipeline services that are not Reference Services.
- Costs incurred in the provision of Ancillary Reference Services are included in the building block calculation. Tariffs for Ancillary Reference Services are based on the incremental cost to AusNet Services of providing those services, including a small overhead cost to cover administration. These tariffs are charged to those customers that request the service.
- Costs associated with non-reference services are set out in the regulatory accounts but are not included in the building block costs. These services are not required by a large part of the market and the scope of the services offered tends to vary significantly. For these reasons, AusNet Services recovers the costs of these services on a recoverable works basis. Therefore, the costs of providing these services is only recovered from those

customers who request the service and not subsidised by either Haulage Reference Service or Ancillary Reference Service Customers.

AusNet Services allocates costs between the tariffs for Haulage Reference Services according to the relevant cost drivers, such as load factor. For example, business customers' usage profiles indicate that these customers' use peak gas at only 1.8 times the rate of off peak gas, while residential customers' peak usage is 3.4 times off peak. Accordingly, AusNet Services retains a lower peak and off-peak charge for business customers to reflect this differing load factor.

15.4 Pricing Principles

Rule 94 requires that reference tariff structures to be efficient, which means that:

1. A reference tariff should encourage consumers to consume gas up to the point where the marginal benefit to them of consuming an additional gigajoule of gas equals the marginal cost of providing that extra gigajoule of gas to that customer.
2. A reference tariff should not:
   - Encourage consumers to disconnect from the network, or seek to bypass the existing network, when the cost to AusNet Services is less than their willingness to pay for gas services; and
   - Encourage consumers to consume gas, when the value that they place on that consumption is less than the avoidable cost of distributing that gas to them.
3. A reference tariff should be administratively simple, in that customers should be able to readily understand and respond to the price signals.

The first two elements are concerned with the LRMC and standalone/avoidable costs, which are considered in turn below. Tariff design, which relates to the third element, is discussed in section 15.5.

15.4.1 Long run marginal cost

As detailed in the introduction to this section,

The LRMC for a network service can be calculated in a number of different ways. The methodology that AusNet Services has utilised is known as the Average Incremental Cost (AIC) approach. This approach is commonly used in distribution networks, as it is well suited to situations where there is fairly consistent profile of investment over time to service growth in demand. An alternative approach is to use the perturbation approach, however this is generally considered to be more suited to wholesale supply systems where there is lumpy capital investment required to augment the system.

The AIC approach to determining the LRMC utilises the following formula:

$$= \frac{\text{PV (growth related shared network capex and opex)}}{\text{PV (incremental demand)}}$$

AusNet Services adopts the following approach to derive the LRMC:

1. We only include costs that shared by tariff customers, typically being 'shared network assets' and their associated opex.
2. The LRMC at peak times exceeds the LRMC at off peak periods, reflecting cost drivers in the model.
3. Relevant capital costs are split between commercial and residential customer classes based on their relative contribution to the forecast increases in MDQ in each tariff zone, which in turn is the underlying driver of capital augmentations.

The results of the LRMC analysis (average for the access arrangement period) are contained in Table 15-1 and Table 15-2 below.

Table 15-1: LRMC Results – Residential

Area	Peak ($/GJ)	Off Peak ($/GJ)
Central	$0.94	$0.06
West	$0.80	$0.06
Adjoining Central	$4.35	$0.12
Adjoining West	$1.15	$0.07

Source: AusNet Services

Table 15-2: LRMC Results – Commercial

Area	Peak ($/GJ)	Off Peak ($/GJ)
Central	$0.13	$0.01
West	$0.27	$0.01
Adjoining Central	$2.46	$0.01
Adjoining West	$0.57	$0.01

Source: AusNet Services

While AusNet Services regards the above estimates as reasonable, the calculations are sensitive to input assumptions. Therefore, the LRMC estimates should be regarded as indicative only.

15.4.2 Standalone and avoidable costs

Rule 94(3) requires that for each tariff class, the revenue expected to be recovered should lie on or between:

- an upper bound, representing the stand alone cost of providing the reference, and
- a lower bound, representing the avoidable cost of not providing the reference service to those customers.

Therefore, for a reference tariff to comply with the Rules requirements, it must deliver a stream of revenue from a class of customers that is between this upper and lower bound. This is commonly known as the ‘efficient pricing band’. There are two reasons why a price within this ‘band’ is considered to be efficient:

- Greater than the avoidable cost: This test means that customers are at least meeting the additional costs incurred in providing the service. If revenues were below this level, customers would be receiving a cross subsidy.
- **Less than the stand alone cost:** This test ensures that customers are not paying more than the costs of a dedicated network to serve their requirements. If charges exceed this level, customers would prefer to bypass the existing network.

AusNet Services has estimated the avoidable costs of supply by calculating the short run marginal costs of supply, and multiplying this cost by the estimated usage for that customer/customer class.

AusNet Services notes that there are a number of methodologies that can be utilised to estimate the stand alone cost of servicing a customer, or group of customers. These broadly include:

- A 'bottom up' build of a stand-alone network, being the construction of a modern day equivalent, optimised, asset base required to support of the delivery of services to each customer or group of customers; and
- A 'top-down' approach, which allocates existing assets to a customer groups.

Each of these methods has its particular challenges. As a more practical approach, AusNet Services focuses on the potential for individual customers or groups of customers within a tariff class to by-pass AusNet Services' network. The bypass analysis also considers the different options for large and small customers:

- **Large Customers**: AusNet Services estimates the bypass costs of connecting a customer to the existing transmission network, taking into account the location and size of existing connections. This approach is adopted for Tariff M and Tariff D customers.
- **Small Customers**: Assessing the cost per gigajoule of utilising 'bottled gas', and comparing this to each of AusNet Services' proposed Tariff V tariffs.

The results of the analysis are contained in Table 15-3 and Table 15.4 below.

Table 15-3: Standalone / Avoidable Cost Results – Residential and Commercial Customers

Tariff Class	Standalone[1]	Avoidable[2]	Average Revenue[3]
Central – Residential	$1,929	$651	$966
West – Residential	$1,935	$518	$768
Adjoining Central – Residential	$1,441	$797	$1,186
Adjoining West – Residential	$2,051	$909	$1,351
Central – Non Residential	$14,915	$1,180	$1,755
West – Non Residential	$8,871	$635	$943
Adjoining Central – Non Residentia	$9,283	$3,015	$4,496
Adjoining West – Non Residential	$13,227	$4,014	$5,985

[1] *Based on average GJ per customer usage in 2015 from AusNet Services Gas tariff Model for each respective tariff zone.*

[2] *Based on the estimated SRMC multiplied by that class' average GJ per customer usage in 2015. Adjusted by a factor of 67% of the average revenue per customer is added as per comment below for comparison purposes.*

[3] *Based on 2015 Average Bill from AusNet Services' 2017 Gas Tariff Model for each respective tariff zone. As Standalone cost is calculated using the cost per gigajoule of utilising 'bottled gas', extra 67% of the total average revenue is added to compare to retail bill.*

Source: AusNet Services

It is noted that for all volume levels tested, AusNet Services' Tariff V complies with the requirements of Rule 94 (3).

Table 15-4: Standalone / Avoidable Cost Results – Large Industrial Customers

Tariff Class	Standalone	Avoidable	Average Revenue[3]
Tariff D			
-0m from transmission, with MHQ of 387GJ/hr[1]	$484 per MHQ	$241 per MHQ	$379 per MHQ
-Customers above this threshold[2]	$1,098 – $361 per MHQ	$193 – $83 per MHQ	$379 per MHQ
Tariff M			
-0m from transmission assuming usage equivalent to citygate capacity of 387GJ/hr	$484 per MHQ	$241 per MHQ	$422 per MHQ
-825m from transmission, assuming average usage equivalent to citygate capacity of 387GJ/hr	$498 per MHQ	$241 per MHQ	$422 per MHQ
-0m from transmission assuming largest Tariff M customer of 105MHQ and citygate of 387GJ/hr	$1,786 per MHQ	$241 per MHQ	$422 per MHQ

1 *Based on the average capacity of a citygate of 387GJ/hr.*

2 *AusNet Services tested the specific impact on the three Tariff D customers that are above 387GJ/hr. This had regard to their location, relative to the transmission network (3.2km – 7km from the transmission network), along with costs associated with the larger citygate capacity that would be required to service those customers.*

3 *Average Revenue is based on AusNet Services' Tariff D and Tariff M customer base and 2017 tariffs.*

Source: AusNet Services

It is noted that for all distances away from the transmission network, AusNet Services' tariff D complies with the requirements of Rule 94 (3) when consumption from that class is assumed to equate to the average capacity of a citygate of 387GJ/hr.

AusNet Services tested the sensitivity of these results for MHQ's above 387GJ/hr to test whether the scale efficiency benefits that accrue from providing an increased capacity at the citygate would lead to the standalone cost being less the than the revenue that is accrued via the levying of Tariff D charges. In short, this analysis showed that even when utilising the largest MHQ exhibited by an individual customer on AusNet Services' network, the revenue generated from levying Tarff D charges is still below the standalone cost of supply, once the cost of connecting that customer to the transmission network, given their specific location, is taken into account. More specifically, the standalone cost, inclusive of connection assets to distribute gas to their specific location, ranges from $361 per MHQ to $1098 per MHQ.

Further, whilst the average revenue for Tariff M customers is assessed as being above the standalone cost, when *a group* of tariff M customers are: a) assumed to be situated directly adjacent to the transmission network, and b) in total, they utilise the full capacity (387GJ/hr) of the citygate; this is not a situation that exists in AusNet Services' network. In particular, AusNet Services' largest Tariff M customer has a capacity of less than a third of this amount (105 GJ/hr), which results in the standalone cost ($1,786) being above the revenue generated from that customer. Further, and more importantly, a group of Tariff M customers that collectively, used 387GJ/hr would need to be situated less than 825m away from the transmission network to make by-pass economic. AusNet Services notes that none of its large Tariff M customers are within this vicinity of the transmission network.

Having regard to the above, AusNet Services considers that its tariffs comply with the Rules, in particular, Rule 94 (3).

15.5 Tariff Design

The following section outlines AusNet Services' proposed tariff design, including the relevant tariff classes in accordance with the Rules requirements.

15.5.1 Tariff classes

AusNet Services is proposing to maintain its existing tariff classes, which were previously approved by the AER as satisfying the requirements of Rule 94. Each tariff class is a sub component of a Haulage Reference Service. This relationship, along with a description of the tariff class, is outlined in the table below.

Table 15-5: Tariff Classes applicable to each Haulage Reference Services

Tariff V Haulage Reference Service	Tariff M Haulage Reference Service	Tariff D Haulage Reference Service
Central Zone – Residential	Central Zone – Demand	Central Zone – Demand
Central Zone – Non Residential	West Zone – Demand	West Zone – Demand
West Zone – Residential	Adjoining Central Zone – Demand	Adjoining Central Zone – Demand
West Zone – Non Residential	Adjoining West Zone – Demand	Adjoining West Zone – Demand
Adjoining Central Zone – Residential		
Adjoining Central Zone – Non Residential		
Adjoining West Zone – Residential		
Adjoining West Zone – Non Residential		

Source: AusNet Services

The tariff parameters reflect the key cost drivers:

- Anytime maximum demand

  A customer's anytime maximum demand determines the size of their connection and the assets required for the provision of pipeline services.

- Location
- AusNet Services has also grouped customers by location, to reflect the different regional costs of delivering gas. The regions also reflect previous policy decisions with regard to pricing zones, along with the requirement to extend the gas network to a number of new regional towns adjacent to the existing supply areas.
- Contribution to overall system peak demand.
- Different customer classes will typically have different load factors across the year, which leads to different utilisation patterns of AusNet Services' asset base and cost of service. In the absence of more sophisticated metering arrangements, it is efficient to group customers into different classes based on their expected load factor.
- AusNet Services has created two classes: residential and non-residential, which typically exhibit quite different load factors. This approach promotes efficient pricing by ensuring that tariffs are cost reflective.

AusNet Services' proposed tariff classes avoid unnecessary transaction costs in accordance with Rule 94. In particular, the tariff definitions readily allow customers to be allocated to the appropriate tariff.

15.5.2 Tariff structures and levels

AusNet Services proposes to maintain its existing tariff structure for both its Haulage Reference Services and its Ancillary Reference Services. The structures and proposed tariff levels for each tariff are outlined in the following tables.

Table 15-6: Tariff V Haulage Reference Services

Tariff V Haulage Reference Service	Domestic	Commercial
Central		
• Fixed Charge per day	0.3177	0.3345
• Peak (0 - 0.1)	9.0500	1.5393
• Peak (0.1 - 0.2)	5.4294	1.4658
• Peak (0.2 – 1.4)	0.9494	1.3110
• Peak (>1.4)	0.7452	0.9838
• Off Peak (0 - 0.1)	2.3731	1.4613
• Off Peak (0.1 - 0.2)	1.9680	1.0220
• Off Peak (0.2 – 1.4)	0.9030	0.8446
• Off Peak (>1.4)	0.3106	0.8040
West		
• Fixed Charge per day	0.3177	0.3345
• Peak (0 - 0.1)	5.1520	2.5207

Tariff V Haulage Reference Service	Domestic	Commercial
• Peak (0.1 - 0.2)	3.6928	2.1228
• Peak (0.2 – 1.4)	1.1893	1.1672
• Peak (>1.4)	1.1326	0.4290
• Off Peak (0 - 0.1)	1.6157	1.0504
• Off Peak (0.1 - 0.2)	1.4365	0.8847
• Off Peak (0.2 – 1.4)	0.8604	0.4784
• Off Peak (>1.4)	0.1670	0.3533
Adjoining Central		
• Fixed Charge per day	0.3177	0.3345
• Peak (0 - 0.1)	12.9127	5.4017
• Peak (0.1 - 0.2)	9.2919	5.1442
• Peak (0.2 – 1.4)	3.3427	4.8938
• Peak (>1.4)	3.1833	4.6465
• Off Peak (0 - 0.1)	6.0013	5.1444
• Off Peak (0.1 - 0.2)	3.6256	4.8847
• Off Peak (0.2 – 1.4)	3.1833	4.6469
• Off Peak (>1.4)	3.0309	4.4252
Adjoining West		
• Fixed Charge per day	0.3177	0.3345
• Peak (0 - 0.1)	9.0147	6.3834
• Peak (0.1 - 0.2)	7.5555	5.9855
• Peak (0.2 – 1.4)	3.8979	5.0299
• Peak (>1.4)	3.7118	4.2914
• Off Peak (0 - 0.1)	5.4784	4.9131
• Off Peak (0.1 - 0.2)	4.1139	4.6791
• Off Peak (0.2 – 1.4)	3.1431	4.3411
• Off Peak (>1.4)	2.9934	4.0869

Source: AusNet Services

Table 15-7: Tariff M Haulage Reference Services

Tariff M Haulage Reference Service	Central	West	Adjoining Central	Adjoining West
0 – 10 MHQ (GJ/hour)	855.6597	855.6597	855.6597	855.6597
10 – 50 MHQ (GJ/hour)	814.9139	814.9139	814.9139	814.9139
>50 MHQ (GJ/hour)	169.6481	169.6481	169.6481	169.6481

Source: AusNet Services

Table 15-8: Tariff D Haulage Reference Services

Tariff D Haulage Reference Service	Central	West	Adjoining Central	Adjoining West
0 – 10 MHQ (GJ/hour)	390.5362	390.5362	390.5362	390.5362
10 – 50 MHQ (GJ/hour)	371.9391	371.9391	371.9391	371.9391
>50 MHQ (GJ/hour)	180.5725	180.5725	180.5725	180.5725

Source: AusNet Services

Table 15-9: Ancillary Reference Services

Ancillary Reference Service	2018 Tariff
Meter & Gas Installation Test	173.83
Disconnection Service	57.94
Reconnection Service	57.94
Special Meter Reading Service	8.98

Source: AusNet Services

15.5.3 Rules compliance

AusNet Services considers that its proposed tariff structures and levels comply with the Rules and the National Gas Objective, for the reasons set out below.

Tariff V Haulage Reference Services

These tariffs apply to both residential and small to medium sized commercial consumers. Each has a fixed and variable component. The variable component is a declining block tariff that is driven by level of gas consumption (measured in GJ). Table 15-4 shows that the expected revenue that will be generated from each tariff class is below the standalone cost of supply, and above the avoidable cost of supply, thus AusNet Services' proposed tariffs comply with Rule 94(3).

AusNet Services proposes to maintain volumetric charges, primarily because existing metering arrangements do not allow charging arrangements for Tariff V customers to be based on a customer's peak demand.

While the fixed charge is higher for commercial compared to residential customers, this partly reflects the fact that the gigajoule tariff is lower. The lower gigajoule tariff is consistent with the flatter load profile for commercial customers, and their more limited contribution to peak demand (which drives network investment).

Both residential and commercial tariffs have peak and off-peak pricing, with marginally higher pricing in the peak (winter) period. This is a standard pricing approach, which recognises that capacity is required to meet peak demand.

Both the residential and commercial tariff variable components charge declining prices for higher consumption (known as 'declining block' tariffs). This approach is efficient in an environment where marginal costs of consumption are low and per customer-related costs do not increase in line with consumption. AusNet Services also notes that declining block tariffs are commonly used across Australia, and therefore are regarded as consistent with the requirements of the Rules and National Gas Objective.

Tariff M Haulage Reference Services

This tariff applies to customers who consume 10,000 Gigajoules of gas in a 12 month period or more than 10 Gigajoules in an hour. Tariff M customers are not required to pay any additional charges for O&M or LCC as these have been embedded in the tariff.

Tariff charges are applied to the MHQ recorded for the calendar year in declining blocks. Once a customer's MHQ exceeds the first block the second block rate is applied to incremental MHQ until that is exceeded and the third block rate applied to the balance. When a customer records an MHQ that is greater than that in any prior month, the excess amount is retrospectively applied to all prior months for that year. This charging approach ensures that customer receives a price signal that reflects the long run marginal costs of supply.

Tariff D Haulage Reference Services

The same charging arrangements for Tariff M customers apply, except that the:

- Local Capacity Charge (LCC) applied to Tariff D customers is a non-reference service charge for providing connection assets and main extensions for a distribution supply point that a new tariff D customer is required to pay prior to connection being made.
- Operations and Maintenance (O&M) charge applied to Tariff D customers is an excluded service charge that recovers the cost of operating and maintaining mains extensions, services, metering and all other installation-related costs. O&M charges are levied on a per-month basis and apply to all Tariff D customers while they are connected to AusNet Services' Distribution Network.

Neither is considered to impact on the efficiency of the underlying tariff.

AusNet Services notes that the AER's previous assessment of our tariff structures concluded that:

> *"The AER is satisfied that SP AusNet's proposed reference tariffs are consistent with the NGR requirements. […] The AER reviewed SP AusNet's definitions of avoidable and standalone costs for the residential, non–residential and demand tariff classes. It considers that these definitions are acceptable for assessing compliance with rule 94(3). SP AusNet demonstrated that for each tariff within the tariff V and tariff D classes, the expected tariff revenue lies on or between the avoidable and standalone costs."*[339]

AusNet Services notes that its tariff classes, structures and cost allocation methodology are unchanged from those previously reviewed by the AER. AusNet Services is confident that the proposed tariff structures continue to meet the Rules requirements.

[339] AER, *Access Arrangement draft decision SPI Networks (Gas) Pty Ltd 2013–17*, Part 2 Attachments, September 2012, p. 197.

16 Fixed Principles

16.1 Key Points

This chapter provides an overview of AusNet Services' fixed principles to apply under the revised access arrangement. The key points are that AusNet Services proposes to:

- retain the existing fixed principles and makes certain amendments to update those principles to allow for their continued application;
- supplement the existing fixed principle relating to the efficiency carryover mechanism by proposing a new fixed principle to reflects its proposal to introduce a Capital Expenditure Sharing Scheme; and
- include a new fixed principle to give effect to its proposal to introduce a Network Innovation Scheme.

16.2 Rationale for proposed fixed principles

A fixed principle provides regulatory certainty by preserving the AER's treatment of a particular issue beyond the current access arrangement period. Rule 99 sets out the following provisions relating to fixed principles:

"(1) A full access arrangement may include a principle declared in the access arrangement to be fixed for a stated period.

(2) A principle may be fixed for a period extending over 2 or more access arrangement periods.

(3) A fixed principle approved before the commencement of these rules, or approved by the AER under these rules, is binding on the AER and the service provider for the period for which the principle is fixed.

(4) However:

(a) the AER may vary or revoke a fixed principle at any time with the service provider's consent; and

(b) if a rule is inconsistent with a fixed principle, the rule operates to the exclusion of the fixed principle."

The following fixed principles were approved by the AER for the current access arrangement period, and apply until the end of the forthcoming access arrangement period (being the Fifth Access Arrangement Period):

(1) The Regulator will use incentive based regulation adopting a CPI - X approach and not rate of return regulation.

This fixed principle will apply until the end of the Fifth Access Arrangement Period.

(2) To the extent that the Capital Base is relevant to the determination of Reference Tariffs, the value of the Capital Base at the start of the Fifth Access Arrangement Period will be adjusted in the same manner as set out in the National Gas Rules in force at 30 March 2012, using benchmark depreciation (as opposed to actual) determined by the AER for Fourth Access Arrangement Period.

This fixed principle will apply until the end of the Fifth Access Arrangement Period.

(3) To the extent that the application of clause 6.4 results in a positive efficiency carryover at the end of the Fourth Access Arrangement Period, the reward earned in the Fourth Access Arrangement Period is to be added to the Total Revenue and carried forward into the Fifth Access Arrangement Period, until it has been retained by the Service Provider for a period of a full six years for Years 1-4 and five years for Year 5 in accordance with clause 6.4.

This fixed principle will apply until the end of the Fifth Access Arrangement Period.

(4) The Regulator will ensure that any mechanism for varying or adjusting the Haulage Reference Tariffs approved for the Fourth Access Arrangement Period will, to the extent required to give full effect to such variation or adjustment, be carried forward into the Fifth Access Arrangement Period.

This fixed principle will apply until the end of the Fifth Access Arrangement Period.

AusNet Services considers it is appropriate to retain the existing fixed principles until the end of the Sixth Access Arrangement Period:

- In relation to the fixed principle relating to incentive based regulation, a continuation of this fixed principle will continue to promote the achievement of the NGO.
- In relation to the fixed principles relating to the use forecast depreciation to establish the opening capital base, a continuation of this principle will promote effective incentives and economic efficiency, as noted by the AER.[340]
- In relation to the fixed principles relating to efficiency carryover mechanism, the fixed principle secures its incentive properties, thereby furthering the NGO.
- In relation to the Haulage Reference Tariff adjustment, a continuation of this fixed principle will promote efficient pricing, which will further the achievement of the NGO.

In summary, AusNet Services considers that the continuation of these fixed principles promotes regulatory certainty and efficient outcomes in accordance with the NGO. AusNet Services proposes a number of minor revisions to the principles to update the references to the forthcoming and subsequent Access Arrangement periods and the NGR, and to ensure consistency in the numbering used in the Access Arrangement. The proposed fixed principles (as amended) are set out in clause 7.2 of the Reference Tariff Policy.

16.3 Rationale for proposed new fixed principles

AusNet Services proposes two new fixed principles to apply during the Fifth and Sixth Access Arrangement Periods. These principles support AusNet Services' proposals to introduce a Capital Expenditure Sharing Scheme (**CESS**) and a Network Innovation Scheme (**NIS**). The operation of and policy rationale for each of these schemes is set out in Chapter 11 (Incentive Arrangements) of the Access Arrangement Proposal.

16.3.1 Capital Expenditure Sharing Scheme fixed principle

AusNet Services proposes that the following fixed principle be adopted in support of the operation of the CESS:

(d) In accordance with clause 6.4.3 and to the extent that the application of that clause results in a CESS efficiency carryover at the end of the Fifth Access Arrangement Period, the reward or penalty earned in the Fifth Access Arrangement Period is to be added to the Total Revenue and carried forward into the Sixth Access Arrangement Period.

This fixed principle will apply until the end of the Sixth Access Arrangement Period.

As explained in Chapter 11, the CESS will promote efficient investment in the gas distribution network by:

[340] AER, *Access Arrangement Final Decision, SPI Networks (Gas) Pty Ltd 2013–17 Part 2: Attachments*, March 2013, page 22.

- strengthening the incentives for AusNet Services to deliver capex efficiencies;
- ensuring AusNet Services' incentive to realise efficiency gains is the same regardless of the year in which a capital investment is made; and
- providing stronger and more balanced incentives for efficient trade-offs between capex and opex.

Because a fixed principle binds the service provider and the AER for the duration of the access arrangement period for which the principle is fixed[341], the proposed fixed principle for the CESS provides certainty as to how any efficiency gains AusNet Services realises in the Fifth Access Arrangement Period will be treated when its revenues for the subsequent period are set. This certainty ensures AusNet Services is exposed to the intended incentives provided by the CESS. The efficiencies that the CESS encourages AusNet Services to achieve will contribute to the achievement of the NGO, including by promoting efficient investment in the gas distribution network.

Given the benefits to consumers that will be encouraged by the CESS, it is appropriate that the fixed principle proposed above be included in AusNet Services' Access Arrangement for the Fifth Access Arrangement Period.

16.3.2 Network Incentive Scheme fixed principle

AusNet Services proposes that the following fixed principle be adopted to support the operation of the NIS:

> *(f)* *In accordance with clause 6.4.4 and to the extent that the application of that clause results in approved Allowable NIS Expenditure at the end of the Fifth Access Arrangement Period, the amount approved from the Fifth Access Arrangement Period is to be added to the Total Revenue and carried forward into the Sixth Access Arrangement Period, with such adjustments as are necessary to provide for financing costs.*
>
> *This fixed principle will apply until the end of the Sixth Access Arrangement Period.*

By including this fixed principle in its access arrangement, AusNet Services benefits from the certainty of knowing the approved NIS expenditure incurred during the Fifth Access Arrangement Period will be recoverable during the Sixth Access Arrangement Period, as intended by the scheme design. This certainty will enable AusNet Services to rely on the NIS to support innovation investments as the cost recovery path for such investments is certain.

As explained in Chapter 11, the criteria for Allowable NIS Expenditure ensures that benefits will accrue to consumers by limiting the kinds of expenditure which qualify for the NIS to those which have the potential to yield tangible benefits. This protection for consumers against over-investment is consistent with the NGO. The NIS makes a further contribution to the achievement of the NGO by encouraging research and development into means for improving the provision and cost efficiency of services, which might not otherwise occur.

In light of the pro-competitive consumer-focused outcomes that will be delivered by the NIS, it is appropriate that the fixed principle proposed above be included in AusNet Services' Access Arrangement for the forthcoming period.

[341] NGR, rule 99(3).

17 Other Matters

17.1 Introduction

This chapter provides information about matters which are required by rules 48 and 49 of the NGR to be addressed in a full access arrangement proposal.

These matters are set out in Part A of AusNet Services' access arrangement proposal for the 2018-2022 access arrangement period. AusNet Services is not proposing to make any significant amendments to these components for the forthcoming period.

17.2 Chapter Structure

The remainder of this chapter is structured as follows:

- Section 17.3 sets out the submission date and review commencement date;
- Section 17.4 addresses AusNet Services' queuing policy;
- Section 17.5 identifies AusNet Services' approach to capacity trading;
- Section 17.6 outlines AusNet Services' extensions and expansion policy;
- Section 17.7 sets out AusNet Services' approach to the requirements regarding changes to receipt and delivery points.

17.3 Review submission date and revision commencement date

17.3.1 Regulatory requirements

Rule 49(1) requires that a full access arrangement (other than a voluntary access arrangement):

- must contain a review submission date and a revision commencement date; and
- must not contain an expiry date.

Rule 50(1) states that, as a general rule:

- a review submission date will fall four years after the access arrangement took effect or the last revision commencement date; and
- a revision commencement date will fall five years after the access arrangement took effect or the last revision commencement date.

The AER may approve dates that do not conform with rule 50(1) if it is satisfied that those dates are consistent with the national gas objective and the revenue and pricing principles.[342]

17.3.2 Current arrangements

The revision commencement date in the current access arrangement was stated to be 1 January 2013. However, because the 2013-2017 Final Decision and the AER's proposed revisions to the access arrangement proposal were delayed, the revisions did not commence until 1 July 2013.

Therefore, in order to calculate the dates for inclusion in this access arrangement proposal in accordance with rule 50(1), the date to be used is the last revision commencement date—1 July 2013.

342 Rule 50(3).

17.3.4 Proposed arrangements

AusNet Services proposes that the duration of the forthcoming access arrangement period be five years.

For the purpose of fixing the review submission date and the revision commencement date, AusNet Services proposes that those dates be calculated as if the revisions to the current arrangement commenced on 1 January 2018. Therefore, it proposes that:

- the review submission date be 1 January 2022; and
- the revision commencement date be 1 January 2023.

AusNet Services accepts that its proposal does not conform with the general rule in rule 50(1). Nevertheless, it considers the AER should exercise its discretion under rule 50(4) to approve these dates to re-align the commencement of the access arrangement period with the beginning of the calendar, as would have been the result had the last access arrangement revisions commenced as anticipated. AusNet Services notes that its proposal has no adverse consequences for consumers and, by virtue of the reference tariff adjustments provided for in Part B of the current Access Arrangement, is revenue neutral for AusNet Services.

In accordance with rule 49(1)(b), AusNet Services does not propose to include an expiry date for the access arrangement.

17.4 Queuing policy requirements

17.4.1 Regulatory requirements

In accordance with rule 48(1)(e), an access arrangement which is to contain queuing requirements is to set out those requirements. Rule 103(1)(b) provides that an access arrangement for a distribution pipeline must contain queuing requirements if the AER notifies the service provider that it must do so. The requirements are set out in rules 103(3) and (5).

17.4.2 Current arrangements

AusNet Services' queuing policy is set out in clause 5.5 of the current access arrangement. It states that requests for connection or modification of a connection are processed on a "first-come, first served" basis.

17.4.3 Proposed arrangements

AusNet Services does not propose any substantive changes to its queuing policy.

17.5 Capacity trading requirements

17.5.1 Regulatory requirements

Rule 48(1)(f) requires a full access arrangement to set out the capacity trading requirements on the pipeline. Rule 105(1)(a) states that the capacity trading requirements of a service provider who is registered as a participant in a particular gas market must be in accordance with rules or procedures governing that market.

AusNet Services is a registered participant in the declared wholesale gas market in Victoria. The rules governing the operation of this market are contained in Part 19 of the NGR.

- AEMO and the transmission pipeline owner have entered into a Service Envelope Agreement which determines, amongst other things, transportation capacity of the transmission system, including that associated with new transmission pipelines or augmentations, and the obligations of each party in relation to the delivery of the agreed transmission capacity.
- At the commencement of the market, AEMO allocated the initial transmission pipeline capacity to individual large (tariff D) customers in the form of authorised MDQ and the balance collectively to the small customer load (tariff V – residential and small to medium sized commercial / industrial customers).
- Market Participants and/or tariff D customers may trade authorised MDQ.
- A service provider for a declared distribution network (as AusNet Services is) does not grant a right to capacity in any section of the network. Therefore, it has not ability to make provision for capacity on its distribution network to be transferred and the need for it to have capacity trading requirements does not apply.

17.5.2 Proposed arrangements

In accordance with the Part 19 of the NGR (Declared Wholesale Gas Market Rules) and rule 105(1) of the NGR, AusNet Services does not provide for capacity on its distribution network to be transferred.

17.6 Extension and expansion policy requirements

17.6.1 Regulatory requirements

Rule 48(1)(g) requires that a full access arrangement set out the extension and expansion requirements. These requirements are specified in rule 104:

> *(1) Extension and expansion requirements may state whether the applicable access arrangement will apply to incremental services to be provided as a result of a particular extension to, or expansion of the capacity of, the pipeline or may allow for later resolution of that question on a basis stated in the requirements.*
>
> *(2) Extension and expansion requirements included in a full access arrangement must, if they provide that an applicable access arrangement is to apply to incremental services, deal with the effect of the extension or expansion on tariffs.*
>
> *(3) The extension and expansion requirements cannot require the service provider to provide funds for work involved in making an extension or expansion unless the service provider agrees.*

17.6.2 Current arrangements

AusNet Services' extension and expansion policy is set out in clause 5.6 of Part A of the current access arrangement.

17.6.3 Proposed arrangements

AusNet Services does not propose to make any substantial amendments to clause 5.6. However, it is proposing some minor editorial amendments to improve the readability of the clause and align drafting style of the clause with the remainder of Part A.

17.7 Change of receipt or delivery points

17.7.1 Regulatory requirements

Rule 48(1)(h) requires that a full access arrangement state the terms and conditions for changing receipt and delivery points. Changes must be made in accordance with the principles in rule 106(1):

(a) *[A] user may, with the service provider's consent, change the user's receipt or delivery point;*

(b) *the service provider must not withhold its consent unless it has reasonable grounds, based on technical or commercial considerations, for doing so.*

The access arrangement may specify in advance the conditions under which consent will or will not be given, and the conditions to be complied with if consent is given.[343]

17.7.2 Current arrangements

AusNet Services' policy for changing receipt and delivery points is set out in clause 5.8 of Part A of the Access Arrangement and is consistent with the requirements of rule 106.

17.7.3 Proposed arrangements

AusNet Services does not propose to make any changes to the terms and conditions for changing receipt and delivery points.

[343] Rule 106(2).

18 Revision of Terms and Conditions of Access

18.1 Key points

- AusNet Services proposes to a number of the definitions amendments to Part A of its access arrangement, principally to reflect changes proposed to the cost pass through events. It also proposes to make limited changes to Part C, which are driven by:
    - the pending commencement of the Fifth Access Arrangement and the need for consistency across access arrangement periods;
    - the need for minor amendments to reflect changes in AusNet Services' regulatory obligations and requirements;
    - a preference for clarity and consistency in the drafting style.
- AusNet Services has also made a number of changes to the formatting of its access arrangement to reflect the AusNet Services brand, and to improve the readability and visual consistency of the access arrangement. These changes have not been tracked as they do not affect the substance of the content.

18.2 Introduction

The access arrangement comprises three parts which, together, constitute the terms and conditions up on which AusNet Services offers access to the distribution pipeline.

- Part A – which establishes a framework for the remainder of the access arrangement, and contains the schedule of ancillary reference services and the glossary;
- Part B – Reference Tariffs and Reference Tariff Policy; and
- Part C – Terms and Conditions.

The Access Arrangement also includes the plans of the Distribution System lodged with the AER.

18.3 Chapter structure

This chapter concerns revisions AusNet Services proposes to its access arrangement to apply for the 2018-22 access arrangement period. The remainder of the chapter is structured as follows:

- Section 18.4 identifies the applicable regulatory requirements;
- Section 18.5 identifies the nature of the amendments AusNet Services proposes to make to each of Parts A, B and C of the Access Arrangement.

18.4 Regulatory framework and review approach

18.4.1 Regulatory framework

Rule 48(1)(d) requires that a full access arrangement must specify for each reference service the terms and conditions on which the reference service will be provided.

Rule 52 states:

(1) A service provider must, on or before the review submission date of an applicable access arrangement, submit an access arrangement revision proposal to the AER.

(2) The access arrangement revision proposal must:

(a) set out the amendments to the access arrangement that the service provider proposes for the ensuing access arrangement period; and

(b) incorporate the text of the access arrangement in the revised form.

AusNet Services proposes to offer its reference services in accordance with the terms and conditions set out in Part C of the revised access arrangement attached to this proposal. Included as part of the proposal is a version of the access arrangement which clearly identifies the changes proposed. These changes to Part C are also summarised in section 18.5.3 below.

18.5 Rationale for proposed amendments

18.5.1 Part A

The proposed amendments to Part A are for the purpose of:

- updating dates and references to access arrangement periods for the Fifth and Sixth Access Arrangement Periods;
- proposing a review commencement date and revision commencement date (see Chapter 17);
- making consequential amendments to the Glossary to support AusNet Services' proposed incentive mechanisms (see Chapter 11) and proposed amendments to its pass through arrangements (see Chapter 12);
- removing the Carbon Tariff;
- making minor editorial and typographical amendments, including for the purpose of improving the clarity of the document and ensuring consistency in its formatting and drafting style.

The proposed amendments are tracked in the marked-up version of Part A provided as part of this access arrangement proposal.

18.5.2 Part B – Reference Tariffs and Reference Tariff Policy

The proposed amendments to Part B are for the purpose of:

- updating dates and references to access arrangement periods for the Fifth and Sixth Access Arrangement Periods;
- providing a mechanism for the cost of debt to be calculated annually and corresponding adjustments made to AusNet Services' reference tariffs (see Chapter 9);
- removing the Carbon Tariff;
- providing for AusNet Services' proposed new incentive mechanisms (see Chapter 11);
- proposing two new fixed principles to support the operation of the proposed incentive mechanisms (see Chapter 16);
- proposing new Haulage Reference Tariffs and Ancillary Reference Tariffs for the Fifth Access Arrangement;
- inserting a new Annexure A to support AusNet Services' proposed Capital Expenditure Sharing Scheme;
- making minor editorial and typographical amendments, including for the purpose of improving the clarity the document and ensuring consistent formatting and drafting style.

The proposed amendments are tracked in the marked-up version of Part B provided as part of this access arrangement proposal.

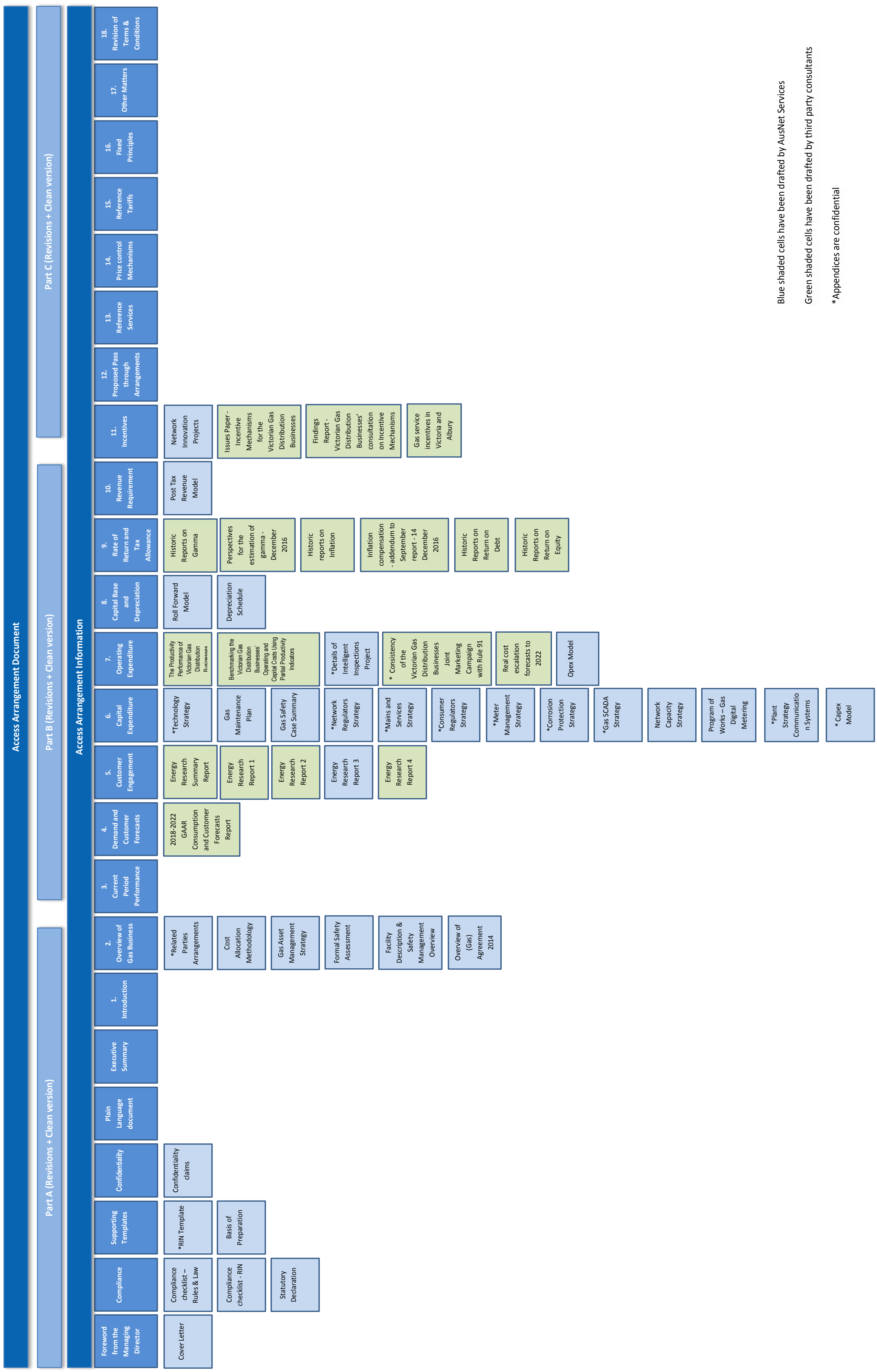
18.5.3 Part C – Term and Conditions

The table below identifies the amendments proposed to Part C of the Access Arrangement and the rationale for the alternation. The proposed amendments are tracked in the marked-up version of Part C provided as part of this access arrangement proposal.

Clause Reference	Reason for amendment
Contact details	Ensures interested parties can make contact the responsible person regardless of internal staff changes.
1.2(a)(14), (k) and (l)	Makes provision for the prospective adoption of National Energy Retail Rules and Parts 12A and 21 of the National Gas Rules as a law of Victoria.
2.5(b)	Editorial amendment to improve the clarity of the clause.
3(b)	Minor editorial amendment to improve the clarity of the clause.
3A(b), (c) and (f)	Editorial amendments for consistency with the numbering convention in the Access Arrangement.
3A(g)	Minor editorial amendment for consistency with the numbering convention in the Access Arrangement.
4.1(d)	Minor amendment to insert omitted words.
4.4(b)	Adopts correct terminology to improve accuracy and clarity.
4.4(d)	Minor editorial amendment.
4.4(e)	Editorial amendment to improve the clarity of the clause.
4.5(b)	Minor editorial amendment to insert the full clause cross-reference.
4.5(c)	Minor editorial amendment to reflect that this term is defined in the National Gas Law.
4.10(c)	Minor amendment to clarify that the calculation of time in this clause is by reference to calendar days. This amendment is made for the avoidance of doubt because the convention in the Agreement is to use Business Days. However, to maintain consistency with the Access Arrangements of other Victorian gas distribution businesses, AusNet Services continues to use calendar days for this clause 4.10.
5(a)	Minor editorial amendment.
6.2(c)	Insert the word "clause" to maintain consistency in the cross-referencing style, and a correction of a typograpical error.
6.2(e) and (h)	Insert the word "clause" to maintain consistency in the cross-referencing style.
7.1(c)	Editorial amendment for consistency with the numbering convention in the Access Arrangement.
7.4(d) and (j)	Corrects cross-referencing errors.

Clause Reference	Reason for amendment
7.5(d)	Minor editorial amendment to improve clarity.
7.6(b)(3) and (4)	Amend clause numbering for consistency.
7.7(d)	Minor editorial amendment to improve clarity.
7.8(a)(2)(C), (a)(3), (b), (f), and (g)	Amendments to clarify that the calculation of time is by reference to calendar days.
9.4(a)(10)	Extends the existing obligation on a User to provide additional information about a Customer who has life support equipment at their premises and requires continuity of supply.
9.4(a)(12)	Corrects a formatting error.
9.5(a)	Corrects a typographical error.
9.9(a)(3)	Corrects a typographical error.
9.10(i)	Minor editorial amendment to improve clarity.
11.2(c)	Re-formatted to improve clarity and readability.
12.2(a)(1)	Corrects a typographical error.
12.2(a)(5) and (6)	Correct clause numbering for consistency.
12.2(c)(1) and (2)	Replaces references to calendar days with references to Business Days for consistency with the calculation of time.
12.2(e)	Creates a new obligation on Users to advise the Service Provider if it is the subject of an Insolvency Event but AEMO determines not to suspend the User from the market. Timely notification to the Service Provider of the Insolvency Event enables the Service Provider to take appropriate action to mitigate risk of non-payment of Reference Tariffs.
12.3(c) and (d)	Replaces references to calendar days with references to Business Days for consistency with the calculation of time.
12.4(a)(2) and (4)(A)	Minor editorial amendments to improve clarity.
12.4(b)(1) and (c)	Replaces references to calendar days with references to Business Days for consistency with the calculation of time.
12.9	Re-formatted to improve clarity and readability.
12.10	Re-formatted to improve clarity and readability.
19.2	Re-number paragraphs to be consistent with numbering convention.

SUBMISSION DOCUMENT MAP



Blue shaded cells have been drafted by AusNet Services

Green shaded cells have been drafted by third party consultants

*Appendices are confidential