Jemena Gas Networks (NSW) Ltd

2015-20 Access Arrangement Information

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ABBREVIATIONS

A&O	Administration and Overheads
AA	Access Arrangement
AAI	Access Arrangement Information
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Organisation
AER	Australian Energy Regulator
AGLUI	AGL Upstream Investments
AMP	Asset Management Plan
CAPM	Capital Asset Pricing Model
CE Act	Clean Energy Act 2011 (Cth)
CGS	Commonwealth Government Securities
CPI	Consumer Price Index
DA	Direct Action
DTIRIS	Department of Trade and Investment, Regional Infrastructure and Services
E to G	Electricity to Gas
E&P	Evans and Peck
EBA	Enterprise Bargaining Agreement
EBSS	Efficiency Benefit Sharing Scheme
EDD	Effective Degree Days
EGP	Eastern Gas Pipeline
EI	Economic Insights
ERF	Emissions Reduction Fund
EWON	Energy and Water Ombudsman
FSA	Field Services Agreement
GDB	Gas Distribution Business
GFC	Global Financial Crisis
GIS	Geographic Information System
HP	High Pressure
IPART	Independent Pricing and Regulatory Tribunal of NSW
IT	Information Technology
JGN	Jemena Gas Networks (NSW) Ltd
KPI	Key Performance Indicators
LNG	Liquefied Natural Gas

LRET	Large-scale Renewable Energy Target
LRMC	Long-Run Marginal Cost
MAOP	Maximum Allowable Operating Pressure
MCPGC	Major Capital Project Governance Committee
MDQ	Maximum Daily Quantity
MP	Medium Pressure
MSP	Moomba to Sydney Pipeline
NECF	National Energy Customer Framework
NERL	National Energy Retail Law
NERR	National Energy Retail Rules
NGER	National Greenhouse and Energy Reporting
NGL	National Gas (NSW) Law
NGO	National Gas Objective
NGR	National Gas Rules
O&M	Operating and Maintenance
OB	Opportunity Brief
OB+	Enhanced Opportunity Brief
OH&S	Occupational Health and Safety
PEM	Project Estimation Model
PFP	Partial Factor Productivity
PJ	Petajoules
PMM	Project Management Methodology
POTS	Packaged Off-take Station
PTRM	Post-tax Revenue Model
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia
RET	Renewable Energy Target
RIN	Regulatory Information Notice
ROLR	Retailer of Last Resort
RSA	Reference Service Agreement
RTS	Reference Tariff Schedule
RY	Regulatory Year
S&P	Standard & Poor's
SCADA	Supervisory Control and Data Acquisition
SCER	Standing Council on Energy and Resources
SGSPAA	SGSP (Australia) Assets Pty Ltd
S-L	Sharpe-Lintner

SRES	Small-scale Renewable Energy Scheme
STTM	Short Term Trading Market
TFP	Total Factor Productivity
TJ	Terajoules
TSS	Tariff Structures Statement
UAG	Unaccounted for Gas
VB	Volume Boundary
VI	Volume Individual
VRT	Volume Residential Distributed Generation Technology
WACC	Weighted Average Cost of Capital
WAPC	Weighted Average Price Cap

OVERVIEW

1. This 2015 Access Arrangement submission sets out Jemena Gas Network's (**JGN**) proposed plan for managing its NSW natural gas network from 1 July 2015 to 30 June 2020 (**2015 Plan**). It explains the activities and costs involved in delivering the safe and reliable gas services that NSW households and businesses expect, both now and into the future.

2. To develop our 2015 Plan we have:

   - considered and validated the safety and service levels our customers expect us to provide
   - forecast the efficient level of costs required over this period and future periods to meet these safety and service levels, and run our business effectively to promote customers' long-term interests
   - calculated a price path to recover our costs that helps to mitigate the impact of wholesale gas price rises.

3. To inform this process we asked our customers to let us know their preferences and concerns, and we have tested whether our proposed service levels, costs and price path promote their long-term interests. Importantly, the long-lived nature of our assets means the decisions we make today have the potential to affect our customers over the next 20 years and beyond.

4. We have prepared a customer overview of the 2015 Plan which is available on Jemena's website.

THE LONG-TERM INTERESTS OF OUR CUSTOMERS

5. To ensure our 2015 Plan promotes the long-term interests of customers, we considered what this means in practical terms. In our view, it means that our 2015 Plan reflects a business run as smartly and efficiently as possible, so that:

   - our prices reflect the lowest sustainable cost of providing services and meeting expected safety and service levels (productive efficiency)
   - our service levels reflect what our customers want and are willing to pay for, and are priced to support efficient use of our network (allocative efficiency)
   - we are responsive to changes in market conditions and innovate to help ensure gas remains a competitive fuel option over the long term (dynamic efficiency).

6. It also means our 2015 Plan reflects a recognition that our network will be used by both our current and future customers, so that:

   - the proposed capital and operating programs will affect the reliability and condition of the network into the future, requiring costs be assessed and optimised across multiple periods
   - the pricing, market expansion investment and marketing activities in our 2015 Plan will affect the prices faced by existing and future customers, and the competitiveness of natural gas as a fuel in NSW
   - customers need to be informed of, and provided an opportunity to influence, any short and longer-term trade-offs inherent in our 2015 Plan.

7. Through our customer engagement on five and 20 year scenarios, and our own 20 year asset strategy process, we are confident we have optimised this balance in our 2015 Plan. Failure to fund or deliver this plan over the five-year period to June 2020 will jeopardise our customers' long-term interests.

ENGAGING WITH OUR CUSTOMERS AND OTHER STAKEHOLDERS

8. We are committed to improving how we engage with our customers, stakeholders and the community on our five-year plans, and as part of our usual business practice. We recognise this is important to help ensure our decisions promote the long-term interests of our customers. As detailed in appendix 1.4, we have undertaken a comprehensive engagement process including with:

- the JGN Customer Council, which comprises consumer and industry representatives of residential, small business and large industrial customers
- residential and small business customers through a series of deliberative forums held in both metropolitan and regional locations
- large industrial customers through one-on-one interviews
- retailers and other network users through forums and one-on-one discussions
- other market participants and stakeholders including energy intermediaries, the Australian Energy Market Organisation (**AEMO**), the Australian Energy Market Commission (**AEMC**), the Independent Pricing and Regulatory Tribunal of NSW (**IPART**) and the NSW Government through one-on-one discussions
- the broader NSW community through the Jemena website and other targeted channels, including distribution of information pamphlets.

9. Through our engagement we were able to test our current and future balancing of costs and prices, safety, and service levels. The three service attributes illustrated in Figure OV–1 formed the basis of this customer engagement.

Figure OV–1: Balancing safety, services and prices in the long-term interests of customers

10. We have heard that our customers:

- expect us to continue to provide the same high safety and service levels over the next five years, and to invest in improving our service quality to ensure all customers benefit from consistently high service levels in all areas of the network
- want us to focus on continually improving the cost efficiency of our gas services and be proactive in attracting new customers to the gas network through our marketing and pricing to help ensure the end-retail price of gas remains competitive
- value us acting to assist vulnerable customers with energy affordability.

OUR SERVICE PROPOSAL

11. Our customers and stakeholders have told us they expect a continuation of the safe and reliable natural gas service we have provided historically. With our 2015 Plan, we propose to deliver on this expectation.

12. Our 20 year asset strategy—provided as appendix 6.1—sets out the community's expectations of our service levels and our approach to meeting these expectations. This includes:

- environmental responsibility
- providing a safe and reliable level of service
- providing a responsive service
- maintaining and enhancing public amenity
- providing common levels of service to all customers.

OUR COST PROPOSAL

13. The JGN network—Australia's largest gas distribution network—has its origins in 1837 when The Australian Gas Light Company was formed to light the streets of Sydney. The network has grown through a combination of extensions, new developments and acquisitions. It now provides gas to more than 1.2 million customers in Sydney, Newcastle, Wollongong and the Central Coast, and over 20 country centres including those within the Central Tablelands, Central West, Southern Tablelands and Riverina regions of NSW.

14. Over the past five years we have invested over $950M extending and refurbishing the network, and a further $800M in operating and maintaining it. This investment has delivered the strong service outcomes expected from the capital and operating programs approved by the AER in our last five-year plan in 2010, and we have achieved operating cost efficiencies at the same time.

15. To continue to deliver the service levels our customers expect, over the next five years we will require (in real terms):

- similar levels of operating and maintenance expenditure
- increased capital expenditure of around $1.15B.

16. Our single largest cost is financing the $3B of pipes and meters already in the ground. Compensating our debt and equity holders accounts for over half our costs. Fortunately, interest rates have fallen since 2009, when we finalised our last five-year plan (for the 2010-15 period). That plan was completed during the global financial

crisis (**GFC**). The price proposal reflected in the 2015 Plan passes the benefits of lower interest rates directly on to our customers.

17. We have forecast a required annual rate of return of 8.67 per cent. This forecast reflects many elements of the Australian Energy Regulator's (**AER**) rate of return guideline. However, there are some important elements of the guideline that would not result in our debt and equity holders receiving an adequate return on their investment. Our investors need to believe that they will earn a reasonable rate of return before they are willing to undertake capital investment in long-lived, immovable assets such as gas distribution pipelines. Investment is required so that JGN can continue to operate a safe and reliable network in the long-term interests of our customers. Our 2015 Plan explains where we have departed from the AER's guideline on elements of the rate of return.

18. JGN's total cost forecast for the next five years is $2.74B.

OUR PRICE PROPOSAL

19. Our proposed price path and price structures over the period of the 2015 Plan seeks to recover our costs in a way that will best support efficient use of our network now and into the future. Our tariff structures statement (**TSS**) explains our pricing objectives and principles and is provided as appendix 1.8.

20. An important aspect of our proposed prices reflects a recognition that our customers' long-term interests will be supported by JGN increasing customer connections to, and use of, our network to lower average prices. Our 2015 Plan seeks to support this over time by:

- providing smoothed real price reductions over the five year period from 1 July 2015 to 30 June 2020 (**2015-20 AA period**) to help off-set expected rises in wholesale gas prices
- maintaining low fixed charges for residential and small business customers, thereby reducing cost barriers to gas connections, recognising gas is a discretionary fuel in NSW.

21. The outcome of our 2015 Plan is that, on average, our network prices will fall in real terms by 4 per cent in 2015-16, and 2.7 per cent each year over the remainder of the 2015-20 AA period.

CHANGES TO OUR ACCESS ARRANGEMENT

22. The access arrangement (**AA**) details terms and conditions upon which JGN offers network services to retailers and self-contracting users of our network.

23. Key changes to the AA include:

- changes to reflect relevant aspects of the National Energy Customer Framework (**NECF**), which was implemented in NSW from 1 July 2013 in transitional form, with the transition period to end for JGN's network on 30 June 2015
- our proposed service classification and tariffs
- general drafting improvements, to enhance the accessibility and structure of the document.

Part A Background

1. INTRODUCTION

24. This Access Arrangement Information (**AAI**) has been prepared by Jemena Gas Networks (NSW) Ltd (ACN 003 004 322). It provides the background to, and supporting information for, the access arrangement revisions proposal applicable to the NSW natural gas distribution network owned, controlled and operated by JGN for the period 1 July 2015 to 30 June 2020 (**2015 AA proposal**).

25. This AAI, the supporting information contained in appendices to the AAI, and the 2015 AA proposal are collectively referred to as JGN's **2015 AA submission**.

26. This chapter describes the purpose, form and structure of JGN's 2015 AA submission:

- section 1.1 explains the purpose of the 2015 AA proposal
- section 1.2 explains the purpose of this AAI
- section 1.3 provides an overview of our customer and stakeholder engagement program
- section 1.4 provides the drafting conventions applied to the 2015 AA submission
- section 1.5 sets out the key compliance requirements for the 2015 AA submission
- section 1.6 sets out the overarching provisions of the regulatory framework
- section 1.7 sets out the structure of this AAI.

1.1 PURPOSE OF THE 2015 AA PROPOSAL

27. The current JGN access arrangement[1] (**2010 AA**) details the commercial and technical terms and conditions upon which JGN offers access to reference services to users and prospective users of the JGN network.

28. Under section 132 of the National Gas (NSW) Law (**NGL**), rule 52(1) of the National Gas Rules (**NGR**) and clause 1.6 of the 2010 AA, JGN must, by 30 June 2014, submit revisions to the 2010 AA for the AER's approval. The revisions will apply for the 2015-20 AA period. The proposed revisions are set out in JGN's 2015 AA proposal. Appendix 1.1 provides an explanation of the proposed revisions.

29. The Reference Service Agreement (**RSA**)—which sets out the terms and conditions for the provision of the haulage reference service—remains a schedule to the AA. Appendix 1.2 provides additional background to the RSA.

1.2 PURPOSE OF THIS AAI

30. Pursuant to rule 42(1), the purpose of this AAI is to provide information that is reasonably necessary for users and prospective users of the JGN network to understand:

[1] AER, *Access Arrangement JGN's NSW gas distribution networks 1 July 2010 – 30 June 2015, amended by order of the Australian Competition Tribunal, 30 June 2011, further amended with regard to mines subsidence expenditure, 26 September 2011*, June 2010.

- the background to the 2015 AA proposal
- the basis and derivation of the various elements of the 2015 AA proposal.

31. Appendix 1.3 provides a statement of interdependencies which identifies how the various elements of the 2015 AA submission interrelate.

1.3 2015 AA CUSTOMER AND STAKEHOLDER ENGAGEMENT

32. JGN has undertaken a targeted program of customer engagement that has directly informed the development of JGN's 2015 AA submission.

33. Our approach was consistent with the AER's consumer engagement guideline (**consumer engagement guideline**).[2] To help ensure our 2015 AA submission reflected our stakeholders' views and concerns, and promoted customers' long-term interests, we engaged with customers, stakeholder and community groups in a range of forums. We explained the context for the 2015 AA submission and explored views on service level and price expectations.

34. In summary customers told us they:

- support public and employee safety being our non-negotiable top priority
- value network service reliability and responsiveness, and are generally satisfied with our current service levels
- think all customers should receive the same service levels for the same prices (a universal level of service)
- are concerned about future increases in wholesale gas costs and end-retail prices
- want us to consider the end-retail price when setting tariffs to promote stability in this price over the next five years (and prevent retail price shocks)
- want us and other gas market players to focus on improving the cost efficiency of gas services
- see the benefits of attracting new customers to the gas network to help ensure the end-retail price of gas remains competitive compared with other fuels.

35. Further details on our customer engagement program and outcomes are provided in appendices 1.4 and 1.5.

36. To facilitate further customer engagement on JGN's 2015 AA submission, JGN has prepared an overview paper (**2015 AA customer overview**) which:

- provides a plain language summary and explanation of the 2015 AA submission
- describes how we have engaged with our customers and has sought to address any relevant concerns identified as a result of that engagement
- describes the key risks and benefits of the 2015 AA submission for our customers
- confirms how we have verified with our customers that the 2015 AA proposal will best promote their long-term interests.

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[2] AER, *Better Regulation Consumer Engagement Guideline for Network Service Providers*, November 2013.

37. We have also prepared a series of customer factsheets to provide succinct and accessible explanations of key 2015 AA submission issues.

38. The 2015 AA customer overview and customer factsheets are available on Jemena's website.

1.4 INTERPRETATION

39. This AAI adopts the following drafting conventions:

- monetary values are reported in real 2014-15 Australian dollars, unless indicated otherwise
- annual values are reported on a 1 July to 30 June regulatory year (**RY**) basis, unless indicated otherwise
- numerical values in tables may not tally due to arithmetic rounding
- reference to a "rule" is a reference to a rule from the NGR
- the document "Access arrangement JGN's NSW gas distribution networks 1 July 2010 – 30 June 2015, amended by order of the Australian Competition Tribunal, 30 June 2011, further amended with regard to mines subsidence expenditure, 26 September 2011, June 2010" is referred to in this 2015 AA submission as the **2010 AA**
- the document "Access arrangement information for the access arrangement, JGN's NSW gas distribution networks 1 July 2010 – 1 July 2015, amended by the order of the Australian Competition Tribunal, 30 June 2011, further amended with regard to mine subsidence expenditure, 26 September 2011, June 2010" is referred to in this 2015 AA submission as the **2010 AAI**
- references to the '2010-15 AA period' or 'current AA period' refer to the period commencing 1 July 2010 and ending 30 June 2015
- references to the '2015-20 AA period' or 'next AA period' refer to the period commencing 1 July 2015 and ending 30 June 2020.

40. An abbreviations list is also provided in this AAI.

1.5 COMPLIANCE OF THE 2015 AA SUBMISSION

41. The 2015 AA submission complies with applicable requirements of the NGL and the NGR. Specific requirements of the NGR are addressed in relevant sections of the 2015 AA submission. A compliance checklist cross-referencing the relevant NGL and NGR compliance requirements with the 2015 AA submission content is provided in appendix 1.6.

42. On 31 March 2014 the AER served JGN with a regulatory information notice to assist the AER's assessment of the 2015 AA submission (**AA RIN**). JGN's response to AA RIN has been provided separately to the 2015 AA submission. JGN's AA RIN and 2015 AA submission cross-refer to each other where appropriate.

1.6 REGULATORY FRAMEWORK

43. The overarching provisions of the NGL set the foundation of the framework in which the 2015 AA submission will be assessed. The objective of the NGL is the National Gas Objective (**NGO**). JGN has carefully considered the meaning and practical implications of the NGO, and associated revenue and pricing principles (refer Box 1–

1) in preparing its 2015 AA submission. We have also sought a view from regulatory economics expert Geoff Swier to assist us, and this view is provided as appendix 1.7.

Box 1–1: NGL sections 23 and 24

23—National gas objective

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.

24—Revenue and pricing principles

(1) The revenue and pricing principles are the principles set out in subsections (2) to (7).

(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.

1.7 STRUCTURE OF THE 2015 AAI

44. This 2015 AAI is structured in three parts:

- *Part A: Background*—introduces JGN, our network, the pipeline services we offer, and recent performance

- *Part B: Derivation of total revenue*—explains the basis and derivation of the building blocks and total revenue requirement for references services for the 2015-20 AA period
- *Part C: Tariffs*—sets out the proposed tariff structures for references services and proposed pass through events and mechanisms for annual tariff variations. Appendix 1.8 provides JGN's TSS, which details our approach to pricing and tariff structures.

45. The 2015 AAI chapter structure is provided in Table 1–1. The 2015 AAI includes the appendices listed in chapter 16. Appendix 1.9 provides a confidentiality claim in relation to specified aspects of the AAI. To protect customer information and intellectual property, confidential information has been redacted from the public version of the 2015 AA submission, in accordance with the AER's confidentiality guideline.[3]

Table 1–1: Structure of the 2015 AAI

Chapter	Content
Part A: Background	
1. Introduction	Purpose, form and structure of JGN's AA submission
2. Jemena Gas Networks	Physical description of the JGN network, services provided, and regulatory oversight
3. Pipeline services	Description of the services JGN will provide in the 2015-20 AA period
4. Current period performance	Delivery against key performance metrics in the current AA period
Part B: Derivation of total revenue	
5. Demand	Forecast of customer numbers, gas volumes and demand for the 2015-20 AA period
6. Capital expenditure	Derivation of the capital expenditure forecast for the 2015-20 AA period
7. Operating expenditure	Derivation of the operating expenditure forecast for the 2015-20 AA period
8. Capital base	Derivation of the opening and closing regulatory asset base for the 2015-20 AA period
9. Rate of return	Proposed allowed rate of return of the 2015-20 AA period
10. Cost of tax	Estimated corporate income tax and proposed valuation of imputation credits for the 2015-20 AA period
11. Incentive mechanisms	Proposed incentive mechanisms for the 2015-20 AA period
12. Total revenue and price path	Derivation of total revenues and price path for the 2015-20 AA period
Part C: Tariffs	
13. Reference tariffs	Description of reference services and tariffs and methodology for allocation of total revenue to services and tariffs
14. Annual reference tariff variation	Price control formulae and process applicable to varying reference tariffs
15. Pass through events	Proposed pass through events and materiality thresholds
16. List of supporting information (appendices)	

[3] AER, *Better Regulation Confidentiality Guideline*, November 2013.

2. JEMENA GAS NETWORKS

46. As an aid to understanding the 2015 AA submission, this chapter describes the physical operation of the JGN gas distribution network, the services JGN offers, and gives an overview of regulatory oversight of the network.

47. This chapter is structured as follows:

- section 2.1 describes JGN's network
- section 2.2 details technical regulation of the network
- section 2.3 describes the network ownership
- section 2.4 clarifies that JGN is the service provider
- section 2.5 describes the associate contract where JGN is the service provider
- section 2.6 describes new external factors affecting JGN.

2.1 DESCRIPTION OF THE NETWORK

48. This section provides an overview of the physical JGN network, the services provided, its users, and customers. It explains characteristics and emerging trends and opportunities that affect reference services and tariffs set out in the 2015 AA proposal.

2.1.1 BACKGROUND

49. JGN provides natural gas transportation and associated services to users of the JGN network (**Network Users**).

50. The JGN network has its origins in 1837 when The Australian Gas Light Company was formed to light the streets of Sydney. The network has grown through a combination of extensions, new developments and acquisitions. It now provides gas to more than 1.2 million customers in Sydney, Newcastle, Wollongong and the Central Coast, and over 20 country centres including those within the Central Tablelands, Central West, Southern Tablelands and Riverina regions of NSW.

2.1.2 CURRENT CONFIGURATION AND OPERATION

51. The majority of gas consumed in NSW is sourced from other states.

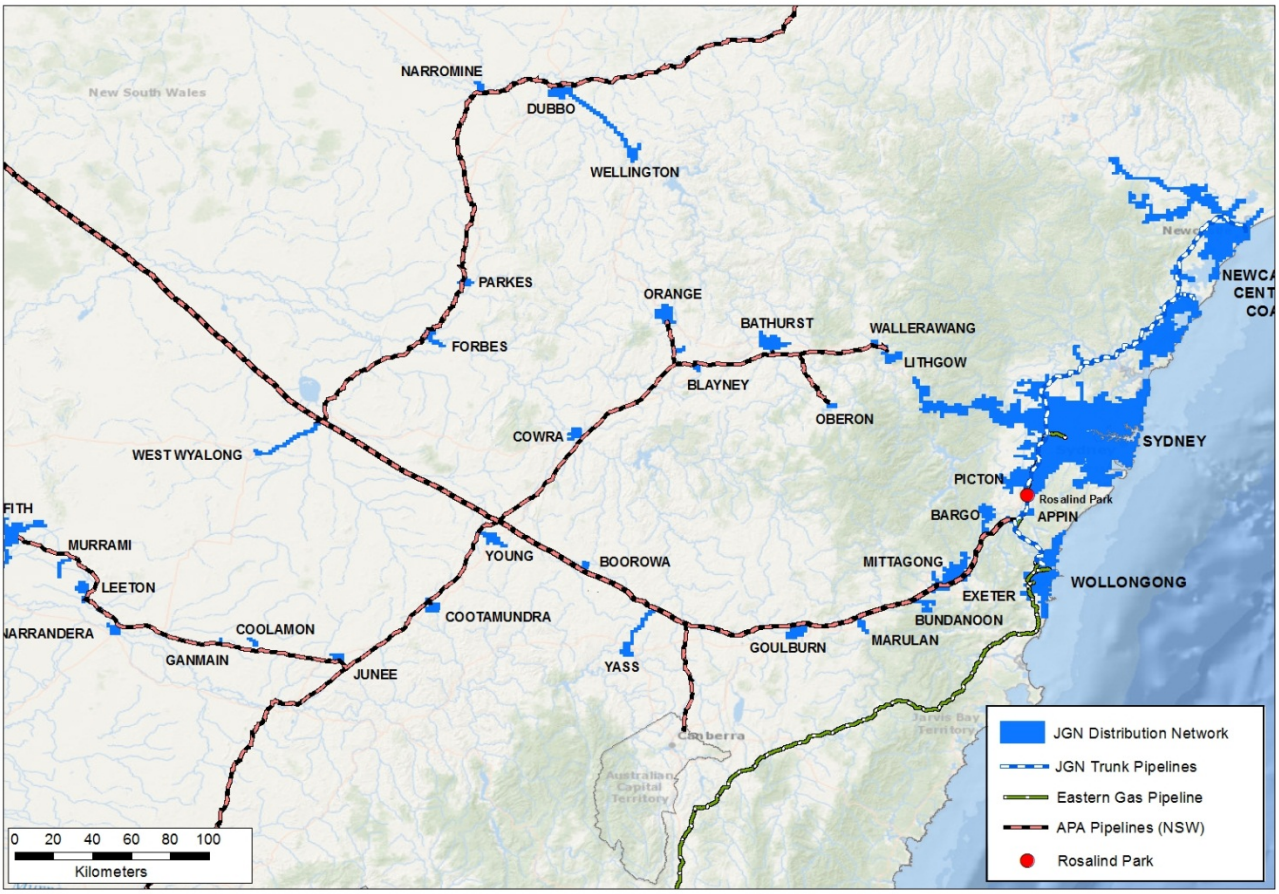
52. At present, gas is injected into the JGN Wilton network section (which provides gas to customers across Sydney, Newcastle, Wollongong and the Central Coast) at five receipt points with a sixth currently under construction. Gas is sourced at these receipt points from:

- the Moomba to Sydney Pipeline (**MSP**), owned by APA Group, which principally transports gas produced in the Cooper Basin in South Australia to JGN's Wilton receipt point
- the Eastern Gas Pipeline (**EGP**), owned by Jemena, which transports gas produced in the Gippsland Basin in Victoria to JGN's Albion Park, Port Kembla, and Horsley Park receipt points
- the Rosalind Park Gas Plant, owned by the AGL Upstream Investments (**AGLUI**), which injects local coal seam methane into JGN's Rosalind Park receipt point

- a gas storage facility and pipeline now being built by AGL at Tomago which will interconnect with the network at a new JGN receipt point at Hexham.

53. There are separate country receipt points (32 in all) for each of the country centres served by the JGN network. All of those centres are connected to the MSP or the Central West Pipeline, both of which are owned by APA Group.

Figure 2–1: JGN network overview map



54. Network Users are responsible for injecting natural gas from a transmission pipeline (MSP or EGP) or facility owner (AGLUI) into JGN's network through JGN's receipt points. Once injected into the network, JGN has contractual obligations with Network Users to transport that gas through the network to the Network Users' customers' premises. Custody transfer quality meters are located near each receipt point to measure the quantity of gas injected into the network.

55. The JGN network currently consists of approximately 267 km of trunk mains, 147 km of primary mains, 1,493 km of secondary mains and 23,470 km of medium and low pressure mains, as well as 55 trunk receiving stations and packaged off-take stations, 17 primary regulating stations, 619 district regulator sets and 2 bulk metering stations.

56. The JGN Wilton network section which serves the Sydney, Newcastle and Wollongong areas is the Short Term Trading Market (**STTM**) distribution system for the STTM Sydney Hub and gas delivered to receipt points in this network section is governed by STTM rules and procedures. The STTM is a market-based wholesale gas balancing mechanism established at defined gas hubs such as the STTM Sydney Hub and allows Network Users to buy gas directly from the STTM rather than through a shipper or producer. AEMO operates the STTM.

While the STTM Sydney Hub is governed by the STTM, JGN's country network sections operate solely under a contractual supply chain framework. This means that Network Users still need to procure gas from a shipper or producer and arrange for that gas to be transported to receipt points for those network sections.

57. As the JGN network has limited gas storage capacity, to maintain operational gas pressure throughout each network section and ensure the safe and reliable operation of the network, there are contractual obligations on Network Users to ensure the total quantity of gas injected and withdrawn from each network section on a day is equal—or balanced. There are also obligations on Network Users to ensure that the gas that is injected into JGN's network meets a defined gas specification and is injected within the minimum and maximum gas pressure range for the relevant receipt point. For the STTM Sydney Hub, the expectation is that the STTM will manage gas balancing behaviours through financial incentives and penalties. JGN deems each country network section to be in balance.

2.1.3 USERS AND SERVICES

58. JGN's principal activity is to transport gas through its network to its Network Users' customers' premises. In the case of the STTM Sydney Hub, JGN transports gas that has been delivered into the STTM Sydney Hub (JGN's Wilton, Horsley Park, Albion Park, Rosalind Park or Port Kembla receipt points) to customers' premises. In JGN's country network sections, JGN transports gas that has been delivered to the relevant country network section receipt point to Network Users' customers' premises. JGN has contractual arrangements with Network Users to charge them for this transportation service. JGN also provides gas metering equipment at customers' premises and associated services to read the quantity of gas flowing through the gas meters. As part of its contractual arrangements with Network Users, JGN procures gas to replenish the difference between the measured quantities of gas entering and leaving the network, known as unaccounted for gas (**UAG**).

59. JGN also undertakes certain activities for Network Users that are ancillary to transportation services. JGN charges ancillary fees for these activities which include disconnection, decommissioning of supply and special meter reading.

60. As set out in the 2015 AA proposal and chapter 3 of this AAI, JGN will make available to Network Users:

- a single haulage reference service which provides for the transportation of gas through the network from one or more receipts points to a delivery point, including delivery point meter reading and user-requested ancillary activities related to the haulage service
- non-reference services:
  - the interconnection of embedded network service
  - negotiated services.

61. This represents a change to the services offered to users in the current AA period. As at December 2013, JGN provided haulage and meter data services through contracts to 11 users, eight of which are energy retailers[4], collectively supplying over 1.2 million customers. The other three users are end-users who contract directly with JGN for their haulage and meter data services.

2.1.4 CUSTOMERS

62. During 2012-13, JGN transported 58 petajoules (**PJ**) of gas to its 401 largest customers, who each consume more than 10 terajoules (**TJ**) per year. These large customers accounted for approximately 10 per cent of JGN's transportation revenue during the year. JGN transported 36 PJ of gas for Network Users who supplied

[4] While Origin Energy has acquired the energy retail business of Country Energy and TRUenergy has acquired the energy retail business of EnergyAustralia, these retailers are still recognised by JGN as separate users.

the remaining customers, being those that consume less than 10 TJ of gas per year, and this provided approximately 90 per cent of JGN's transportation revenue for the year.

63. The numbers of customers connected to the JGN network in 2012-13, and their gas consumption in that year, are set out in Table 2–1.

Table 2–1: Customers and load by region during 2012-13

Region	Customers who use 10 TJ or more per year		Customers who use less than 10 TJ per year	
	Number	Load (TJ)	Number	Load (TJ)
Sydney	284	30,675	890,231	27,275
Newcastle	57	19,186	121,526	3,075
Wollongong	15	4,012	63,283	1,459
Country	45	4,020	99,081	4,648
Total	**401**	**57,892**	**1,174,121**	**36,457**

(1) Gas loads in this table are not weather normalised. Customer numbers are as at 30 June 2013.

64. Residential gas usage is principally for home heating, water heating and cooking. Accordingly, demand levels are affected by the weather. Residential penetration of gas on line-of-main in NSW is around 60 per cent.

65. Commercial premises use natural gas principally for water heating, steam raising, cooking and other commercial applications.

66. Industrial customers use natural gas as a source of energy for production processes and, in some cases, as feedstock for fertiliser or petrochemical products.

2.2 REGULATION

67. Apart from the NGL and NGR, there are three principal regulatory regimes that apply to JGN and the JGN network.

2.2.1 RETICULATOR'S AUTHORISATION

68. JGN currently holds a reticulator's authorisation to operate the JGN network as required by the Gas Supply Act 1996 (NSW) (**Gas Supply Act**). The authorisation is subject to certain conditions, including that JGN must develop, adopt and comply with a Network Code[5]; maintain prudent insurances; and develop and maintain effective compliance management systems. JGN is also subject to the legal obligations that apply to reticulators under the Gas Supply Act and regulations made under the Gas Supply Act. Among other things, the Gas Supply Act requires that JGN be a member of the energy ombudsman scheme and of Dial Before You Dig NSW/ACT Incorporated. The Gas Supply (Safety and Network Management) Regulation 2013 (NSW) requires that JGN lodge, implement and periodically review a safety and operating plan to demonstrate sufficient management systems for safe operation of its gas distribution network.

[5] The Network Code sets minimum standards for the relationship between network operators and retailers. See http://www.jemena.com.au/operations/distribution/JGN/distributionNetworks/070502JemenaNetwork Code.pdf. As at June 2014, the NSW Department of Trade and Investment, Regional Infrastructure and Services is reviewing the ongoing operation of the Network Code in view of the significant overlap and some inconsistencies between the Network Code and provisions of the National Energy Retail Law and National Energy Retail Rules which commenced operation in NSW in transitional form on 1 July 2013.

69. Regulatory responsibility for the Gas Supply Act and regulations made under that Act rests with:

- IPART, in relation to the reticulator's authorisation
- the NSW Office of Fair Trading, in relation to the Gas Supply (Consumer Safety) Regulation 2012 (NSW), which requires that the supply of gas be metered, and specifies arrangements for testing meters both before they are installed and when they are in service
- the NSW Department of Trade and Investment, Regional Infrastructure and Services (**DTIRIS**) for all remaining aspects of the Gas Supply Act and regulations.

2.2.2 PIPELINE LICENCES

70. JGN holds five licences under the Pipelines Act 1967 (NSW) (**Pipelines Act**) for the following pipelines:

- Wilton to Horsley Park Natural Gas Pipeline (NSW: Pipeline Licence No 1)
- Wilton to Wollongong Natural Gas Pipeline (NSW: Pipeline Licence No 2)
- Horsley Park to Plumpton Natural Gas Pipeline (NSW: Pipeline Licence No 3)
- Plumpton to Killingworth Natural Gas Pipeline (NSW: Pipeline Licence No 7)
- Killingworth to Kooragang Island Gas Pipeline (NSW: Pipeline Licence No 8).

71. Under the Pipelines Regulation 2013 (NSW), JGN must, among other things, implement a pipeline management system in accordance with relevant provisions of AS2885. JGN must also lodge and implement a pipeline management plan that describes and forms part of the pipeline management system. JGN's pipeline management system and plan encompasses all five licensed pipelines.

72. DTIRIS administers the Pipelines Act and Regulation, including having regulatory responsibilities for licences granted under that Act.

73. The pipelines described above have been classified as distribution pipelines for purposes of regulation under the NGL and NGR.[6]

2.2.3 NATIONAL ENERGY CUSTOMER FRAMEWORK

74. The National Energy Retail Law (**NERL**) and National Energy Retail Rules (**NERR**) and associated amendments to the NGR[7]—together the NECF—commenced in NSW, in transitional form, on 1 July 2013. The NECF, which is administered by the AER, imposes a range of significant new obligations on gas distributors including JGN. In particular, under NECF JGN now has a direct contractual relationship with gas consumers as well as with Network Users. Other requirements relate to, among other things, the classification of customers, the provision of information to retailers and customers, billing requirements as between JGN and retailers, and the provision of connection services.

75. In recognition of the significant system changes that JGN must make to meet all requirements of the NECF, and the 2010 AA and associated contractual arrangements, implementation of certain provisions of the NECF was deferred in NSW until 1 July 2015. In particular, during the transitional period:

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6 The National Competition Council made a relevant reclassification decision in June 2009, see http://www.ncc.gov.au/index.php/application/jemena_gas_networks_nsw_limited

7 Principally new parts 12A and 21 in the NGR.

- retailers continue to operate as the interface between JGN and customers, exercising rights and discharging obligations under deemed customer contracts, on the customer's behalf
- connection applications may only be made to JGN by builders, plumbers or property developers, or retailers acting on behalf of customers (rather than customers applying directly to JGN, as is contemplated after the end of the NECF transitional period)
- Part 21 of the NGR—which deals with retail support obligations between distributors and retailers—does not apply.[8]

76. JGN must develop and implement a range of system and process changes in order to comply with full NECF requirements from 1 July 2015. JGN must also develop, among other things, basic and standard connection offer documentation to be approved by the AER, and ensure that all relevant documents, including the AA and the RSA, are consistent between themselves and with the applicable NGR and NECF requirements.

77. As a consequence of the commencement of full NECF, JGN expects a significant volume of enquiries and service requests to come directly from customers and potential customers from 1 July 2015. System and process changes will ensure that JGN can receive and respond to those requests in compliance with NECF requirements. The 2015 AA submission includes provision for the cost of the additional resources that JGN will require to manage those enquiries and service requests.

2.3 NETWORK OWNERSHIP CONTEXT

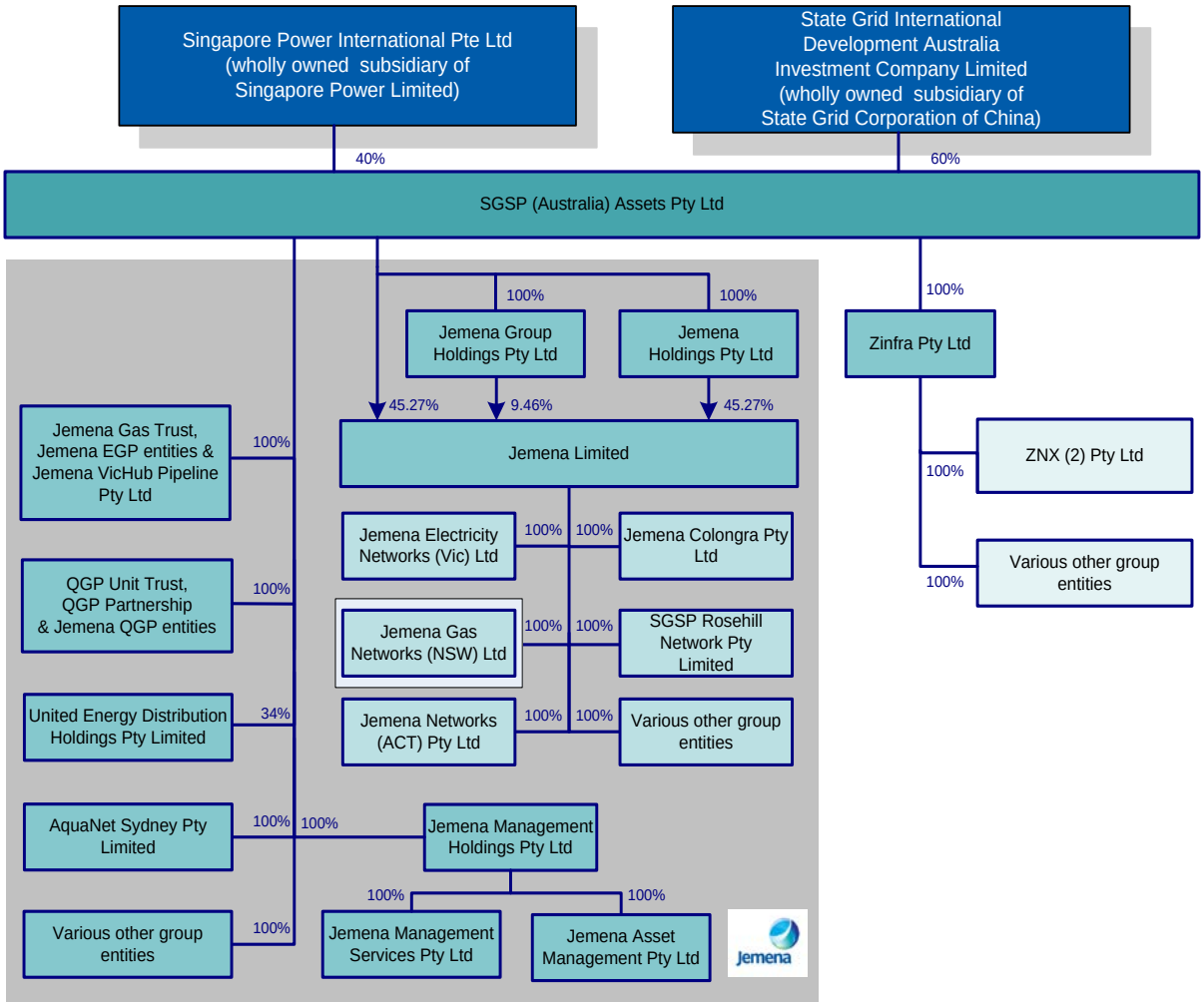
78. The JGN network is owned by JGN.[9] SGSP (Australia) Assets Pty Ltd (**SGSPAA**) indirectly owns 100 per cent of the shares in JGN. Singapore Power International owned 100 per cent of the shares in SGSPAA until January 2014 when State Grid Corporation of China acquired 60 per cent of those shares.[10] Figure 2–2 is a schematic diagram showing entities in the corporate structure of which JGN is a part.

8 NGR, Schedule 3, Part 1.

9 Past AA decisions and some statutory references still refer to JGN by its previous names: Alinta AGN Ltd, and AGL Gas Networks Limited.

10 Prior to completion of this transaction in January 2014, SGSPAA was named SPI (Australia) Assets Pty Ltd (SPIAA).

Figure 2–2: JGN ownership context



2.4 SERVICE PROVIDER

79. JGN is the sole covered pipeline service provider[11] in relation to the services that are the subject of the AA.

80. JGN is also the sole service provider[12] for the JGN network. Accordingly, JGN is not a local agent of, nor does it act on behalf of, another service provider of the JGN network.

2.5 ASSOCIATE CONTRACTS WHERE JGN IS THE SERVICE PROVIDER

81. JGN is party to one associate contract concerning an interconnection of embedded network agreement and the novation of certain contractual responsibilities of Delta Electricity under that agreement to Jemena Colongra Pty Ltd (ACN 127 533 519) (**Jemena Colongra**). The associate contract, titled the Interconnection Side Deed,

11 NGL s. 2.

12 NGL s. 8.

dated 25 March 2008, partially novates (from Delta Electricity to Jemena Colongra) the terms and conditions under which JGN agreed to design, construct, operate and maintain the delivery station for interconnection with the Jemena Colongra pipeline. This is an associate contract as defined in the NGL as Jemena Limited owns both JGN and Jemena Colongra.

2.6 NEW EXTERNAL FACTORS AFFECTING JGN'S BUSINESS

82. There are three key external factors that are affecting, or about to affect, JGN's operations and associated costs, and that JGN has taken into account when preparing its 2015 AA submission.

2.6.1 WHOLESALE GAS PRICES

83. There is significant upward pressure on wholesale gas prices in Eastern Australia. Long-term contracts for the supply of gas from the Cooper Basin and Gippsland Basin are coming to an end and gas producers already serving the Eastern Australian domestic gas market are able to access higher export prices via new liquefied natural gas (**LNG**) export facilities in Gladstone. This upward pressure has directly influenced the 2015 AA submission in the following respects:

- *demand forecasts*—JGN's demand forecasts reflect a continuation of the declining trend in average consumption per customer which will be exacerbated by the forecast increases in the wholesale price of gas flowing through to retail prices
- *price path*—JGN has structured its network price path to help mitigate the effects of expected increases in wholesale gas prices
- *marketing*—customers have expressed support for JGN's proposed marketing program, which is increasingly important to maintain network utilisation and keep gas competitive in NSW in an environment of rising retail prices.

2.6.2 ENERGY AND CLIMATE CHANGE POLICY

2.6.2.1 Renewable energy target scheme

84. The renewable energy target (**RET**) scheme "is designed to deliver on the Australian Government's commitment to ensure that the equivalent of at least 20 per cent of Australia's electricity comes from renewable sources by 2020"[13]. The term 'equivalent' is used to capture displacement technologies—such as solar water heaters and heat pumps—which are included in the RET scheme but do not generate electricity.

85. The RET scheme creates a demand for additional renewable energy by placing a legal obligation on entities that purchase wholesale electricity (mainly electricity retailers) to surrender a certain number of renewable energy certificates to the Clean Energy Regulator each year. Each certificate represents one megawatt hour of additional renewable energy for compliance purposes. Certificates are generated by accredited renewable energy power stations and eligible small-scale renewable technology systems.

86. Since 1 January 2011, the RET has operated as two schemes—the Large-scale Renewable Energy Target (**LRET**) and the Small-scale Renewable Energy Scheme (**SRES**). The LRET supports large-scale renewable energy projects, such as wind generators and commercial solar, by helping to bridge the cost between renewable and fossil-fuel generation. The SRES assists households, small businesses and community groups with the upfront cost of installing small-scale renewable technology systems and eligible displacement technologies.

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13 http://www.climatechange.gov.au/reducing-carbon/renewable-energy/renewable-energy-target accessed on 19 December, 2013.

87. The Australian Government is presently reviewing the RET scheme. Jemena has participated in the consultation process through industry associations. JGN considers:

- the inclusion of solar and heat pump water heaters as eligible sources for the purpose of the SRES, and the exclusion of gas alternatives creates a market distortion
- households and taxpayers are financially worse-off as the SRES-subsidised appliances are more expensive than gas hot water heaters, even with small-scale technology certificates subsidies
- the SRES has a sub-optimal impact on achieving the Government's greenhouse gas and environmental objectives because gas hot water systems are a source of least-cost greenhouse emissions abatement.

88. JGN has taken the operation of the RET scheme into account in developing its demand forecasts.

2.6.2.2 Direct Action Policy

89. The Australian Government has a stated intention to repeal the current carbon pricing obligations and other measures contained in the 'Clean Energy Future' legislation and implement a Direct Action (**DA**) policy in its place. The DA policy aims to provide financial incentives for a range of greenhouse reduction measures. Some aspects of the DA policy are in the early stages of formal consultation, while active consultation is yet to commence for other policy measures.

90. The DA policy's centrepiece $1.5B Emissions Reduction Fund (**ERF**) will provide financial incentives to a range of emissions reduction activities. The ERF includes funding provisions from the Australian Government's consolidated revenue of $300M, $500M and $750M in 2014-15, 2015-16 and 2016-17 respectively. The Government is currently consulting on the design of the ERF and it is too early to determine the impact, positive or negative, on gas demand. The Government also intends to commence consultation during 2015 on the design of longer-term emissions reduction policy settings to be put in place after the ERF closes in 2017.

91. The level of carbon policy uncertainty, and JGN's inability to manage this risk, has been taken into account in the proposed:

- reference tariff variation mechanism (carbon cost adjustment factor) and definition of the regulatory change cost pass through event
- allocation of carbon costs in forecast operating expenditure (**opex**).

2.6.2.3 National hot water strategic framework

92. The Standing Council on Energy and Resources (**SCER**), now the Council of Australian Governments Energy Council, has responsibility for the national hot water strategic framework to guide the reduction of greenhouse gas emissions associated with water heating. It specifies minimum energy performance standards for water heaters and phasing out of conventional electric resistance water heaters, except where the emissions intensity of the public electricity supply is low, together with a range of information and education measures.

93. The phase-out of conventional electric resistance water heaters was intended to cover all new homes and established homes in gas reticulated areas from 2010, and new flats and apartments in gas reticulated areas and established homes in gas non-reticulated areas from 2012. However, the NSW Government subsequently announced on 30 November 2012, a reversal in its plan to ban electric hot water systems. The policy reversal was due to concerns that customers who do not have access to reticulated gas would be forced into buying expensive new hot water systems.

94. As a result of the policy reversal, JGN's new connection and gas consumption forecasts are lower than they would otherwise be.

95. Jemena will continue to engage with the NSW Government to explore ways to deliver on the intent of the national hot water strategic framework.

2.6.3 NATIONAL ENERGY CUSTOMER FRAMEWORK

96. As noted in section 2.2.3, NECF has commenced in NSW in transitional form. Full NECF commences from 1 July 2015. The transition to full NECF has influenced the 2015 AA submission in two key ways:

- JGN has proposed NECF-driven amendments to the 2010 AA, including the RSA
- investment is necessary to implement system and process changes to transition to full NECF.

3. PIPELINE SERVICES

Box 3–1 Key messages – pipeline services

Our customers and stakeholders are seeking greater simplification and harmonisation of our service offerings, including our tariffs and charges. As a result JGN is proposing to offer a single reference service—the haulage reference service—over the 2015-20 AA period. The proposed haulage reference service can be provided under a demand tariff or volume tariff.

JGN is also proposing to simplify its disconnection activities. This involves providing a single disconnection activity as part of the haulage reference service.

Simplifying our reference services will:

- facilitate simplification of our reference tariffs and charge components (including our disconnection charges)
- harmonise with the approach approved by the AER for other gas distribution businesses
- help make it easier for market participants to understand our tariffs and charges and compare retail offers.

JGN's TSS outlines how JGN proposes to structure its proposed haulage reference service tariffs and charges, the basis of the charges, and how these will change over the next AA period.

97. This chapter describes the pipeline services to be provided by JGN over the 2015-20 AA period.

98. The pipeline services include a reference service, which is a service that is likely to be sought by a significant part of the market, and is governed by a standard set of terms and conditions in the AA. The pipeline services also include non-reference services, which are negotiated on a case by case basis and with reference to relevant AA schedules (including reference tariffs and charges in the reference tariff schedule (**RTS**)). This chapter is structured as follows:

- section 3.1 summarises JGN's pipeline services
- section 3.2 sets out the proposed reference service
- section 3.3 sets out the non-reference services

3.1 SUMMARY

99. JGN's proposed reference service for the 2015-20 AA period is the haulage reference service which includes transportation of gas through the network to a delivery point on behalf of a Network User, including meter reading, installation and maintenance of metering equipment and other user-requested ancillary activities related to the haulage service.

100. JGN's non-reference services are:

- the interconnection of embedded network service
- negotiated services.

3.2 REFERENCE SERVICES

101. JGN currently provides the following reference services:

- *haulage service*—a service for transportation of gas by JGN through its network to a single eligible delivery point for the use of a single customer
- *meter data service*—a service for the provision of meter reading and on-site data and communication equipment to a delivery point.

102. JGN currently charges fees for ancillary reference activities that may be requested by a significant part of the market, with those fees sitting within the haulage and meter data services.

103. The reference services are provided on the terms and conditions of the standard RSA as set out in schedule 3 of the 2010 AA. These services are presently utilised by the market for transportation services to all but a small number of the 1.2 million delivery points currently connected to the JGN network.

104. In response to customer and stakeholder feedback seeking greater simplification and harmonisation of our services, tariffs and charges, JGN is proposing to offer a single reference service—the haulage reference service—over the 2015-20 AA period.

105. The proposed haulage reference service includes:

- receiving gas injected from a different gas pipeline or other gas facility (the point of injection being referred to as a receipt point)
- haulage (or transportation) of gas from a receipt point to an eligible delivery point
- allowing the withdrawal of gas at an eligible delivery point
- meter reading and associated data services, and the provision and maintenance of a standard metering installation
- other user-requested ancillary activities:
  - *special meter reads*—meter reading for a delivery point that is in addition to the scheduled meter reading
  - *disconnections*—disconnection to prevent the withdrawal of gas at the delivery point. The specific method of disconnection is at the discretion of JGN
  - *temporary disconnections*—temporary disconnection to prevent the withdrawal of gas at the delivery point for large customers only (customers that consume > 1 TJ p.a.)
  - *decommissioning and meter removals*—removal of a meter and the permanent decommissioning of a network connection. The specific method of disconnection is at the discretion of JGN
  - *hourly charge for non-standard user requests*—collation of information and provision of a response to a user or prospective user in relation to non-standard requests and queries.

106. JGN considers that the haulage reference service will be sought by a significant part of the market over the 2015-20 AA period. As such, JGN proposes that the service be provided from 1 July 2015, but with a minor change in service classification from that which applies under the 2010 AA to reflect customer and stakeholder feedback.

107. The proposed haulage reference service can be provided to delivery points assigned to reference tariffs in the demand tariff or volume tariff customer groups.

108. JGN is proposing the inclusion of ancillary activities that were previously related to the meter data service—including the provision and maintenance of additional equipment required for daily meter reading of demand customers—within the haulage reference service, in line with the services proposed by Envestra (Victoria), and approved by the AER.[14] The meter data service is currently provided as a bundled service because the meter reading and data process is required to enable billing for the haulage reference service.

109. JGN considers that simplifying our reference services will:

- reduce the number of individual reference tariffs and charge components. Currently JGN has three fixed charge components in tariffs for volume market customers which we are proposing to consolidate into a single fixed charge component per customer class. JGN's customer and stakeholder engagement has indicated support for this consolidation (refer appendix 1.4)
- harmonise with the approach approved by the AER for other gas distribution businesses.[15]

110. Chapter 13 and JGN's TSS (appendix 1.8) outlines the structure of the proposed ancillary charges, the basis of the charges, and how they will change over the 2015-20 AA period.

111. JGN is proposing to expand the availability of the haulage reference service to include transportation to energy intermediaries[16] who then on-sell or on-supply energy to individual end customers. The extension of the haulage reference service is effected through changes to the tariff classes and assignment criteria (see chapter 13) including:

- a new volume tariff for boundary metered delivery points where gas is used to on-supply energy to multiple residential and business customers at a site
- clarification of tariff assignment for business precincts supplied with energy from gas-fired cogeneration
- a new volume tariff to promote the development of large scale residential gas-fired cogeneration precincts.

112. JGN considers that expanding the availability of the haulage reference service and reference tariffs in this way will:

- encourage the development of innovative energy technologies (such as cogeneration) and retail energy services, by providing certainty our services, tariffs and charges to energy intermediaries
- provide additional choice to owners within, and developers of, medium-density developments between:
  - the current NSW market model for residential centralised gas hot water where each resident's gas and hot water consumption is individually metered and then totalled by JGN, providing the benefit of individual billing for each customer, access to the competitive retail gas market and access to energy consumer protection frameworks

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14 AER, *Access arrangement final decision – Envestra Limited 2013-17*, March 2013.

15 Envestra (Victoria) proposed two reference services: a volume haulage service and a demand haulage service (Envestra, *Access arrangement proposal*, 30 March 2012, p. 5). The AER approved these reference services subject to amendments related to access to these services: AER, *Access Arrangement draft decision: Envestra Ltd 2013–17, Part 2,* September 2012*,* pp.3-4.

16 JGN considers an intermediary to be a customer at a single delivery point which then supplies this gas—or energy from this gas—to end customers at the premises served beyond the relevant delivery point. Recent technological and commercial developments mean some residential and business customers may be supplied gas, hot water, and potentially electricity services through 'energy intermediaries' or 'aggregators', rather than receiving services direct from our network. Under these arrangements it may no longer be JGN's role to deliver the existing services to those customers, rather many of the core responsibilities for supplying these residential and business customers would rest with the intermediary.

  - an alternative where JGN delivers gas to a single meter at the boundary and an intermediary (the customer at the boundary gas meter) is responsible for gas and/or hot water supply to the individual end customers at the site[17]

- have regard to the exempt seller regime under Part 9 of the NERR.

113. JGN is also proposing to simplify its disconnection activities for small customers. This involves providing a single disconnection activity—that combines aspects of the current temporary and permanent disconnection services—as part of the haulage reference service (see refer section 13.2.5). This change is consistent with the contractual customer framework under NECF which does not differentiate between temporary and permanent disconnection, and which contemplates that a small customer's contractual obligations to the network under the deemed standard connection contract will terminate when disconnected. Simplifying our tariffs and charges is also consistent with the feedback from our customer and stakeholder engagement to facilitate customer and stakeholder understanding of our charges and improved participation in the energy market (refer appendix 1.4).

114. JGN considers that simplifying our reference services is consistent with the pricing principles that JGN has consulted on with its customers and stakeholders (as outlined in JGN's TSS in appendix 1.8) and promotes the long-term interests of its customers. Reducing barriers to customer participation in the energy market and the economic risks of under-utilisation of the JGN is consistent with the revenue and pricing principles set out in the NGL.[18]

3.3 NON-REFERENCE SERVICES

115. In certain cases, a user or prospective user may require pipeline services that are different from the reference services, which are referred to as non-reference services. JGN will negotiate a price, and terms and conditions, for each service on a case-by-case basis, where the price will depend on the specific conditions attached to the provision of the service as requested by the user.

116. In addition to reference services, JGN currently offers the following non-reference services:

- the interconnection of embedded network service
- negotiated services.

117. JGN is not proposing to change these non-reference services for the 2015-20 AA period.

[17] For more information, refer to JGN Customer Council, Fact Sheet – The customer experience and Gas supply from energy intermediaries, 5 December 2013.

http://jemena.com.au/Gas/Customer-Engagement-and-Price-Review/Engaging-with-the-community.aspx

[18] NGL, s24(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.

4. CURRENT PERIOD PERFORMANCE

Box 4–1 Key messages – current period performance

In the current AA period JGN managed its network efficiently and effectively, as demonstrated by sound network performance outcomes for customers and delivery of significantly enhanced capital and operating investment programs. Over the current AA period:

- JGN had increased customer numbers but experienced declining loads:
  - there are a range of factors contributing to the decline in average consumption per customer, including warmer weather, uptake of reverse cycle air-conditioners, government policy (including incentives for solar hot water take-up, and energy efficiency) and increased appliance efficiency
  - the increase in customer numbers was underpinned by new dwellings in new estates and in higher-density developments
- JGN expects to incur opex of $802.2M, which is an underspend of 3.4 per cent when accounting for the fact that our opex allowance did not include a forecast for carbon costs
- JGN expects to have invested $957.9M in capital expenditure, which is 8.7 per cent higher than the amount the AER allowed, primarily due to unexpected expenditure on property and IT systems in 2014-15.

Economic Insights—independent economic experts—reviewed JGN's opex cost efficiency performance and found JGN to be among the most efficient gas distribution businesses in its peer group.

118. This chapter examines JGN's performance during the current AA period in the areas of demand, energy consumption and customer numbers, opex, capital expenditure (**capex**), and key performance indicators (**KPI**).

119. This chapter is structured as follows:

- section 4.1 provides a summary of JGN's performance in the current AA period
- section 4.2 discusses JGN's demand, energy and customer numbers performance in the current AA period
- section 4.3 considers JGN's opex performance
- section 4.4 considers JGN's capex performance
- section 4.5 describes what benefits customers receive from JGN's forecast delivery of services and sets out JGN's performance in terms of KPIs
- section 4.6 describes JGN's productivity performance.

4.1 SUMMARY

120. In the current AA period JGN managed its network effectively, as demonstrated by sound network performance outcomes for customers and delivery of significantly enhanced capital and operating investment programs. Over the current AA period JGN:

- had increased customer numbers but declining loads

  - there are a range of factors contributing to the decline in average consumption per customer, including warmer weather, uptake of reverse cycle air-conditioners, government policy (including incentives for solar hot water take-up, and energy efficiency) and increased appliance efficiency
  - the increase in customer numbers was underpinned by new dwellings in new estates and in higher-density developments
- expects to incur $802.2M in opex, which is an underspend of 3.4 per cent when accounting for the fact that our opex allowance did not include a forecast for carbon costs
- expects to incur $957.9M in capex, which is 8.7 per cent higher than the amount the AER allowed, primarily due to unexpected expenditure on property and IT systems in 2014-15.

4.2 CUSTOMER NUMBERS, DEMAND AND VOLUME

121. Table 4–1 to Table 4–4 show JGN's outcomes over the current AA period in relation to customer numbers, maximum, minimum and average demand, and total gas load (volume). Maximum daily quantity (**MDQ**) for large customers (annual consumption greater than or equal to 10 TJ) is also shown. JGN engaged demand forecasting expert Core Energy Group (**Core Energy**) to prepare its demand forecasts (refer chapter 5 and appendix 5.1). Customer numbers by tariff classes for the current and next AA periods are provided in appendix 5.4.

122. These volume and customer number outcomes are supported by JGN's marketing program, which promotes new connections to lower average network prices.

Table 4–1: 2010 AA forecast customer numbers compared with actuals and JGN's currently estimated and forecast outcomes

		2010-11	2011-12	2012-13	2013-14	2014-15
Residential	2010 AA	1,082,658	1,115,918	1,148,907	1,189,233	1,233,758
	Actual/Estimate	1,096,101	1,124,125	1,160,022	1,185,901	1,214,680
Small business	2010 AA	30,496	30,961	31,082	30,911	31,045
	Actual/Estimate	14,064	15,188	14,099	16,244	16,551
Total volume customers	**2010 AA**	**1,113,154**	**1,146,879**	**1,179,989**	**1,220,144**	**1,264,802**
	Actual/Estimate	**1,110,165**	**1,139,313**	**1,174,121**	**1,202,145**	**1,231,231**
Demand customers	2010 AA	412	412	410	409	409
	Actual/Estimate	401	398	401	380	378
Total customers	**2010 AA**	**1,113,567**	**1,147,291**	**1,180,399**	**1,220,553**	**1,265,211**
	Actual/Estimate	**1,110,566**	**1,139,711**	**1,174,522**	**1,202,525**	**1,231,609**

(1) JGN figures are actuals to 2012-13, estimates for 2013-14, and forecast for 2014-15.

123. From around 1.1 million customers in 2010-11, the number of customers in the volume market reached more than 1.2 million customers in 2014. This represents more than 30,000 new customers annually on average over this period, which is below the customer number growth forecast by the AER. The increase in customer numbers is underpinned by new dwellings in new estates and in medium/high-density developments.

124. JGN expects a decline in demand market customer numbers over 2013-14 and 2014-15 as some customers close down operations due to deterioration in the competitiveness of the industrial segments of the NSW economy.

Table 4–2: Minimum, maximum and average daily load total JGN network 2010-11 to 2012-13 (TJ)

	2010-11	2011-12	2012-13
	actual	actual	actual
Minimum load	156.27	126.44	157.78
Maximum load(1)	416.20	382.78	385.62
Average daily load	274.44	248.30	258.49

(1) The maximum daily load is determined by aggregating total gas receipts on the maximum peak day for any given regulatory year. Maximum daily loads provided in RY11 (410TJ), RY12 (377TJ) and RY13 (376TJ) regulatory information notices were understated due to a combination of inconsistent calculation methods and selecting the incorrect maximum peak day.

(2) JGN does not have available forecasts of maximum and minimum total system wide demand nor forecasts or actuals for 2013-14 and 2014-15 at 30 June 2014, which is why the above table provides historical actuals only.

(3) Average daily gas loads derived from totals in Table 4–4.

125. JGN's average daily load has fluctuated between 2010-11 and 2012-13. However, maximum load has declined from 416.2 TJ in 2010-11 to 385.6 TJ in 2012-13. JGN expects average daily load to decline for volume customers over 2013-14 and 2014-15 (refer Table 4–3).

126. There are a range of factors contributing to the decline in average consumption per customer, including warmer weather, the closure of business customers, uptake of reverse cycle air-conditioners, government policy (including incentives for solar hot water take-up, and energy efficiency) and increased appliance efficiency. This is particularly evident for newer customers that typically have fewer appliances per dwelling and more efficient appliances. A new residential customer connected in 2013-14 in a medium-density dwelling will typically consume 15.25 GJ per year, which is 0.46 GJ less than the average for the existing residential customer base.

Table 4–3: Average daily gas load - volume and demand customers and MDQ for demand customers for current AA period (TJ)

	2010-11	2011-12	2012-13	2013-14	2014-15
	actual	actual	actual	estimate	forecast
Volume customers	97.37	100.70	99.88	98.73	96.69
Demand customers	177.07	147.60	158.61	145.60	126.84
Total average daily load	274.44	248.30	258.49	244.33	223.53
Demand market CD	333.49	336.25	308.23	291.58	263.89

(1) Gas loads for 2013-14 and 2014-15 are Core Energy weather-normalised forecasts.

(2) Average daily gas loads are derived from totals in Table 4–4**.**

(3) Demand customer MDQ is chargeable demand (**CD**).

127. JGN expects the volume market load to slightly decline over 2013-14 and 2014-15, while the demand market load is expected to decline significantly over 2014-15. This is driving total load to decline from 100.2 TJ in 2010-11 to 81.6 TJ in 2014-15 (refer Table 4–4).

Table 4–4: Gas load by customer type and tariff for current AA period (TJ)

Service	2010-11	2011-12	2012-13	2013-14	2014-15
	actual	actual	actual	estimate	forecast
Residential	28,195	28,804	28,606	28,152	27,594
Small business	7,345	8,051	7,851	7,882	7,698
Total volume customers	**35,540**	**36,855**	**36,457**	**36,035**	**35,292**

Service	2010-11	2011-12	2012-13	2013-14	2014-15
Total demand customers	64,629	54,022	57,892	53,144	46,297
Total load all customers	**100,169**	**90,877**	**94,349**	**89,179**	**81,589**

(1) Gas loads for 2013-14 and 2014-15 are Core Energy weather-normalised forecasts.

(2) Volume customers' split into residential and small business for 2011-11 to 2012-13 is based on Core Energy classification of weather-normalised actuals.

Table 4–5: Forecasts of total gas load compared with actual (TJ)

Forecast	2010-11	2011-12	2012-13	2013-14
AER 2010 final decision	100,637	101,878	100,958	98,856
JGN's AA submission – August 2009	96,025	96,629	95,757	96,838
Actuals to 2012-13 plus estimate 2013-14	100,169	90,877	94,349	89,179

(1) Gas load for 2013-14 is Core Energy weather-normalised forecast.

(2) Actual and forecast total gas load derived from totals in Table 4–4.

128. JGN notes that the total customer load over the current AA period is closer to the forecasts JGN submitted to the AER in 2009 than it is to the AER 2010 final decision (refer Table 4–5). Although the volume customer load is above the AER's 2010 final decision by 4 PJ (2 per cent) over the current AA period, this is more than offset by the shortfall in demand customer load which is below the AER 2010 final decision by 51 PJ, or 16 per cent (refer Table 4–6).

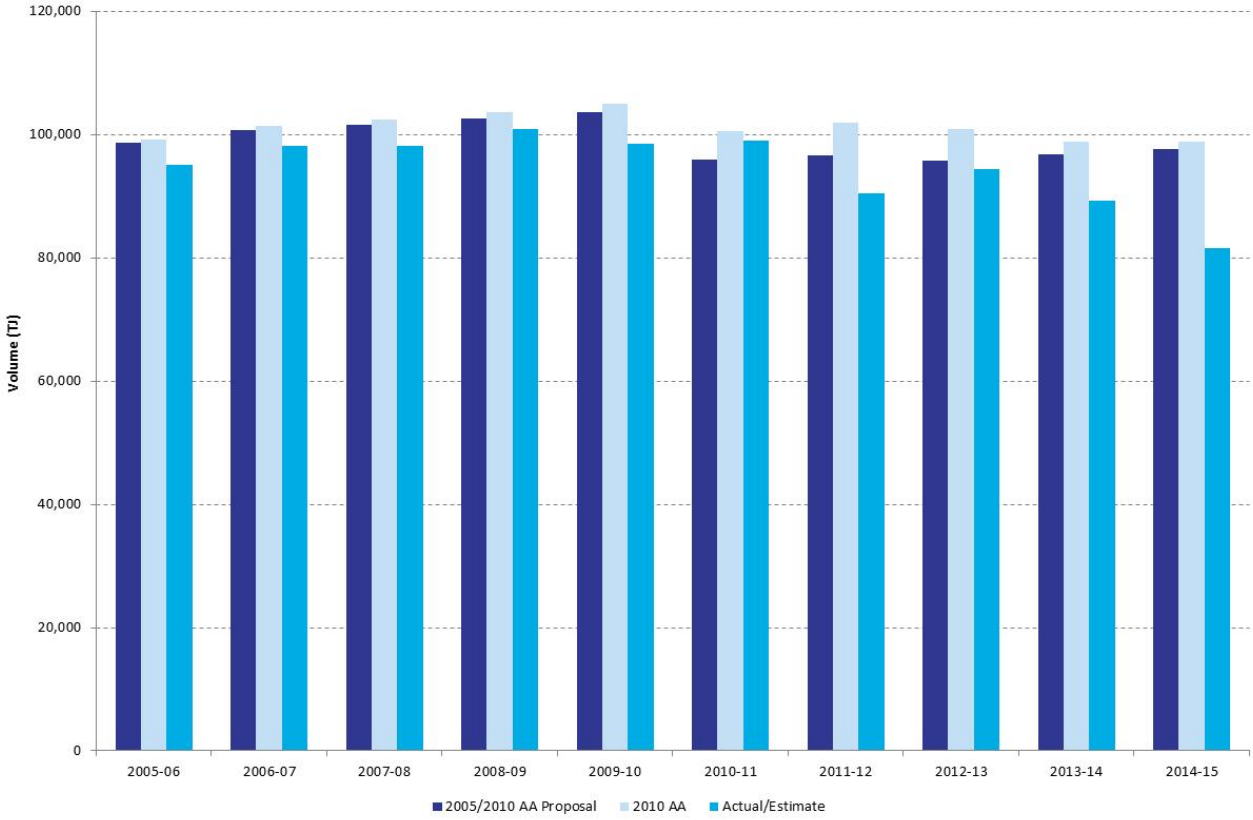
Table 4–6: Forecast of customers' gas load compared with actual and current estimates (TJ)

		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
Volume customers gas load	2005/2010 AA Proposal	33,592	34,429	35,273	36,122	36,979	32,435	32,480	33,187	34,010	34,769	343,276
	2005/2010 AA Decision	34,107	35,135	36,202	37,325	38,469	34,701	34,695	35,429	35,171	35,171	356,405
	Actual/ Estimate	31,653	32,644	33,471	34,470	33,709	35,066	36,459	36,507	36,035	35,292	345,307
Demand customers gas load	2005/2010 AA Proposal	65,097	66,340	66,287	66,439	66,695	63,590	64,149	62,570	62,829	62,933	646,929
	2005/2010 AA Decision	65,000	66,238	66,230	66,369	66,608	65,936	67,183	65,529	63,685	63,685	656,463
	Actual/ Estimate	63,376	65,503	64,622	66,412	64,735	64,021	54,030	57,949	53,144	46,297	600,090
Total gas load	2005/2010 AA Proposal	98,689	100,769	101,560	102,561	103,674	96,025	96,629	95,757	96,839	97,702	990,205
	2005/2010 AA Decision	99,107	101,373	102,432	103,694	105,077	100,637	101,878	100,958	98,856	98,856	1,012,868
	Actual/ Estimate	95,029	98,147	98,093	100,882	98,444	99,087	90,489	94,457	89,179	81,589	945,397

(1) Gas loads for 2010-11 to 2012-13 and 2013-14 to 2014-15 are Core Energy weather-normalised actuals and forecasts, respectively.

129. JGN's experience in the last AA review shows how important policy measures can be in their impact on gas load, and how necessary it is to factor them into demand forecasts. Policy measures will influence consumer behaviour and fuel preferences. Failure to give appropriate recognition to all significant market factors and policy measures can result in inaccurate forecasts, effectively denying the service provider a reasonable opportunity to recover at least its efficient costs. Figure 4–1 shows that actual and estimated total customer loads from 2005-06 to 2014-15 are closer to the forecasts JGN proposed in December 2003 and August 2009 than they are to the AER 2010 final decision.

Figure 4–1: Forecast of customers' gas loads compared with AER 2010 final decision and actual and current estimates (TJ)

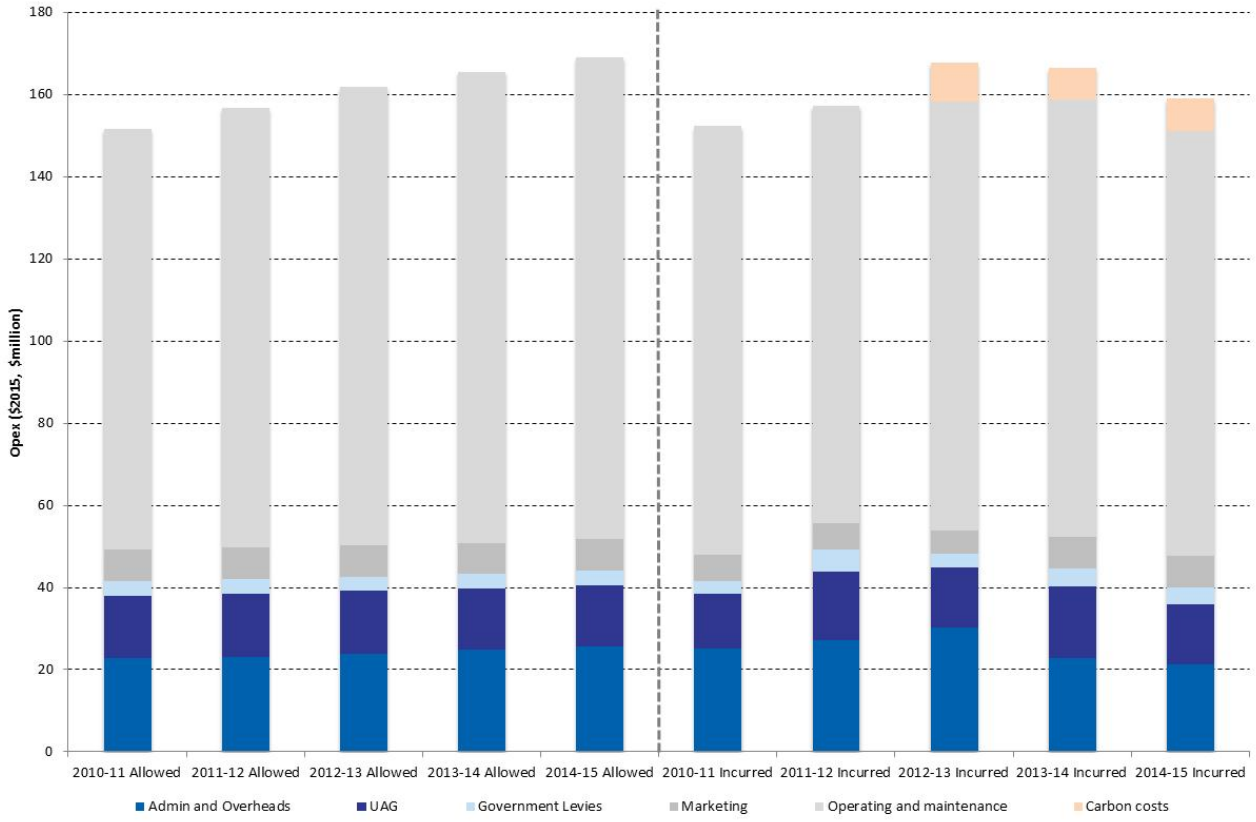


4.3 OPERATING EXPENDITURE

130. Figure 4–2 shows the AER's opex allowance for JGN for the current AA period in the categories that the AER specified. At a total level, JGN expects to incur $802.2M of opex over the current AA period, which is $2.3M (or 0.3 per cent) below the allowance of $804.5M and $39.4M (or 4.7 per cent) below the $841.6M proposed by JGN.

131. However, it is pertinent to note that the AER approved JGN's opex forecasts on the premise that carbon costs would be a cost pass through event over the current AA period. JGN expects to spend $24.9M over 2012-13 to 2014-15 on carbon costs and $38.0M over the current AA period on disallowed corporate overheads. If carbon costs and the disallowed corporate overheads were excluded from the comparison, JGN's opex would be $739.3M, or 8.1 per cent below that allowed by the AER.

Figure 4–2: JGN historical opex ($2015)



132. JGN notes that rule 72(1)(a)(ii) requires the AAI to provide actual opex by category over the current AA period. JGN presents its historical opex in this manner in Table 4–7, with a comparison against the AER approved costs. Analysis of variances between allowed and actual opex is set out in Table 4–8.

Table 4–7: Allowed opex compared with actuals and JGN's currently estimated and forecast outcomes ($millions, $2015)

		Actual	Actual	Actual	Estimate	Forecast	Total
		2010-11	2011-12	2012-13	2013-14	2014-15	2011-15
Operating and maintenance	2010 AA	102.54	107.09	111.52	114.65	117.29	553.08
	Actual/Estimate	104.23	101.56	104.35	106.47	103.48	520.09
Administration and overheads	2010 AA	21.19	21.60	22.33	23.22	24.00	112.34
	Actual/Estimate	24.98	27.17	30.10	22.77	21.12	126.14
Marketing	2010 AA	7.66	7.66	7.66	7.66	7.66	38.28
	Actual/Estimate	6.54	6.42	5.74	7.66	7.56	33.91
Government levies	2010 AA	3.50	3.50	3.50	3.50	3.50	17.50
	Actual/Estimate	3.14	5.35	3.36	4.21	4.21	20.28
UAG	2010 AA	15.29	15.37	15.18	14.89	14.94	75.67
	Actual/Estimate	13.31	16.65	14.70	17.49	14.71	76.86
Carbon	2010 AA	0.00	0.00	0.00	0.00	0.00	0.00

		Actual	Actual	Actual	Estimate	Forecast	Total
	Actual/Estimate	0.00	0.00	9.36	7.75	7.76	24.87
Debt raising costs	2010 AA	1.45	1.50	1.53	1.56	1.59	7.62
	Actual/Estimate	0.00	0.00	0.00	0.00	0.00	0.00
Total non-capital costs excl. pass throughs	2010 AA	131.38	136.34	141.50	145.53	148.95	703.70
	Actual/Estimate	135.74	135.15	140.19	136.90	132.16	680.14
Efficiencies achieved (per cent)		-3.32	0.87	0.93	5.93	11.27	3.35
Total non-capital costs	2010 AA	151.63	156.71	161.71	165.47	168.98	804.50
	Actual/Estimate	152.19	157.16	167.61	166.35	158.84	802.15
Efficiencies achieved (per cent)		-0.37	-0.29	-3.65	-0.54	6.00	0.29

(1) Amounts allowed are adapted from the 2010 AA forecast data model, "Appendix 9.8 JGN forecast data model (Merits review) v2AER".
(2) Amounts incurred include debt raising costs and are JGN's actuals to 2012-13, and its estimate for 2013-14 and its forecast for 2014-15.
(3) O&M costs include pigging costs, integrity digs, ad-hoc mains and services renewal that the AER treated as opex instead of capex.

Table 4–8: Analysis of variance between allowed and actual opex 2010-11 to 2012-13

Opex category	Analysis of variance
Operating and maintenance (O&M)	Underspend due to: • lower IT costs attributed to savings from IT service providers in RY13 • delays in the delivery of the integrity dig program • organisational changes[19] which meant that JGN no longer pays a margin in respect of services received under the Asset Management Agreement (**AMA**) with Jemena Asset Management Pty Ltd (**JAM**).
Administration and overheads (A&O)	Overspend due to inclusion of enterprise support function (**ESF**) costs that were excluded in the AER approved forecast.
Marketing	Underspend due to: • recycling of high profile advertising components such as TV commercials and efficiency gains via media purchasing programs • NSW Government's reversal of phase out of emission intensive hot water heaters, which halted the progress of JGN initiatives and led to an underspend in marketing programs, including reduced incentive payments.
Government levies	Overspend due to: • the difficulty for JGN to accurately predict government levies for the current AA period • a review of mains tax valuations result in an expense adjustment during 2011-12 to recognise actual government levies incurred.

[19] In April 2012, a new operating structure was introduced as part of the restructure of the SPIAA Group, to form a separate assets business (called "Jemena") and a services business (called "Zinfra"). Further information is provided in appendices 4.1 and 4.2. Costing drivers of the Jemena assets business were updated during the current AA period to recognise the separation. At the same time, Jemena implemented a new SAP system replacing two out-dated legacy systems with a single business-wide system with enhanced capabilities.

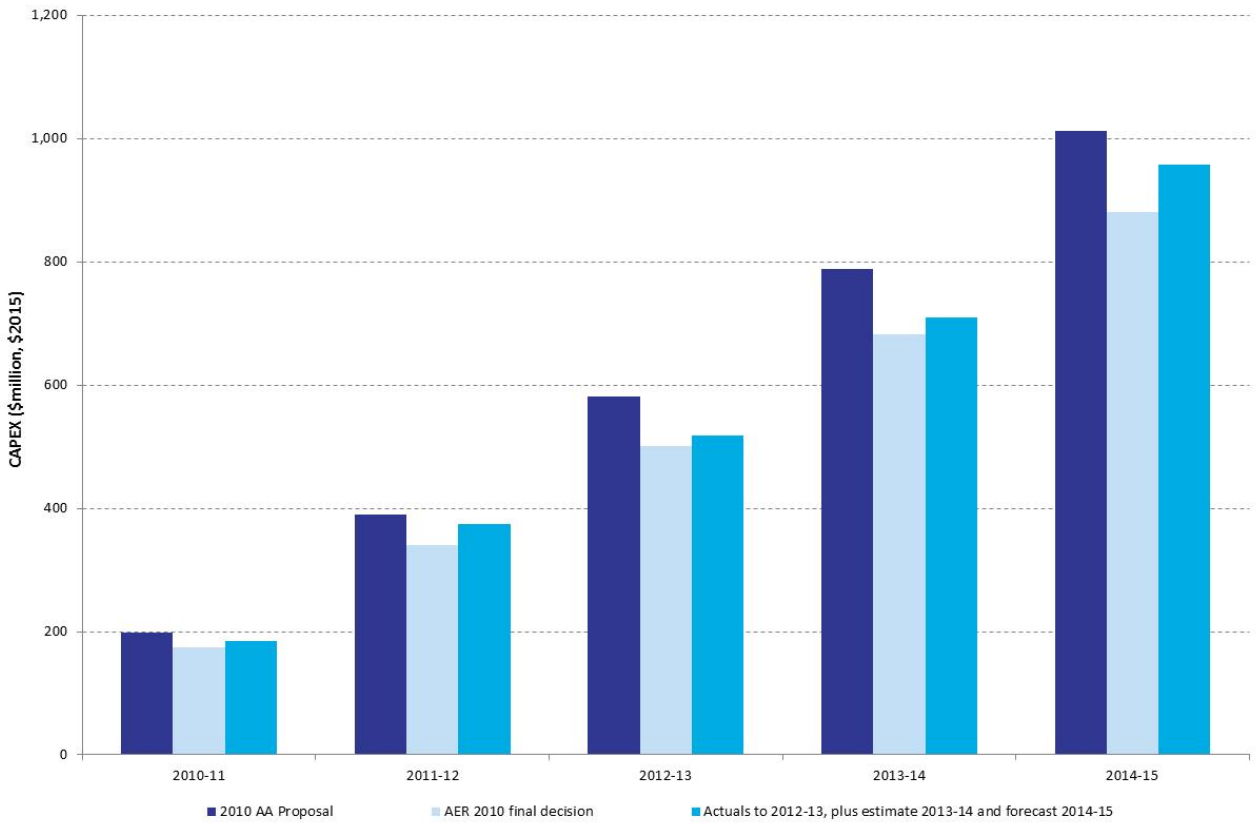
Opex category	Analysis of variance
UAG	Overspend in 2011-12 mainly due to volume forecast error and variation in wholesale gas prices, both of which are outside JGN's control and for which there are pass through arrangements in place.
Carbon	Overspend due to the AER not providing an allowance for carbon costs.

4.4 CAPITAL EXPENDITURE

133. As shown in Table 4–9, JGN expects to incur capex over the current AA period of $957.9M, which is $76.4M (8.7 per cent) above that allowed by the AER but $55.5M (5.5 per cent) below that proposed by JGN. Capex broken down by asset classes for the current and next AA periods are provided in JGN's forecast revenue model (refer appendix 12.1).

134. Figure 4–3 illustrates JGN's capex compared to the allowance from the AER 2010 final decision.

Figure 4–3: Comparison of JGN's cumulative actual capex to allowance ($2015, $millions)



135. JGN's capex is split into the following categories:

- *market expansion*—new assets required for the connection of new customers, including new mains, services and meters
- *system reinforcement*—enhancements to the system to maintain capacity for existing customers and provide capacity for future market expansion activities, including renewal and upgrade of assets that are reaching the end of their lives such as mains and services rehabilitation and aged meters

- *non-system assets*—IT systems and software, motor vehicles, plant and equipment which are not part of the network**.**

136. JGN considers that its capex during the current AA period satisfies the conforming capital test under rule 79. These projects and programs have been managed under JGN's robust capital governance and project management framework, which have been positively assessed by Jacobs SKM (**SKM**) (refer appendix 6.5).

137. JGN has used this actual capex to establish the opening regulatory asset base (**RAB**) for the next AA period as explained in chapter 8.

Table 4–9: Allowed capital costs compared with actuals and JGN's currently estimated and forecast outcomes ($2015, $millions)

Cost category		Actual 2010-11	Actual 2011-12	Actual 2012-13	Estimate 2013-14	Forecast 2014-15	Total
Market expansion	2010 AA Proposal	74.03	86.50	92.39	87.96	83.85	424.73
	2010 AA	65.76	76.33	78.41	91.57	100.22	412.29
	Actual/Estimate	64.27	70.69	80.64	94.94	89.56	400.11
System reinforcement / renewal / replacement	2010 AA Proposal	94.63	81.77	78.97	80.06	100.72	436.15
	2010 AA	80.72	70.89	64.31	55.87	62.02	333.82
	Actual/Estimate	71.95	86.12	43.35	55.75	73.20	330.38
IT and other non-system	2010 AA Proposal	29.46	23.04	20.76	39.14	40.07	152.47
	2010 AA	27.76	18.98	17.42	35.04	36.08	135.27
	Actual/Estimate	49.26	32.29	19.26	40.32	86.23	227.38
Total capital costs	2010 AA Proposal	198.12	191.31	192.12	207.16	224.64	1,013.35
	2010 AA	174.24	166.20	160.14	182.48	198.32	881.38
	Actual/Estimate	185.48	189.11	143.26	191.02	248.99	957.87
Variance to 2010 AA (per cent)		6.46	13.79	-10.54	4.68	25.55	8.68

(1) Amounts allowed are adapted from the 2010 AA forecast data model, "Appendix 9.8 JGN forecast data model (Merits review) v2AER".
(2) Amounts incurred are JGN's actuals to 2012-13, estimates for 2013-14, and forecast for 2014-15.
(3) Excludes pigging costs, integrity digs, ad-hoc mains and services renewal AER treated as opex instead of capex.

138. JGN's response to the AA RIN provides further disaggregation of current AA period capex.

139. Table 4–10 explains the variation between JGN's actual capex to that allowed by the AER for each program over 2010-11 to 2012-13.

Table 4–10: Analysis of variance between allowed and actual capex over 2010-11 to 2012-13

Capex category	Analysis of variance
Market expansion	RY12 underspend due to lower expenditure on meters, primarily due to lower than forecast market expansion connection volumes and lower industrial & commercial meter average costs.
System reinforcement/renewal/ replacement	RY11 underspend due to early project initiation and lower overall total project cost of over life of "Replacement of 106 Meter Regulators" project. RY12 overspend due to some fixed plant projects costing more than allowed. RY13 underspend due to: • replacement timing of, and/or lower volumes of, tariff meters across a number of meter classes • delay of the final stage rehabilitation at Mallaty Creek • an APA project delay with consequential delay to a JGN country packaged off-take station (**POTS**) project • reprioritisation of mains and services projects, with one project rescheduled following review of prudency of options.
Non-system assets	RY11 overspend largely due to IT roll-over that was directly allocated from Jemena group corporate to JGN. RY12 overspend largely due to changes in project scope and also the implementation of transitional NECF, which was not included in JGN's approved forecasts.

4.5 KEY PERFORMANCE INDICATORS

140. In the 2009 AAI that JGN submitted to the AER[20], JGN included opex KPIs for the current AA period. Separate KPIs (in 2010 dollars) were provided for the trunk and distribution segments of the network. These KPIs have been updated to reflect allowed opex and customer numbers. Table 4–11 provides a comparison against actual figures for the years to 2013-14 and a forecast for 2014-15, both in 2015 dollars.

141. JGN slightly underperformed on the KPIs in the first four years of the current AA period, but is expected to improve in 2014-15. Any comparison of KPIs between one service provider and another should take proper account of the differences in their markets and networks.

Table 4–11: Distribution segment KPIs: Operating cost per metre and cost per customer site ($2015)

		2010-11	2011-12	2012-13	2013-14	2014-15
Operating cost per metre	Allowed	6.05	6.19	6.37	6.45	6.52
	Actual	6.07	6.21	6.60	6.48	6.12
	Efficiencies achieved (per cent)	-0.37	-0.29	-3.65	-0.54	6.00
Operating cost per customer site	Allowed	136.17	136.59	136.99	135.57	133.56
	Actual	137.04	137.89	142.70	138.34	128.97

[20] JGN, *Access Arrangement Proposal*, August 2009.

		2010-11	2011-12	2012-13	2013-14	2014-15
	Efficiencies achieved (per cent)	-0.64	-0.95	-4.17	-2.04	3.44

(1) JGN has calculated operating cost per km and per metre by dividing the operating and maintenance and administration and overhead costs for each pipeline segment by the relevant length of pipeline.

(2) Operating cost per customer site for the distribution segment was based on the total operating cost allocated to the distribution system.

4.6 PRODUCTIVITY PERFORMANCE

142. Economic Insights (**EI**) has conducted a productivity study for JGN, examining total factor productivity (**TFP**) and opex partial factor productivity (**PFP**) and assessing the relative efficiency of JGN's opex from 1999 to 2013. In addition, JGN's achievable opex productivity growth over the next AA period is forecast using forecast output and capital and important operating environment factors—such as customer numbers and number of service connections.

143. The results of the productivity study and opex output growth report are positive for JGN (refer to appendix 4.3).

144. The key findings are:

- on the basis of overall productivity, JGN has had similar multilateral TFP levels to SP AusNet and Multinet since around 2005
- JGN has had the highest or second highest level of opex multilateral partial productivity for the last 15 years among its gas distribution business (**GDB**) peer group
- JGN is found to be among the most efficient of the GDBs in terms of opex cost efficiency when the effects of scale, customer density, network age and network fragmentation are taken into account—its opex efficiency is not statistically different from the efficient frontier level
- JGN's forecast average annual opex partial productivity growth rate over the period 2015-16 to 2019-20 is 1.03 per cent when returns to scale, the impact of operating environment factors and technical change are taken into account.

Part B Derivation of total revenue

5. DEMAND

Box 5–1 Key messages – demand

NSW gas demand is highly influenced by weather, policy and increasingly by industrial and economic factors, including forecast increases in wholesale and retail gas prices.

JGN's demand forecasts reflect a continuation of the trend decline in average consumption per customer. This decline is exacerbated by the forecast increases to retail gas prices, including the projected increases in the wholesale price of gas, and the increasing competitiveness of forecast retail electricity prices over the next AA period.

These factors are likely to drive increasing energy conservation measures, appliance substitution, and in some sectors, business closures.

JGN has obtained independent expert forecasts from Core Energy, and adjusted these to include the benefits from the proposed step increase in marketing opex. JGN forecasts that:

- total gas consumption will decrease from 80.01 PJ in 2015-16 to 77.84 PJ in 2019-20, representing an annual decline of 0.94 per cent over the next AA period
- total gas consumption for volume market customers will increase from 34.06 PJ in 2015-16 to 34.44 PJ in 2019-20, representing an annual decrease of 0.49 per cent over the next AA period[21]
- MDQ/CD for demand customers will decrease from 262.4 TJ in 2015-16 to 254.2 TJ in 2019-20, representing an annual decline of 0.74 per cent over the next AA period
- total customer numbers will increase from 1.26 million in 2015-16 to 1.39 million in 2019-20, representing an annual increase of 2.41 per cent over the next AA period

The forecast increase in customer numbers is reflective of JGN's proposal to continue our targeted marketing activities to grow our customer base, and thereby support lower average network prices over time. Our customers have told us that they support this strategy for delivering their long-term interests as regards to price and gas availability.

145. This chapter explains how JGN has forecast customer numbers, volumes and MDQ for the 2015-20 AA period.

146. The demand and customer number forecasts drive elements of the opex and capex requirements into the future (refer chapters 6 and 7). The forecasts are also a key input into determining our reference tariffs (chapter 13).

147. The chapter is structured as follows:

- section 5.1 summarises JGN's forecast customer numbers, volume and demand
- section 5.2 describes our approach to forecasting demand by customer category
- section 5.3 provides an overview of the demand forecasts

[21] Total gas consumption for volume market customers in 2014-15 is forecast to be 35.29 PJ. The change over the next AA period is an annual decrease of 0.49 per cent.

- section 5.4 explains the use of the demand forecasts.

5.1 SUMMARY

148. JGN operates its network in a temperate climate with a gas penetration rate significantly less than that of networks located in cooler climates, such as Victoria. Natural gas is a discretionary fuel in NSW and demand in JGN's network area is highly influenced by weather, policy and increasingly by industrial and economic factors, including forecast increases in wholesale gas prices.

149. JGN forecasts that:

- total gas consumption will decrease from 80.01 PJ in 2015-16 to 77.84 PJ in 2019-20, representing an annual decline of 0.94 per cent over the next AA period
- total gas consumption for volume market customers will increase from 34.06 PJ in 2015-16 to 34.44 PJ in 2019-20, representing an annual decrease of 0.49 per cent over the next AA period[22]
- MDQ/CD for demand customers will decrease from 262.4 TJ in 2015-16 to 254.2 TJ in 2019-20, representing an annual decline of 0.74 per cent over the next AA period
- total customer numbers will increase from 1.26 million in 2015-16 to 1.39 million in 2019-20, representing an annual increase of 2.41 per cent over the next AA period

150. JGN considers that the forecasts presented in this chapter are the best forecast possible in the circumstances, and have been prepared on a reasonable basis in accordance with rule 74(2).

151. These forecasts include the impact of JGN's proposed step change in marketing opex that would add 0.04 PJ every year from 2015-16 onwards (totalling 0.2 PJ by 2019-20).

152. JGN's forecasts reflect a continuation of the trend decline in average consumption per customer. This decline is exacerbated by the forecast increases to retail gas prices, including the projected increases in the wholesale price of gas[23], and the increasing competitiveness of forecast retail electricity prices over the period. These factors are likely to drive increasing energy conservation measures, appliance substitution, and in some sectors, business closures. Gas is a discretionary fuel source in NSW with increasing fuel options available to households and small businesses for cooking, heating and hot water. As a result demand is more sensitive to movements in gas prices and other factors, relative to demand in cooler climates.

153. The decline in average consumption per customer in the volume market is partly offset by steady increases in customer numbers—both in new estates and in higher-density developments—and the continuation of low disconnection rates over the next AA period. The number of customers in the demand market is forecast to be constant over the next AA period.

5.2 JGN'S FORECASTING APPROACH

154. As noted in section 4.2, JGN engaged Core Energy to forecast customer numbers and consumption by customer type.

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22 Total gas consumption for volume market customers in 2014-15 is forecast to be 35.29 PJ. The change over the next AA period is an annual decrease of 0.49 per cent.

23 Core Energy has forecast, supported by a range of publicly available evidence, that wholesale gas prices in NSW will increase from around $4/GJ to $8/GJ by 2017-18 (in real terms).

155. This section describes the approach Core Energy used to prepare these forecasts and the key drivers that influenced the forecasts over the 2015-20 AA period (the Core Energy report and model are provided as appendices 5.1 and 5.2).

156. The approach is broadly consistent with the approach approved by the AER for Envestra's South Australian, Queensland and Victorian networks, including the approach to weather normalisation.[24]

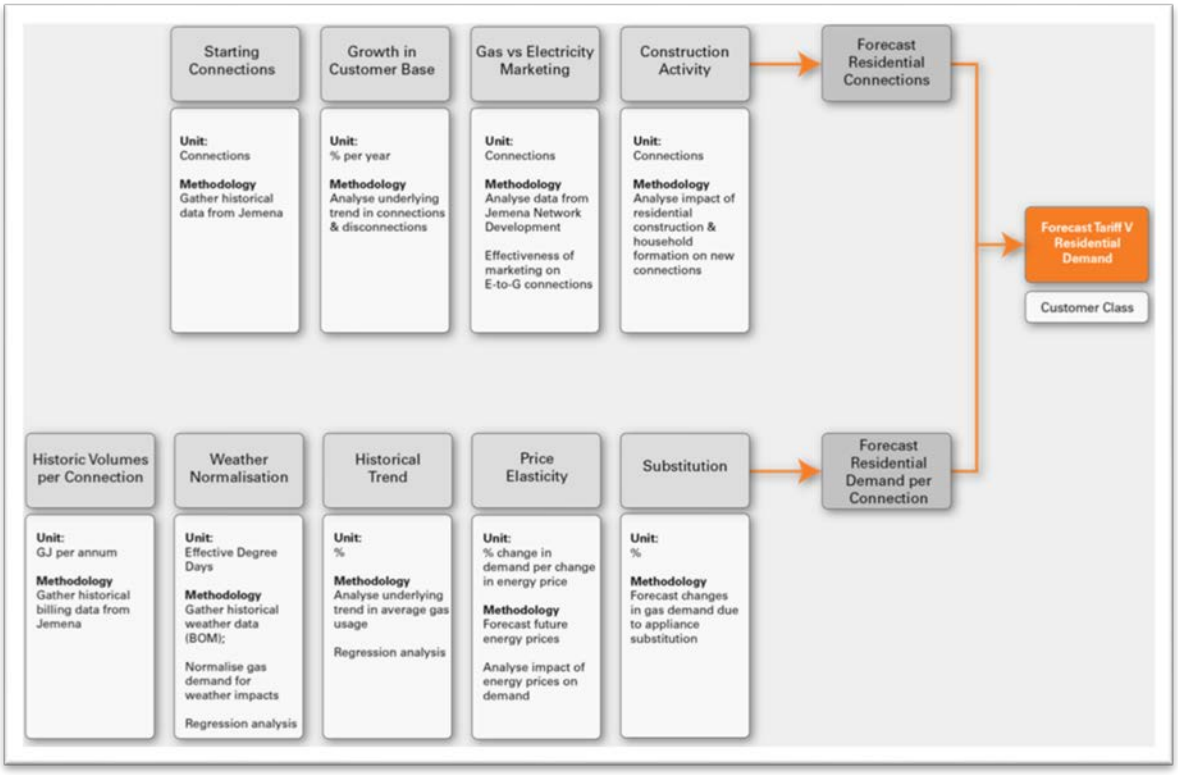
157. Core Energy's approach has allowed JGN to provide the AER with a detailed model clearly demonstrating how the demand forecasts were determined in each customer segment.

5.2.1 SUMMARY OF APPROACH

158. The proposed approach broadly involves forecasting customer numbers and the average demand per connection to provide total forecast demand.

159. Figure 5–1 provides a summary of Core Energy's approach to forecasting demand for residential customers in the volume market.

Figure 5–1: Core Energy – demand forecasting approach – volume market



Source: Core Energy report, p12

160. Table 5–1 sets out the nature of the forecasts that Core Energy has prepared for each of its customer types, which reflect the manner by which each customer group is billed.

[24] See for example AER, *Access arrangement final decision – Envestra Limited 2013-17*, March 2013.

Table 5–1: Core Energy forecasts

	Customer numbers	Consumption	MDQ
Volume market	Yes	Yes	Not required
Demand market	Yes	Yes	Yes

5.2.2 APPROACH TO FORECASTING CUSTOMER NUMBERS

161. Core Energy's approach to forecasting customer connections involves:

- using regression analysis to determine the historical trend in new connections to derive a suitable forecast for each year
- analysing the historical trend in the rate of disconnections to derive a suitable forecast for each year
- adjusting connection forecasts for factors which are not present in the historical trend, including forecast changes in the relative prices of gas and electricity.

5.2.3 APPROACH TO FORECASTING DEMAND PER CONNECTION

162. Core Energy's approach to forecasting demand per connection involves:

- normalise total demand per annum for the effects of weather
- divide total demand by number of connections to determine demand per connection
- determine the historical trend in demand per connection to establish a base for projection
- adjust demand per connection forecasts for factors which are not present in the historical trend, including the impact of rising wholesale gas prices and increasing appliance substitution.

163. This approach is consistent with the approach proposed by Envestra and accepted by the AER.[25]

5.2.3.1 Weather normalisation

164. Gas demand is influenced by the effects of weather. Core Energy weather normalised the historical gas consumption data using Effective Degree Days (**EDD**), where cooler temperatures (below a given threshold), result in higher gas use for heating purposes. This approach is based on AEMO guidelines.[26] Core Energy's approach is summarised in Box 5–2.

25 AER, *Access arrangement final decision – Envestra Limited 2013-17*, March 2013.

26 AEMO, *2012 review of the weather standards for gas forecasting,* April 2012.

Box 5–2 Core Energy forecasting method

Core Energy's process of weather normalising demand using EDD involves:

- specifying the EDD index for calculating EDD. This involves using regression analysis to determine the coefficients providing the best fit between demand and weather for JGN's NSW network
- using historical temperature data at the Sydney Airport weather station, determine the trend in historical EDD
- determining an appropriate 'normalised' EDD figure for each year (either a trending series or, if no trend in EDD is apparent, the average yearly EDD) which represents normal weather conditions. In the case of Sydney Airport no long-term trend in EDD was evident, thus an average EDD was used
- comparing the actual EDD recorded each year to the normalised EDD figure for that year to obtain the 'abnormal' EDD
- using regression analysis to determine the sensitivity of demand to EDD in each year for each customer class, multiplying this factor by the abnormal EDD figure to arrive at the total abnormal gas demand due to weather for each year
- subtracting abnormal demand from actual demand to arrive at weather normalised demand for each customer class.

5.2.3.2 Price elasticity

165. Projected retail gas and electricity prices impact on forecast gas consumption.

166. Over time, higher gas prices result in customers using less gas. Core Energy captured this relationship through a long-term own price elasticity of -0.3 for residential customers, and -0.35 for non-residential customers, consistent with the AER's decision for Envestra (Victoria).

167. Over time, decreases in retail electricity prices relative to gas prices will also result in customers using less gas. Core Energy captured this relationship through a long-term cross price elasticity of -0.1 for residential customers and non-residential customers. While the AER has not considered this effect previously, Core Energy considers material relative increases in retail gas prices and increasing fuel choice will impact customers' decisions in the:

- *short term*—particularly given the high penetration of reverse cycle air-conditioning in NSW that provides customers with heating choice
- *longer term*—as customers make appliance replacement decisions, such as the choice of hot water supply.

168. Core Energy projected retail gas and electricity prices using a range of publicly available regulatory decisions and market evidence.

169. Chapter 2 of Core Energy's report describes the method and outcomes of the price elasticity analysis.

5.3 DEMAND FORECASTS

170. Table 5–2 to Table 5–4 set out JGN's forecast customer numbers, average consumption and total consumption over the next AA period respectively.

5.3.1 FORECAST CUSTOMER NUMBERS

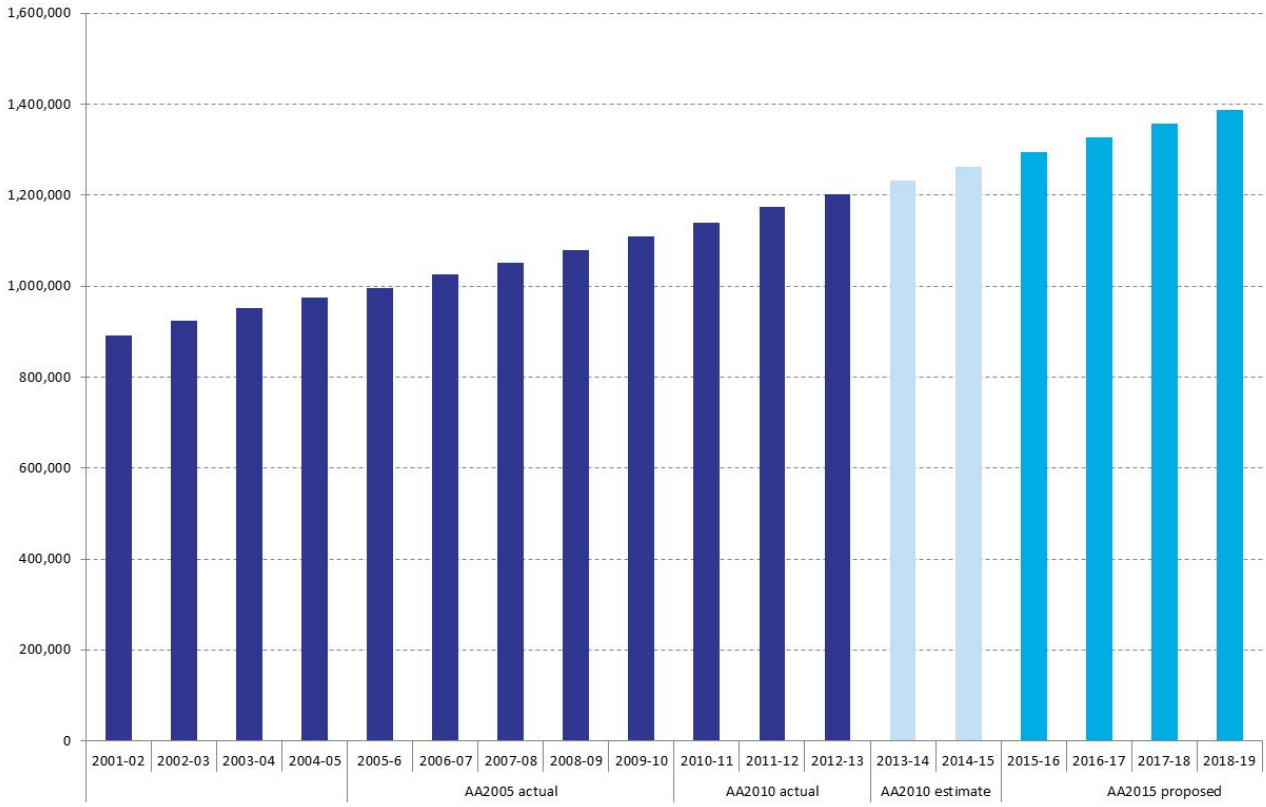
Table 5–2: Forecast JGN customer numbers by customer type

	2015-16	2016-17	2017-18	2018-19	2019-20
Total Volume Market	1,262,196	1,294,964	1,326,503	1,356,828	1,386,945
Total Demand Market	427	427	427	427	427
Total Customers	**1,262,623**	**1,295,391**	**1,326,930**	**1,357,255**	**1,387,372**

171. Core Energy forecasts that total customer numbers will increase from 1.26 million in 2015-16 to 1.39 million in 2019-20, representing an annual increase of 2.41 per cent over the next AA period.

172. Figure 5–2 shows that this continues the growth in customer numbers that JGN has experienced historically.

Figure 5–2: Actual and forecast volume market customer numbers



173. This reflects:

- new connections as a result of new dwellings in NSW, supported by continued population growth in the local government areas within the JGN network area and some addressing of the dwelling stock deficiency in NSW
- new connections from existing households which connect to gas
- continued low disconnection rates of around 0.5 per cent per year

- JGN's marketing program that promotes natural gas as a fuel of choice to increase gas demand and put downward pressure on prices.[27]

174. Core Energy is forecasting a slowing in new connections from existing households which connect to gas (reduction of between 6,500 and 7,000 per year) because of the forecast decline in the competitiveness of gas as a fuel of choice. However new connections from new dwellings in new estates and medium/high-density developments are forecast to continue to grow over the next AA period (to between 28,000 and 30,000 per year).

5.3.2 FORECAST CONSUMPTION

Table 5–3: Forecast JGN average daily consumption by customer type and MDQ (TJ)

	2015-16	2016-17	2017-18	2018-19	2019-20
Volume market	93.05	93.63	93.66	93.79	94.09
Demand market	125.55	124.08	122.31	120.59	118.58
Total average load	**218.60**	**217.72**	**215.97**	**214.37**	**212.67**
Demand market MDQ/CD	**262.40**	**259.88**	**256.63**	**254.23**	**254.23**

175. Core Energy forecasts that total gas consumption will decrease from 80.01 PJ in 2015-16 to 77.84 PJ in 2019-20, representing an annual decline of 0.94 per cent over the next AA period.[28] Total gas consumption for volume market customers will increase from 34.06 PJ in 2015-16 to 34.44 PJ in 2019-20.

Table 5–4: Forecast JGN consumption by customer type (TJ): 2016-20

	2015-16	2016-17	2017-18	2018-19	2019-20
Total volume market	34,057	34,177	34,185	34,232	34,437
Total demand market	45,952	45,290	44,645	44,015	43,400
Total consumption	**80,009**	**79,467**	**78,830**	**78,247**	**77,837**

176. The forecast decline in consumption reflects a continuation of the declining trend in average consumption per customer.

177. Average residential consumption was 22.5 GJ per year in 2003. Table 5–5 shows that this is forecast to decline to 17.86 GJ by 2020. This decline reflects a continuation of the trend decline as well as the impact of forecast increases to retail gas prices, including the projected increases in the wholesale price of gas, and the increasing competitiveness of forecast retail electricity prices over the next AA period. These factors are likely to drive increasing energy conservation measures, appliance substitution, and in some sectors, business closures. As gas is a discretionary fuel source in NSW, forecast demand is more sensitive to movements in gas prices compared to networks located in cooler climates.

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27 The program offers incentives to customers to install new natural gas appliances in their households while also driving new connections.

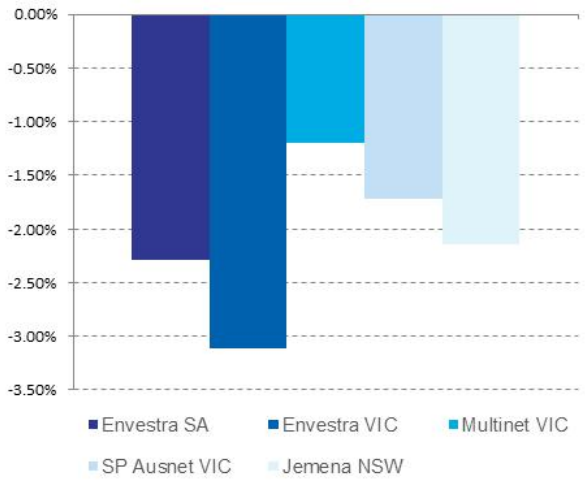
28 These forecasts include the impact of JGN's proposed step change in marketing opex that would add 0.04 PJ every year from 2015-16 onwards (to 0.2 PJ by 2019-20).

Table 5–5: Forecast JGN average consumption by volume market type (GJ): 2014-20

Demand per Connection	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Existing residential	19.97	19.31	18.79	18.52	18.22	18.02	17.86
Electricity to gas **(E to G)**	13.26	12.83	12.48	12.30	12.10	11.97	11.87
New estates	17.37	16.80	16.35	16.11	15.85	15.68	15.54
New medium density	15.25	14.75	14.35	14.15	13.92	13.77	13.65
Small business	229.10	214.61	201.18	193.62	185.45	176.70	169.89
I&C	485.24	465.11	404.82	398.41	390.16	379.96	373.60

178. This trend is in line with trends forecast for other gas networks,[29] including those in cooler climates and those with lower rates of new connections which typically have lower gas usage.

Figure 5–3: Comparison of reductions in average consumption approved by the AER and JGN forecast (volume market)



Source: Core Energy, Final Report, p11.

179. The decline in average consumption per customer in the volume market is partly offset by steady increases in customer numbers. The number of customers in the demand market is forecast to be constant over the next AA period.[30]

[29] See Envestra, *Access Arrangement Proposal*, March 2012.

[30] Rule 72(1)(d) provides that the AAI must include to the extent practicable a forecast of pipeline capacity over the next AA period and the basis upon which the forecast has been derived. Capacity information for a distribution network is not available or meaningful for a distribution pipeline. The JGN network is a geographically dispersed network made up of interconnected pipes and there are a number of practical considerations governing why the calculation of capacity is not practicable.

5.4 USE OF DEMAND FORECASTS

5.4.1 DEVELOPING REFERENCE TARIFFS

180. Developing reference tariffs (chapter 13) requires the demand forecasts to be translated into demand per tariff class. The approach to adapting these demand forecasts to reference tariffs is described in appendices 5.3 and 5.4.

5.4.2 DEVELOPMENT OF CAPEX AND OPEX FORECASTS

181. Forecast market expansion capex is directly related to the gross connection forecasts by customer class. The capex is calculated by applying unit rates of construction relating to mains, services and meters by customer class to the gross connection forecast.

182. Forecast capacity development capex is directly related to the growth in localised peak hourly demand on the distribution network, rather than average network demand. Peak load growth is linked to the consumption profiles of existing customers, including the impact of appliance choices (such as continuous-flow hot water appliances), as well as the number of connections to the network.

183. JGN's opex forecast takes into account network growth (customer numbers and energy usage) in calculating the 'rate of change' for trend escalation (see chapter 7).

6. CAPITAL EXPENDITURE

Box 6–1 Key messages – capital expenditure

JGN's capex forecast reflects the efficient delivery of a program of work necessary to deliver the service levels that our customers have told us they expect now, and into the future.

JGN's proposed capex for the 2015-20 AA period is $1,148.5M. This is an increase of $190.7M, or 20 per cent, over the estimated expenditure for the 2010-15 AA period and an increase of $269.6M relative to the amount that the AER approved for the current AA period. The capex forecast is justified under rule 79.

The main features of our capex program are:

- a 39 per cent increase in the number of residential meter replacements as a significant population of meters which have already had their lives extended will require replacement
- market expansion expenditure, due to continued forecast growth in residential connection numbers
- facilities renewal and refurbishment, to ensure our key regulating stations and other facilities continue to provide a level of service necessary to deliver a safe and reliable gas supply
- mains and services renewal expenditure which reflects JGN's on-going commitment to rehabilitating remaining aging assets to deliver the universal level of service customers expect and ongoing safe and reliable supply in those areas
- IT expenditure to replace out-dated systems and upgrade JGN's IT capability in areas such as our market billing and geographical information systems.

JGN has analysed a number of scenarios and tested these with our customers to confirm that our capital plan for the 2015-20 AA period provides a demonstrable benefit to customers and best meets our customers' preferred long-term outcomes as regards safety, price and service levels.

184. The NGR require JGN to submit with its 2015 AA proposal its forecast of conforming capital expenditure for the next AA period. Conforming capital expenditure is capex 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. It must also be justifiable on one or more specified grounds.[31]

185. This chapter demonstrates how JGN has forecast conforming capital expenditure, and how the forecast complies with the relevant provisions of the NGR. It is structured as follows:

- section 6.1 summarises JGN's proposal
- section 6.2 describes JGN's asset management, capex governance, cost estimation and project management processes and practices
- section 6.3 describes the components of JGN's capex forecast
- section 6.4 summarises the analysis that JGN has performed to assess the effect of different capex scenarios on the long-term outcomes for customers
- section 6.5 describes the key inputs and assumptions that underpin JGN's capex forecast

31 Rule 79(1).

- section 6.6 sets out JGN's forecast of conforming capital expenditure for the 2015-20 AA period.

6.1 SUMMARY

186. JGN has tested with our customers the current balance between the prices we charge for our reference services, the long-term safety of these services, and the service levels JGN provides to current and new customers. While there was some support for modest service improvements, overall customer satisfaction with current service levels is relatively strong. Therefore JGN proposes to broadly maintain current service levels for the next AA period rather than invest in improvements that would increase prices at a time when other components of customers' gas bills are expected to rise. These outcomes are reflected in JGN's 20 year asset strategy, provided as appendix 6.1.

187. As described in chapter 4, JGN expects to spend total capex of $957.9M over the current AA period. Forecast capex for the next AA period is $1,148.5M or 20 per cent greater in real terms than estimated capex for the current AA period. Anticipated average annual capex for the current AA period and forecast expenditure for the next AA period are summarised in Table 6–1:

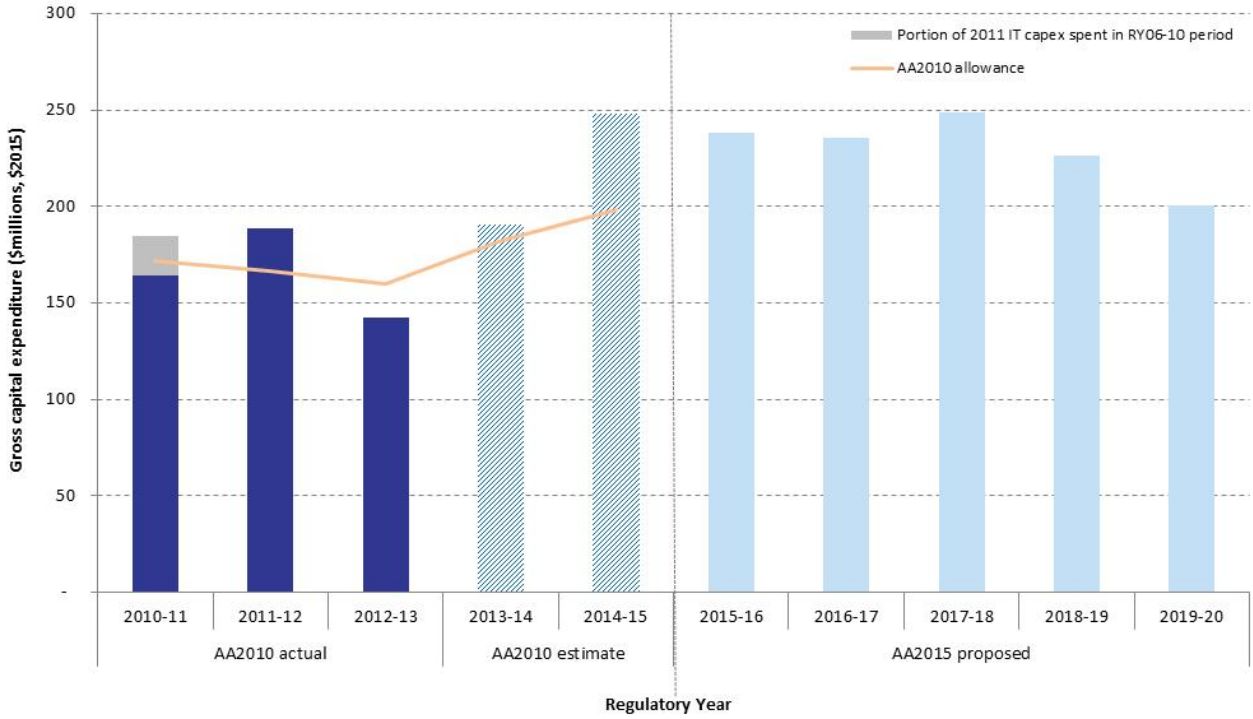
Table 6–1: JGN gross capex[32] – current AA period and forecast ($2015, $millions)

	Annual average 2011-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2016-20
Market expansion	80.02	86.47	91.13	91.49	90.34	91.49	450.91
Reinforcement, renewal and replacement	66.08	105.13	107.55	116.98	107.29	92.55	529.49
IT and other non-system	45.48	46.31	37.02	40.24	28.29	16.28	168.14
Total	**191.57**	**237.91**	**235.69**	**248.71**	**225.91**	**200.32**	**1,148.54**

[32] All capex amounts in this chapter 6 are "gross". That is, they include amounts that JGN expects to recover as capital contributions. Conforming capital expenditure is gross capex less capital contributions. JGN's forecast conforming capital expenditure is summarised in section 8.7.

188. Figure 6–1 provides a graphical comparison of actual, estimated and forecast capex.

Figure 6–1: JGN gross capex – 2015-20 forecast vs 2010-15 actual/estimate

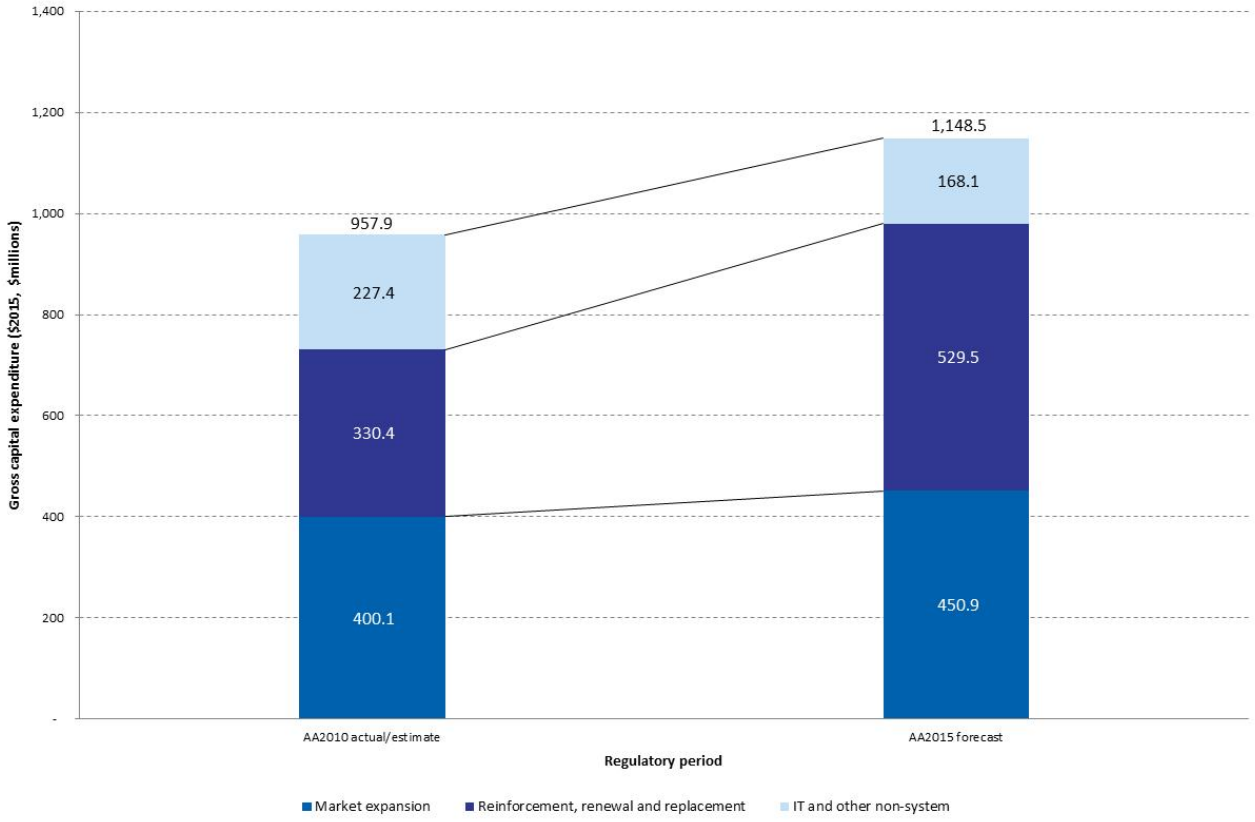


(1) As reported in JGN's annual RIN response for 2010-11, IT capex for 2011 includes an amount, shown here as $20.46M ($2015), that was spent in the 2005-10 AA period.

189. The forecast capex program is supported by and consistent with JGN's asset management plan (**AMP**) for distribution assets and IT asset management plan (**IT AMP**) for information and communications technology assets. The AMP and IT AMP are consistent with the efficient and prudent delivery of gas distribution and related services at lowest sustainable cost for the long-term benefit of consumers. The AMP is provided as appendix 6.2 and the IT AMP as appendix 6.3.

190. Figure 6–2 shows the principal contributors to the forecast increase in capex for the 2015-20 AA period.

Figure 6–2: Total capex – 2015-20 forecast vs 2010-15 actual/estimate



191. Market expansion accounts for 39.3 per cent of total forecast capex for the 2015-20 AA period. Market expansion capex in the next AA period is forecast to be 12.7 per cent greater than in the current AA period. The main features of the forecast are:

- *an increased number of new connections*—188,362 new connections are forecast for the next AA period compared with 164,703 expected for the current AA period. Most of the increase is forecast to occur in new estates and in medium/high-density premises
- *higher delivery costs*—due to increased unit rates for routine works reflecting new contractual arrangements and real cost escalation.

192. Reinforcement renewal and replacement expenditure is the largest category of forecast capex for the 2015-20 AA period accounting for 46.1 per cent of the forecast total. Expenditure in this category is forecast to be 60.3 per cent greater than in the current AA period due mainly to:

- *increased meter replacement activity*—a significant population of residential gas meters is approaching the end of its economic life and must be replaced during the 2015-20 AA period. In addition, certain types of residential hot water meters have been found to be failing prematurely and will be replaced. 265,600 planned residential meter replacements are forecast for the next AA period compared with 191,400 in the current AA period
- *projects rescheduled from the current AA period*—several projects forecast to occur during the current AA period did not proceed for technical and other reasons and have been re-scoped and/or re-scheduled for the next AA period

- *capitalising integrity investigation costs*—in-line inspections and integrity digs are undertaken on a periodic basis and their value is effectively applied over the period between successive rounds of activity. In-line inspections are typically run every ten years. Capitalisation is consistent with accounting treatment and with recent AER decisions
- *higher delivery costs*—due to increased unit rates for routine works reflecting new contractual arrangements and real cost escalation.

193. Expenditure on IT and other non-distribution assets accounts for the remaining 14.6 per cent of total forecast capex for the 2015-20 AA period and is 26.1 per cent below expenditure for the current AA period. The principal reason for the reduction is that JGN incurred significant once-off property-related costs in the current AA period, principally for office and depot relocations and to develop a new meter testing facility. There are no similar costs forecast for the next AA period.

194. The components of the forecast are described in greater detail in section 6.3 and the capex forecast model is provided as appendix 6.4.

195. The significant funding requirements associated with the forecast capex program are supported by JGN's proposed cost of capital (chapter 9) and price path (chapter 12).

6.2 JGN'S APPROACH TO ASSET MANAGEMENT

196. JGN has established and maintains sound systems and practices for asset management planning, capex governance, cost estimation and project management. Together, these systems ensure that capex is planned, managed and delivered prudently and efficiently.

197. JGN's approach to asset management is informed by Jemena's vision to be recognised as a world class owner and manager of energy delivery assets. That vision, in turn, informs JGN's asset management policy which is to:

- manage our assets without compromising our employees, contractors and public safety, as per the Jemena Health and Safety Policy
- manage our assets in an environmentally sustainable manner as recognised by the Jemena Environmental Policy
- comply with all relevant regulatory and legislative requirements
- actively engage with customers and key stakeholders to understand and respond to their requirements to ensure outcomes are achieved that are in their long-term interests
- develop asset management plans that deliver the corporate objectives and business plan
- facilitate continual improvement in the safety and performance of the assets, through the establishment, maintenance and governance of effective asset and safety management systems
- make best practice asset management an accepted and important part of our 'business as usual' approach, and measure it against an internationally recognised asset management framework
- apply the Jemena risk management approach to asset management activities
- develop and maintain asset information systems that support asset management decisions and activities throughout the asset lifecycle
- establish a consistent, collaborative and integrated approach to the management of the lifecycle of the assets, to ensure that the optimum outcomes are delivered in an efficient way across Jemena

- develop the skills and knowledge of our people to sustain and reinforce our asset management capabilities.

198. As part of JGN's drive for continuous improvement and to maintain alignment with current good industry practice, JGN is proceeding with a plan to gain accreditation to PAS 55—the British Standards Institution's (BSI) Publicly Available Specification for the optimised management of physical assets:

> *PAS 55 defines asset management. The internationally recognized specification outlines best practice for managing assets … [it] provides clear guidance on building an asset management system that brings strategy and day-to-day action together.*[33]

6.2.1 ASSET MANAGEMENT PLANNING

199. JGN's AMP and related IT AMP are key planning documents for the business. The AMP and IT AMP detail current and proposed long-term technical management strategies for JGN network assets and IT assets respectively.

200. The AMP covers management of the following asset classes:

- trunk mains and facilities
- primary mains, facilities and services
- secondary mains and services
- low and medium pressure mains and services
- pressure regulating stations (all pressures)
- meters and meter sets
- supervisory control and data acquisition (**SCADA**), communications and monitoring.

201. Together, the plans focus on achieving an optimal balance between the key elements of asset management—service levels, cost and risk.

202. The AMP and IT AMP are the products of an assessment of available asset management options and, ultimately, the development and documentation of the proposed work program for each asset class. The plans set the six year work program within which JGN will consider specific annual projects for review and final approval consistent with the gating process described in section 6.2.2 for network assets or the analogous process for IT expenditure.

203. JGN's forecast of gross capex for the next AA period is summarised in Table 6–1 and described in greater detail in section 6.3. The forecast is consistent with JGN's current AMP and IT AMP.

6.2.1.1 Key AMP and IT AMP projects for 2015-20 AA period

204. Principal features of the capex program for the next AA period are:

- increased expenditure to meet anticipated market growth particularly in the north-west and south-west growth areas of Sydney
- increased expenditure on meter replacement where significant populations of residential gas and hot water meters will require replacement

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33 http://www.bsigroup.co.uk/PAS-55-Asset-Management/ accessed on 12 December 2013.

- initial stages of the northern primary main upgrade to maintain the integrity of services in northern Sydney
- increased expenditure for mains renewal and facilities upgrade where the principal projects are:
  - *Mt Druitt steel replacement program*—this is a special project requiring the replacement of 10 km of steel main
  - *Penrith primary mains thin wall replacement*—given its location the existing high pressure thin wall pipe does not meet current integrity standards and must be replaced
- completing the GASS+ replacement project which will replace JGN's legacy asset and works management system with a SAP-based system
- establishing new geographic information system (**GIS**) capabilities encompassing all land based asset information, mapping, geographic and topographic information
- introducing a field mobility solution which builds on the GIS and the works delivery capability provided by the SAP gas system.

6.2.2 DISTRIBUTION CAPITAL EXPENDITURE GOVERNANCE

205. As part of its Asset Management System, JGN has developed and adopted Project Governance Guidelines which require that:

> *all capital infrastructure projects delivered by Jemena … have a level of project governance commensurate with their strategic importance, risk and complexity. This, combined with project management discipline, should ensure that project delivery within Jemena is effective and efficient.*

206. The Guidelines:

- define the principles and requirements related to capital project governance
- identify the key roles and the associated accountabilities of those roles to ensure the effective implementation of project governance.

207. The objective of project governance within Jemena is to protect investments made by the business. This is achieved through custodianship and timely and effective decision-making to ensure:

- sound scope definition
- cost control
- appropriate project planning
- defined accountabilities.

208. Project governance provides a structured and transparent decision-making framework that is logical, robust and repeatable to govern JGN's projects and to ensure continuous improvement for future projects and programs.

209. As one component of its governance arrangements, JGN uses a project gating process that provides the structure for managing and delivering projects from inception through to delivery and project close-out. The gating process consists of seven stages, with the first three (1 to 3) governing project initiation and planning and design up to the point where JGN approves the business case. Stages 4 to 7 cover project mobilisation, construction, commissioning and handover of the project.

Table 6–2: Capital project governance stages

Stage	Stage aim	Process
1. Assessment	Review potential options	• Operational, engineering or commercial solutions considered • High-level scope • Preliminary assessment of risks • Initial cost estimate • Preferred option selected
2. Requirement	Define requirements and high-level scope	• Feasibility study/front end engineering and design • Refinement of initial cost estimates • Land and long-lead items (seek approval to procure)
3. Definition	Complete specifications and detailed design	• Detailed specifications and engineering drawings • Tendering completed • Decision/budget quality cost estimate (business case approval)
4. Mobilisation	Prepare project for construction	• Contracts awarded, equipment ordered • Detailed risk assessment • Site establishment • External approvals finalised • Documentation and inductions complete
5. Construction	Manage construction of project	• Construction • Progress monitoring and reporting • Contract management and audits
6. Commissioning	Pre-commissioning and commissioning of the asset	• Commissioning management • Maintenance initiation • Training
7. Handover	Integrate asset into network; financial close	• Final site remediation • Finalise invoices • Formal project closure • Post-implementation review • Lessons learned register

210. Projects enter the gating process as problems and/or opportunities are identified in the course of business or as a result of a customer enquiry or request (gate 0). Given that the next AA period does not begin until 1 July 2015 and extends to 30 June 2020, all new projects included in JGN's AMP and the forecast of capex for the next AA period are currently at an early gate.

211. Project cost estimates of increasing precision are produced at each of the first three stages, reflecting the progressive development and refinement of the project. The extent and drivers of uncertainty are not the same for all projects and programs that go to make up the forecast. For example, the principal source of uncertainty for capital programs such as new connections is the volume of activity whereas, for larger non-routine projects, the driver is scope uncertainty which is reflected in variability in the labour and other components of the cost estimates for those projects.

212. Business cases (produced at either gate 2 or gate 3) are reviewed and approved at the management level, or by the SGSPAA Board, as specified in Jemena's Delegation of Financial Authority Manual.

213. Jemena has also established a Major Capital Project Governance Committee (**MCPGC**) which is a senior management forum that provides high-level oversight of the performance of major network capital projects in accordance with its Charter, the key elements of which are to:

- monitor the delivery of major capital projects against time, cost and quality metrics
- provide oversight of management systems and controls used by Jemena to ensure the efficient and timely delivery of major network capital projects
- appoint project sponsors and steering committee members when deemed appropriate for a project
- review and report on the effectiveness of the governance framework, Project Management Methodology (**PMM**) and standardised policies and practices established to ensure efficient and timely delivery of Jemena's major network capital projects
- ensure that appropriate resources (capability and quantity) are allocated to managing Jemena's major capital projects and that resourcing is commensurate with risk
- ensure that an effective process is in place to review the end-to-end delivery of major network capital projects and that recommendations from these reviews are implemented
- define the audit program for major capital projects and ensure that findings from audits are implemented.

6.2.3 DISTRIBUTION CAPITAL EXPENDITURE COST ESTIMATION

6.2.3.1 Program estimates

214. Programs are characterised by large volumes of repetitive or similar works and account for approximately 56 per cent of JGN's 2015-20 capex forecast. The program cost can be effectively estimated by forecasting the quantity of work and unit rates (based on an appropriate materials and labour mix). Unit rates are developed through the following:

- long-term tendered rates
- extrapolation of existing rates
- long-term material and equipment supply agreements
- other published rate data.

6.2.3.2 Individual project estimates

215. For larger and one-off projects, the approach that JGN takes to cost estimation is a function of project size, complexity, the inputs involved (labour and materials mix), and gate stage.

216. The following criteria are applied to determine the level of assessment and cost estimation:

- *projects less than $0.2M*—a desktop summary is produced based upon a review of the project scope. The scope indicates the approximate volume of work to be undertaken, for example, lay 100 m of 50 mm nylon pipe in Smith Street. Costs are built up by applying unit rates to the scope of work overlaid with a desktop analysis of any environmental or other construction factors.

- *projects greater than $0.2M, low complexity*—these projects have standard constituent elements and so unit rates can be used. For these projects, cost estimates are compiled using the JGN Project Estimation Model (**PEM**) and documented with a gate certificate (for projects planned for the next AA period, that is either gate 0 or gate 1, depending on the level of scope definition and the progress through the project lifecycle). The scope is defined in an Opportunity Brief (**OB**) which covers:
  - the extent or volume of work to be undertaken
  - environmental/construction considerations, such as restoration required, road crossings, traffic management requirements.

217. The OB assessment is based upon desktop measurements supported by either a field confirmation or evaluation by an estimator with knowledge of the location.

- *projects greater than $0.2M, moderate complexity*—these projects predominantly consist of standard constituent elements with some additional unique elements and so estimates are a mix of mainly unit rates with some individual cost elements. The costs of the unique elements may be estimated from either knowledge of similar projects, quotations, or first principles. For these projects, cost estimates are compiled using the JGN PEM and documented with a gate certificate (for projects planned for the next AA period, that is either gate 0 or gate 1, depending on the level of scope definition and the progress through the project lifecycle). The scope for this type of project is defined in an Enhanced OB (**OB+**) which covers:
  - the extent or volume of work to be undertaken, based upon desktop measurements confirmed by a field visit
  - environmental/construction considerations, such as restoration required, road crossings, traffic management requirements based upon desktop measurements confirmed by a field visit
  - the extent and nature of the unique requirements.
- *projects greater than $0.2M, high complexity*—these projects predominantly consist of unique constituent elements and some standard elements and so estimates are built from individually costed elements and some unit rates for the standard elements. The costs of the unique elements may be estimated from either knowledge of similar projects, quotations, or first principles. For these projects, cost estimates are compiled using the JGN PEM and documented with a gate certificate (for projects planned for the next AA period, that is either gate 0 or gate 1 if a feasibility assessment has been completed). A feasibility assessment includes engineering concept documentation for the recommended (prudent) option in addition to the information contained in an OB+.

6.2.3.3 Minor capital allocations

218. Minor capital allocations are provisions set aside for minor capital activities such as a requirement to replace a short section of network with significant leakage where the replacement is not part of a planned mains renewal project for an area. In some circumstances, undertaking minor capital rehabilitation can also defer the requirement for rehabilitation of a wider area. The estimation for these allocations is generally based upon historical patterns of expenditure.

6.2.4 REVIEW OF CAPITAL GOVERNANCE PROCESSES

219. JGN engaged SKM to review the appropriateness of its capex governance process (refer appendix 6.5). SKM's report concluded:

- JGN has made—and has a program to continue to make—improvements in its capital investment governance in keeping with industry trends in this area and good industry practice
- there are opportunities to enhance JGN's capital investment governance

- JGN has in place a capital investment governance framework that is robust in its support of prudency and efficiency in the identification, planning and delivery of its capital program
- JGN's focus on capital investment governance provides it with the opportunity of being a leader in this field.

220. JGN notes SKM's recommendations and a Management response to the recommendations is provided as appendix 6.6.

6.3 CAPITAL EXPENDITURE CATEGORIES

221. For purposes of managing and forecasting capex, JGN categorises capex as set out in Table 6–3. Funding for each category motivates particularly capital activities. Without sufficient funding—and as a consequence, investment—there will be negative consequences for our customers' long-term interests.

Table 6–3: Capex categories

Category	Consequence of underinvestment
Distribution capital	
Market expansion	JGN would not be able to economically extend and expand the distribution network to increase efficient network utilisation and lower average network prices in the long-term interests of customers.
Capacity development	Expected peak demand would not be met as a result of the deferral of capacity development expenditure. Customers would be more likely to experience lower levels of supply reliability during periods of colder than average temperatures. Long-term performance against the 'poor supply/1000 customers' measure would deteriorate and consumer perception of the quality of natural gas and the value it delivers is likely to fall. This has adverse consequences for JGN's ability to attract new customers to the network.
Mains and services renewal	JGN would not provide a safe and reliable universal level of service, that supports public amenity and environmental objectives through low levels of gas leakage. Overall safety performance is driven in the long term by the application of integrity management planning and prudent investment in asset replacement expenditure. While increased publically reported gas escapes and disruptions/street closures resulting from emergency response to reported gas escapes could be seen as a safety issue, it also has a serious impact on the amenity of the community through nuisance smells, traffic disruptions and the perception of an increased level of safety risk. Failure to adequately invest in mains and service renewals will lead to increased reactive maintenance and emergency response costs and would have a negative impact on consumer perceptions of the quality of natural gas and the value it delivers, reducing JGN's ability to attract new customers to the network.
Facilities renewal and refurbishment	Facilities such as pressure reduction stations and associated equipment are critical to maintaining the integrity and reliability of gas supply. These assets are hazardous plant. Failure to replace aging and obsolete facilities results in increased planned and reactive maintenance costs to maintain acceptable levels of risk, and is likely to result in lower levels of supply reliability as aging plant fails in service.
Meter renewal and upgrade	JGN would breach its metering regulatory obligations and failed meters would not be replaced. Meters would not read with appropriate accuracy to support customer billing, undermining allocative efficiency objectives.

Category	Consequence of underinvestment
Government authority work	JGN would not be able to relocate assets to comply with contractual, legislative or regulatory obligations, so that JGN could provide safe and reliable network services in a compliant manner.
Mines subsidence	JGN would not be able to manage and mitigate the significant effect that mining can have on our network assets, to ensure JGN continues to provide safe and reliable network services.
Non-distribution capital	
Information technology	JGN would operate with out-dated and inefficient systems compromising the efficiency and safety of delivered network services.
SCADA	JGN would not be able to promptly respond to network issues that would compromise the safe and reliable provision of services to customers.
Other non-distribution	JGN would not have the necessary supporting equipment and depots to operate its network and transport its staff across the network to support the provision of safe, reliable and efficient network services.

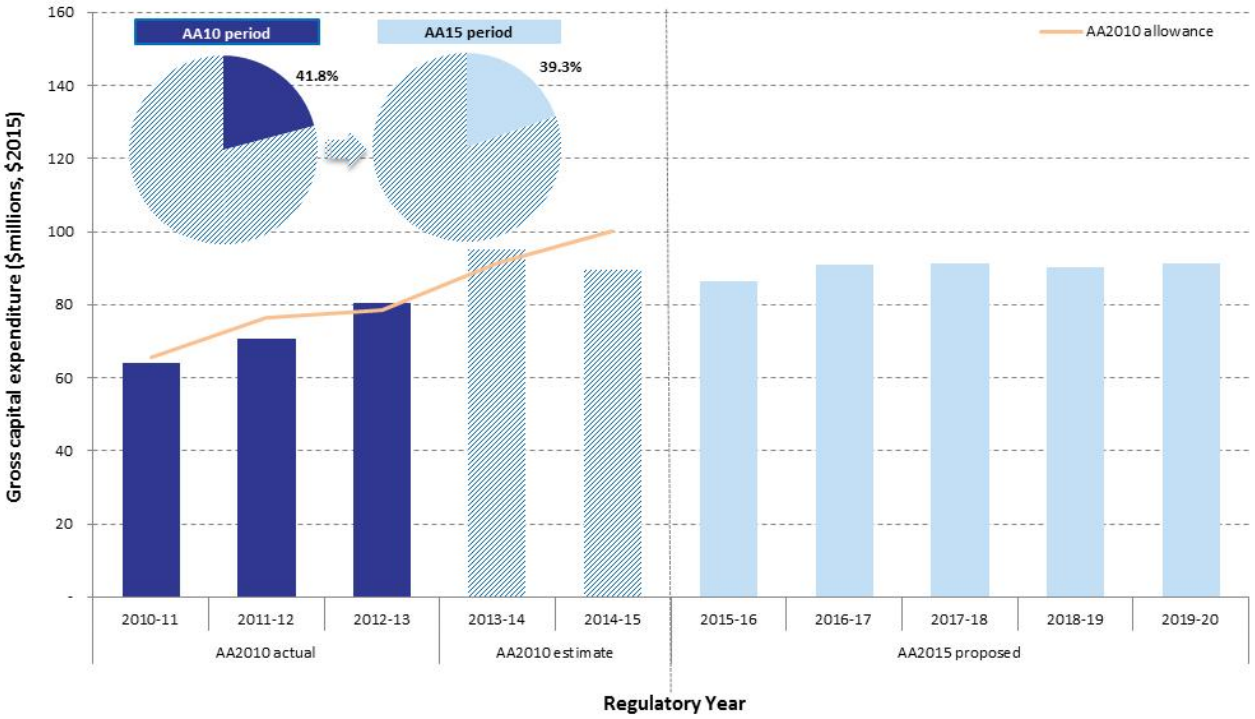
222. The sub-sections that follow describe each category and the factors that characterise forecast expenditure in each. In practice, many capex projects will fall into more than one category, for example, when replacing an asset that has reached the end of its economic life, it is often prudent and efficient for the replacement asset to have greater capacity in order to meet forecast growth. However, for purposes of capex forecasting and the sub-sections that follow, such projects are classified according to their primary driver.

6.3.1 MARKET EXPANSION

223. Expenditure in this category covers the cost of mains, services and meters and associated equipment required to meet market growth and new connections to the network. Growing the network economically is in the long-term interests of customers because it lowers average network charges. JGN actively promotes new connections through its marketing activities. The main types of new connections are:

- E to G conversions where the connection is to a pre-existing main passing the customer's premises
- new estates where gas infrastructure is installed and connections are made as a new estate is developed
- medium-density residential developments
- mains extensions where the network is extended to connect one or more new customers, most often at the request of the customer(s).

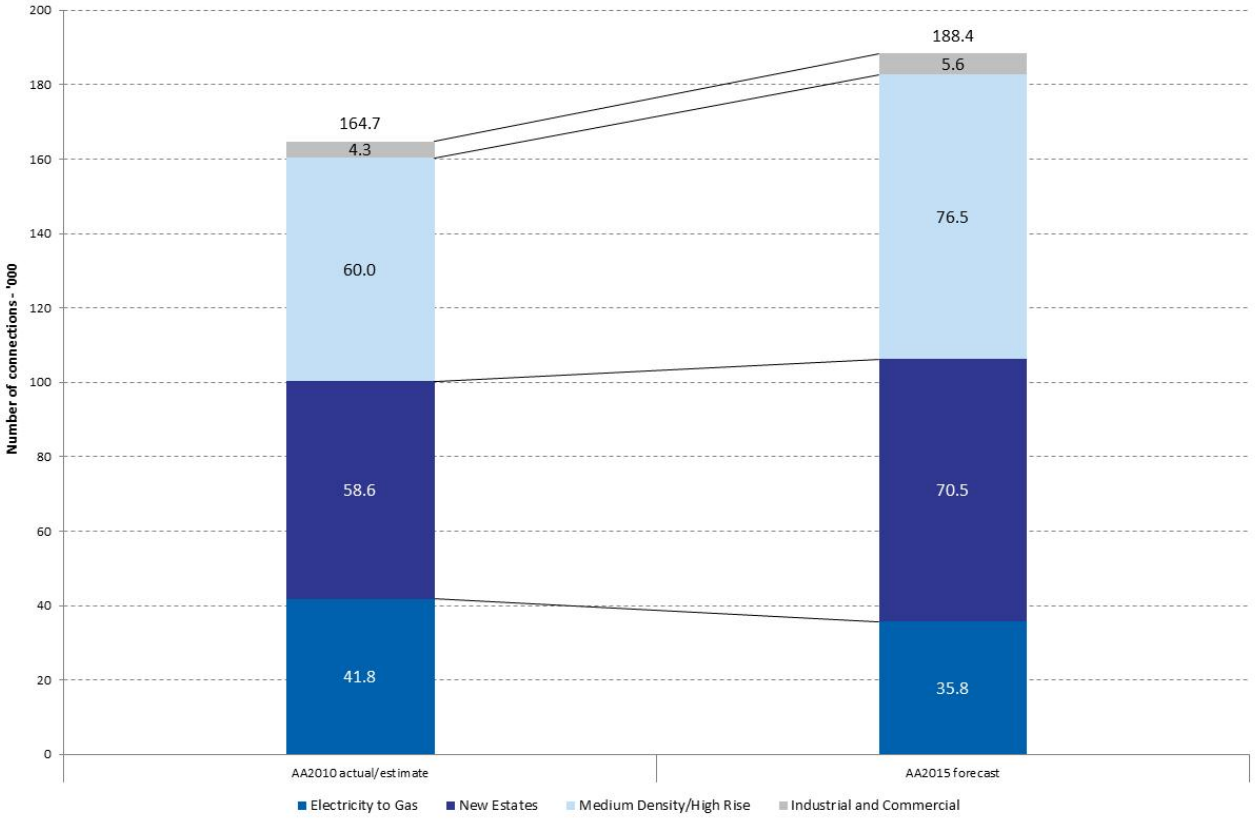
Figure 6–3: Market expansion capex – 2011 to 2020



6.3.1.1 Factors influencing the forecast for the 2015-20 AA period

224. Market development capex is driven by the forecast volume of new customer connections. 188,362 new connections are forecast for the 2015-20 AA period compared with 164,703 expected for the current AA period. Most of the increase is forecast to occur in new estates and in medium-density premises.

Figure 6–4: New connections – 2015-20 forecast vs 2010-15 actual/estimate



6.3.1.2 Forecasting basis and justification

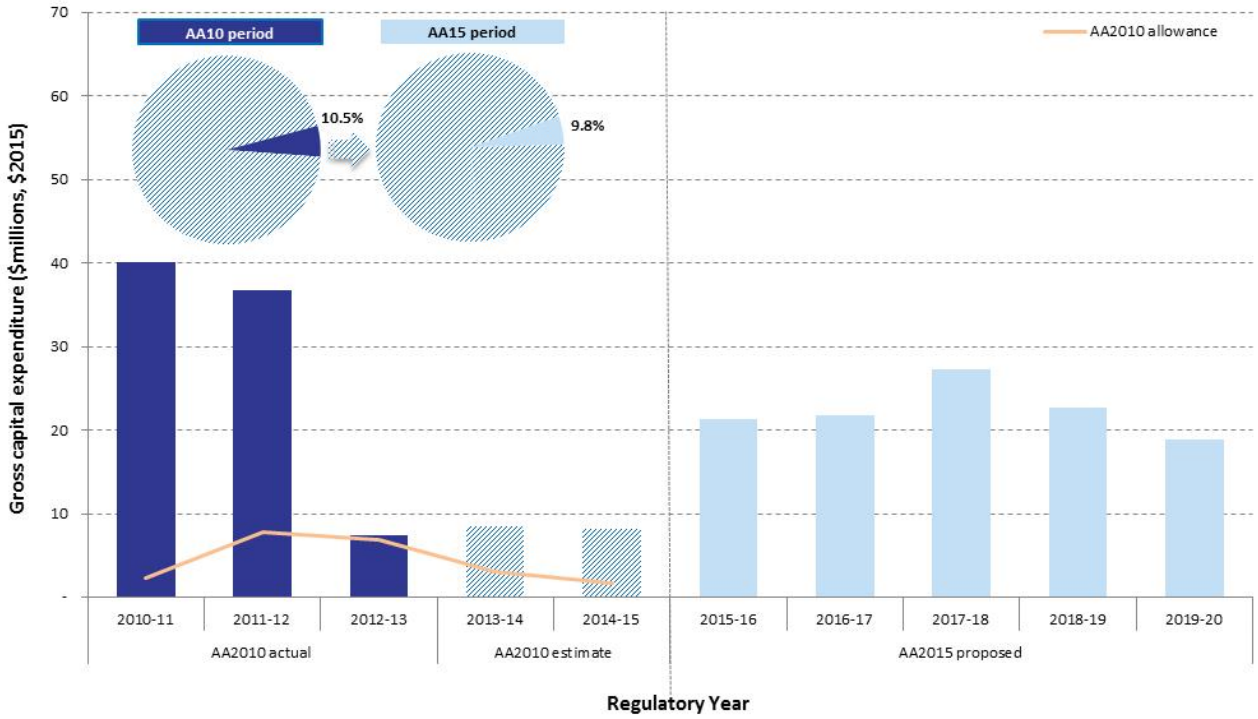
225. Market expansion activities are, for the most part, high volume routine activities. Expenditure is forecast as the product of forecast volumes of new connections and unit rates.

226. Market expansion expenditure is primarily justified on the basis of rule 79(2)(b).

6.3.2 CAPACITY DEVELOPMENT

227. Capacity development expenditure covers augmentation and other works, generally deeper in the network, required to support demand growth. This may involve the installation of additional or higher-capacity mains, and/or increasing the capacity of pressure reduction equipment.

Figure 6–5: Capacity development capex – 2011 to 2020



6.3.2.1 Factors influencing the forecast for the 2015-20 AA period

228. Capacity development is directed towards meeting growth in peak hourly demand on the distribution network. Additional capacity is required to accommodate demand from new customers and to meet organic growth, that is, growth in peak demand from existing customers as they upgrade or add appliances. For example, continuous-flow hot water appliances are characterised by peakier consumption than the storage hot water heaters installed historically. JGN has no control over organic growth and actively markets to promote customer-initiated new connections.

6.3.2.2 Forecasting basis and justification

229. Projects for capacity development are identified for inclusion in the AMP and capex forecasts through various planning, monitoring, validation and risk assessment activities. The approach that JGN takes to forecasting the capital cost of these projects is a function of project size and complexity.

230. JGN also includes in its capex forecast an annual budget allocation for minor capacity-related capital works that are identified after the AMP is approved each year. An example would be a mains reinforcement of 100 m of 50 mm nylon to maintain the terminal pressure at a location where local gauging during winter has indicated potential supply restrictions. This allocation is forecast on the basis of the historically observed average level of expenditure.

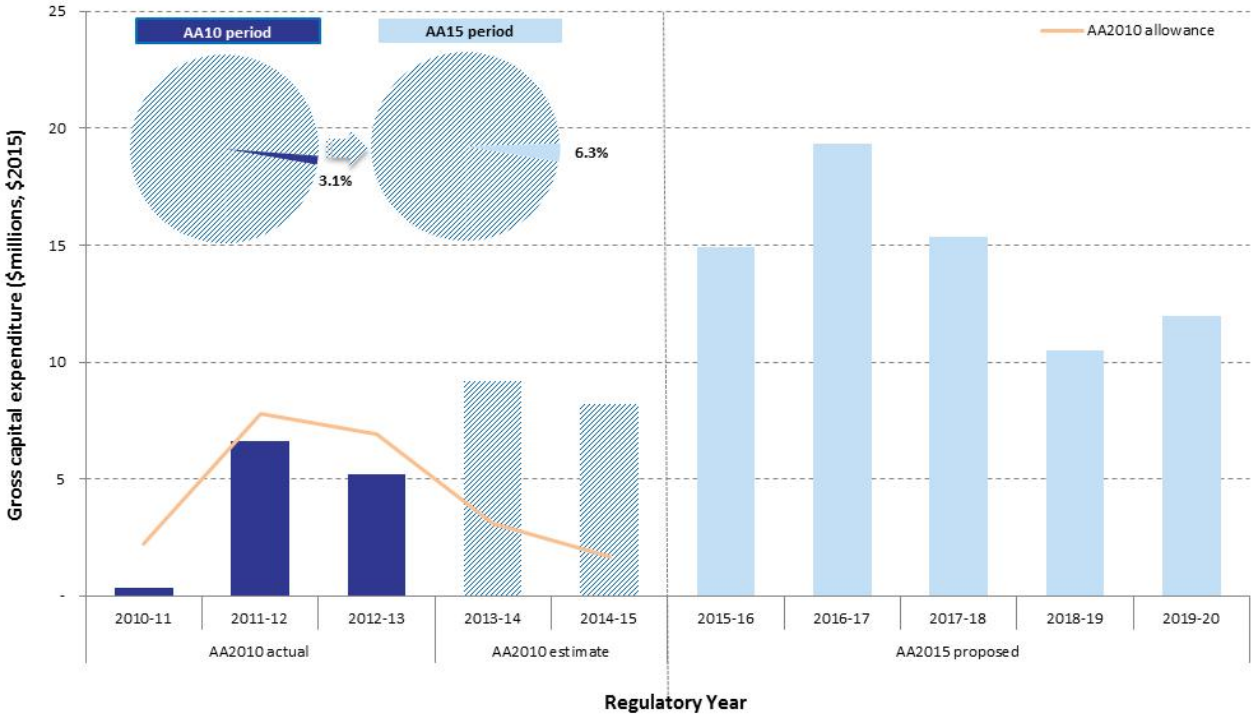
231. JGN invests in capacity development projects to:

- maintain the security and reliability of supply (rule 79(2)(c)(ii))
- maintain its capacity to supply existing services (rule 79(2)(c)(iv)).

6.3.3 MAINS AND SERVICES RENEWAL

232. Expenditure in this category is required to replace gas mains and services that have reached the end of their economic life. This occurs most often where gas leakage or maintenance requirements in a particular area or for a particular section of mains are such as to justify replacement.

Figure 6–6: Mains and services renewal capex – 2011 to 2020



6.3.3.1 Factors influencing the forecast for the 2015-20 AA period

233. JGN renews low and medium pressure gas mains and services that have reached the end of their economic life when necessary to maintain:

- public and employee safety
- levels of reliability
- economic levels of serviceability.

234. The majority of renewal activity is planned although some is reactive in nature. Mains renewal or replacement has historically been required for old cast iron or in some cases galvanised or unprotected steel mains that have high levels of gas leakage due to joint degradation or corrosion resulting in holes in the mains. Mains renewal is also conducted for older grades of plastic mains which are susceptible to brittle fracturing or that have joining methods that have an unacceptable risk of failure and are now deemed substandard.

235. Mains and services renewal expenditure and capacity development expenditure (section 6.3.2) are primarily required to address localised supply constraints or leakage issues which, if left unresolved, would result in some customers receiving inferior levels of service quality and reliability. For example, the supply pressure in an area may be so low that customers cannot install modern, efficient, appliances such as continuous-flow hot water heaters that have high peak consumption rates. In the consultations that JGN has conducted in preparing its 2015 AA submission, customers have indicated support for maintaining the quality and reliability of service

currently available to most customers and improving levels of service in specific parts of the network to ensure customers experience equitable and universal service levels.[34]

6.3.3.2 Forecasting basis and justification

236. Budget allocations for mains and services renewal include:

- capital works related to renewal of mains and services—localised renewal of sections of main and associated services that pose unacceptable risk or have reached the end of their economic life (specific projects are identified each year)
- capital works related to renewal of individual services that pose unacceptable risk or have reached the end of their economic life.

237. Forecasts for larger projects are based on historical proposals and average unit rates from comparable recent projects and current contractor panel unit rates, with larger projects (>$0.2M) being estimated using the PEM. Detailed estimates are developed for projects prior to final approval and release of funds.

238. JGN also includes in its capex forecast an allocation for minor mains and services renewal capital works. This allowance is for reactive minor renewal projects typically of up to 250 m of pipe or individual services that pose an unacceptable risk or have reached the end of their economic life. In some circumstances undertaking minor capital rehabilitation can also defer the requirement for rehabilitation of a wider area.

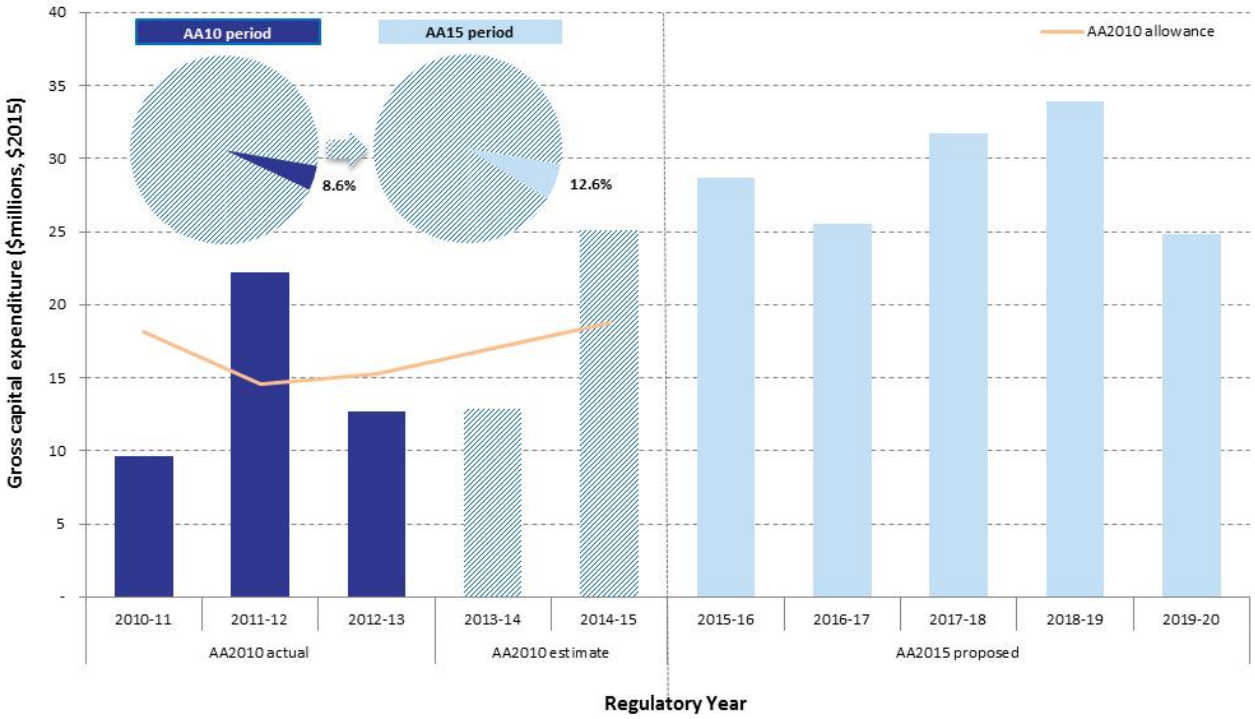
239. Mains and services renewal expenditure is primarily justified on the basis of rules 79(2)(b) and 79(2)(c)(i)—(iv).

6.3.4 FACILITIES RENEWAL AND UPGRADE

240. Expenditure in this category is required to renew or upgrade network facilities such as pressure reduction stations that have integrity, workplace health and safety, capacity, regulatory compliance, or similar issues, or have otherwise reached the end of their economic lives. Total planning costs have been allocated to facilities renewal and upgrade.

[34] The customer and stakeholder engagement program is discussed in detail in appendices 1.4 and 1.5.

Figure 6–7: Facilities renewal and upgrade capex – 2011 to 2020



6.3.4.1 Factors influencing the forecast for the 2015-20 AA period

241. A large proportion of JGN's high pressure network was constructed up to, and soon after, the introduction of natural gas to NSW in December 1976. Consequently, many of the assets are approaching 40 years old and the end of their economic lives, or are reaching a stage where much more intensive monitoring and maintenance is required. Additionally, some of JGN's network facilities are experiencing urban encroachment and must be upgraded to meet safety and integrity requirements in this modified environment.

242. Compared to the current AA period, JGN forecasts a 75 per cent increase in expenditure on facilities renewal and refurbishment over the next AA period. The increase in this category is due to:

- *projects rescheduled from the current AA period*—a small number of the 75 facilities projects forecast for the current AA period did not proceed for technical and other reasons and have been re-scoped and/or re-scheduled for the next AA period:
  - *pigging facilities for the Mount Keira to Wollongong section of the Wilton to Wollongong trunk*—deferred as JGN is currently operating the pipeline at a pressure well below its maximum allowable operating pressure (**MAOP**)
  - *pigging facilities for Sydney Primary Main*—investigative works identified a level of complexity that required resolution before the project could commence. Complexity included the land acquisition process and difficulty determining the configuration of the 40 year old main and whether it can accept a pig
  - *Riverina HP facilities upgrade stage 2: upgrade of TRSs and POTS supplying towns off APA's Riverina lateral*—based upon the connection agreement between JGN and APA, JGN will need to upgrade its facilities when APA increases the operating pressure in the lateral or removes the 'temporary' pressure control station at Burnt Creek. JGN had expected APA to increase the pressure in the Riverina lateral during the current AA period, but this has not occurred and it is now expected to occur during the next AA period

- *refurbishment of Auburn, Banksmeadow, Haberfield, and Windsor TRSs*—additional options were identified and planning for these projects is currently being finalised. Additionally, land considerations are currently being resolved
- *automatic line break valve refurbishment*—the scope and delivery strategy was amended to ensure a more efficient delivery of the project.

- *the northern trunk pressure increase mitigation project*—will upgrade JGN's receiving stations on the northern trunk to handle pressures up to 6,000 kPa that are expected when a new supply source is connected to the trunk system in the vicinity of Newcastle. This connection is expected to come from coal seam gas developments in the Northern Sydney Basin, Gloucester Basin and/or the Gunnedah Basin
- *capitalising integrity investigation costs*—JGN performs in-line inspections typically every ten years, and integrity digs on a periodic basis. The value of these investigations is effectively applied over the period between successive rounds of activity. In the 2010 AAI, the AER required those costs to be treated as opex. However, in subsequent decisions for APA GasNet[35] and the Roma to Brisbane Pipeline[36], the AER has accepted capitalisation of those costs. Capitalisation is also consistent with accounting treatment and supports mitigation of the impact of wholesale gas price on end-retail prices.

6.3.4.2 Forecasting basis and justification

243. Projects are identified for inclusion in the AMP and capex forecast through various planning, monitoring, risk and engineering assessment activities. The approach that JGN takes to forecasting the capital cost of these projects is a function of project size and complexity as described in section 6.2.3.1 . JGN also includes an annual budget allocation for a number of minor capital projects identified after the AMP is approved each year.

244. Committed estimates are developed for projects prior to final approval/release of funds.

245. Facilities renewal and upgrade expenditure is primarily justified on the basis of rules 79(2)(c)(i)—(iv). The expenditure is required to maintain the integrity and safety of JGN's network and to ensure continued provision of existing services. The expenditure is also required to comply with obligations under the Gas Supply Act, Gas Supply (Safety and Network Management) Regulation 2013 (NSW) (including regulations requiring compliance with AS4645), and obligations under the Pipelines Act and the Pipelines Regulation 2013 (NSW) (including regulations requiring compliance with AS2885).

6.3.5 METER RENEWAL AND UPGRADE

246. Expenditure in this category is required to replace and/or upgrade meters and related equipment that has failed or otherwise reached the end of its economic life.[37]

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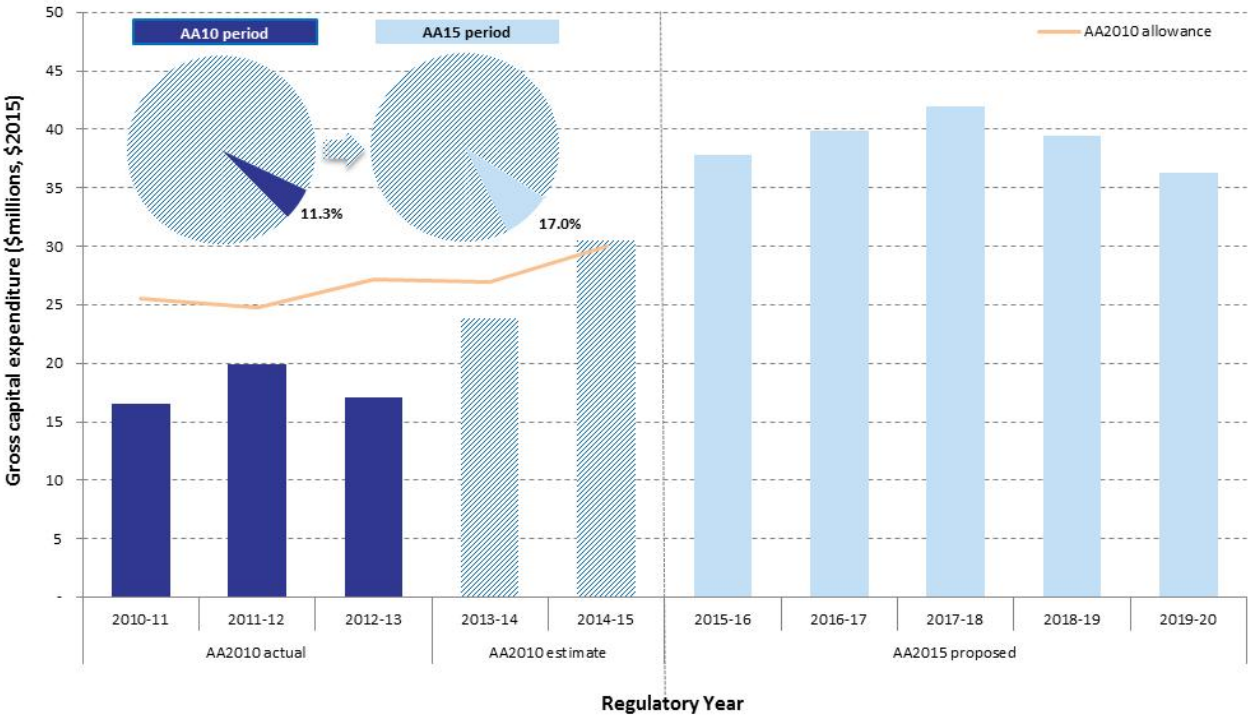
35 See APA GasNet Australia (Operations) Pty Ltd, *Access Arrangement Submission, 1 January 2013 to 31 December 2017*, March 2012, p. 109; and AER, *Access arrangement draft decision APA GasNet Australia (Operations) Pty Ltd 2013–17*, Part 1, September 2012, pp 51—52.

36 See APT Petroleum Pipelines Limited, *Access Arrangement Submission Effective 12 April 2012 – 30 June 2017*, October 2011, p. 43 and APT Petroleum Pipelines Limited, *SIB Business Cases Covering the period 12 April 2012 – 30 June 2017*, pp 1—7; and

AER, *APT Petroleum Pipeline Pty Ltd Access arrangement draft decision Roma to Brisbane Pipeline 2012–13 to 2016–17*, April 2012, p. 181.

37 This category of expenditure does not include new meters installed as part of new connection work. Capex on new connection meters is included in the market expansion capex forecast.

Figure 6–8: Meter renewal and upgrade capex – 2011 to 2020



6.3.5.1 Factors influencing the forecast for the 2015-20 AA period

247. JGN replaces and upgrades meters and related equipment (which includes the filter/regulator or separate filter and regulator, and data logging or telemetry equipment where applicable) when necessary, to maintain the integrity of measurement of gas delivered and/or the safety of the metering installation. Replacement activity is largely planned, but there is some reactive replacement.

248. JGN manages residential gas meters in accordance with the requirements of AS4944 which requires replacement of meters after 15 years unless granted a life extension. Life extensions are granted on the basis of statistical sampling studies. A significant population of residential gas meters is approaching the end of its economic life and must be replaced during the 2015-20 AA period. In addition, certain types of residential hot water meters have been found to be failing prematurely and will be replaced. Approximately 266,000 residential meters—gas and water—are forecast for replacement in the next AA period, compared with approximately 191,000 in the current AA period.

6.3.5.2 Forecasting basis and justification

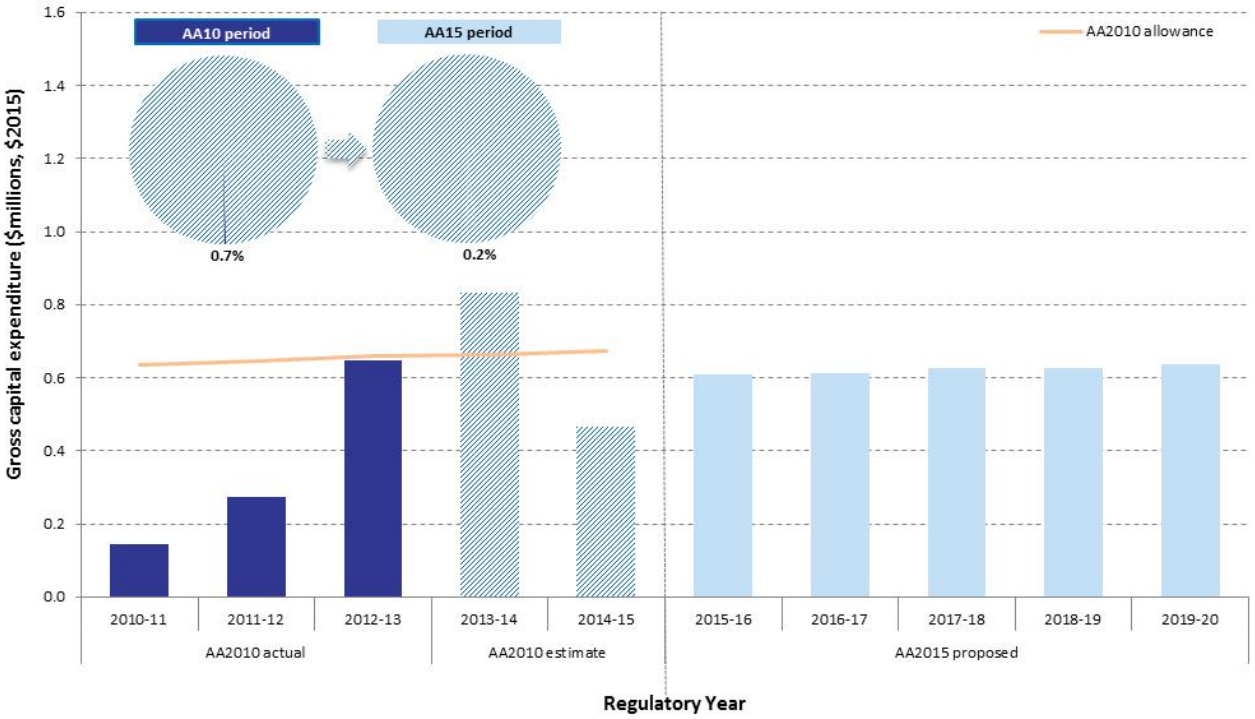
249. Like market expansion activities, planned meter renewals and upgrades are considered high volume routine activities and are estimated based on forecast volumes and unit rates. Forecast unit rates are based on current rates for purchase.

250. Meter renewal and upgrade expenditure is primarily justified on the basis of rules 79(2)(c)(ii) and (iii).

6.3.6 GOVERNMENT AUTHORITY WORK

251. From time to time, government authorities require JGN to move its gas mains or other assets to enable the authority to perform works such as road re-alignment or widening. Private property owners may also request JGN to modify or re-locate network assets.

Figure 6–9: Government authority work capex – 2011 to 2020



6.3.6.1 Factors influencing the forecast for the 2015-20 AA period

252. Where arrangements with the relevant authority or landowner do not provide JGN with a right guaranteeing the location of its assets, JGN must relocate them as required by the authority or landowner at its own expense. In cases where JGN does have such rights, it will recover the cost of relocation from the authority or landowner.

6.3.6.2 Forecasting basis and justification

253. JGN forecasts a cost of $0.6M per year for this government authority work, based on the historical trend. The timing and cost to JGN of this work is dependent on the requirements of the relevant authority or landowner and JGN's rights and is generally not predictable. The historical trend is considered the best basis for forecasting in these circumstances. Committed estimates are developed for projects prior to final approval/release of funds.

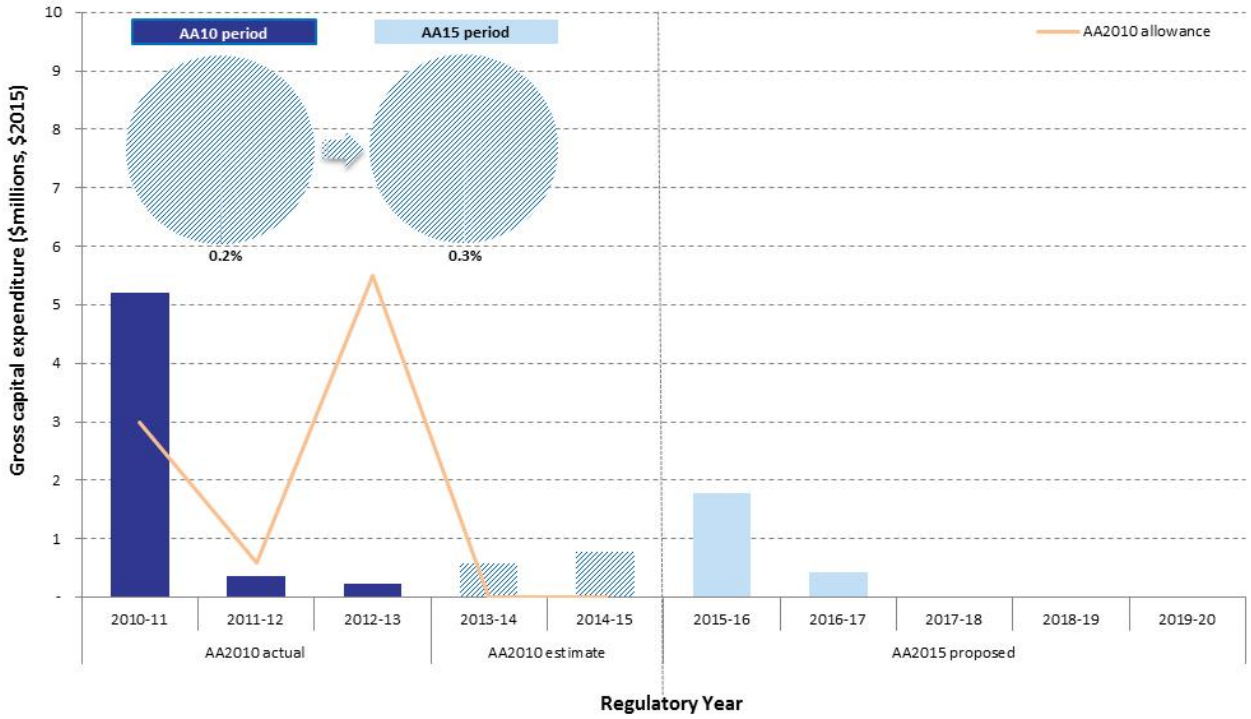
254. Government authority work is primarily justified on the basis of rule 79(2)(c)(iv).

6.3.7 MINE SUBSIDENCE

255. Expenditure in this category is required to manage and mitigate the effects on network assets of ground subsidence that can occur when mining takes place beneath or in the vicinity of those assets. It also includes the cost of monitoring the asset's condition where subsidence is anticipated and the monitoring leads to capital works.[38]

[38] See Australian Competition Tribunal, Application by Jemena Gas Networks (NSW) Ltd (No 3) [2011] ACompT 6.

Figure 6–10: Mine subsidence capex – 2011 to 2020



6.3.7.1 Factors influencing the forecast for the 2015-20 AA period

256. The timing of capex is driven by the long-wall mining schedule and agreement with owners of other assets—the EGP and the Gorodok ethane pipeline—impacted by mine subsidence. BHP Billiton will complete mining at its Westcliff mine in 2016 and no other mining activity is anticipated in the vicinity of the trunk pipeline during the 2015-20 AA period. As a consequence, capex for mine subsidence in the 2015-20 AA period is expected to be significantly less than in the current AA period.

6.3.7.2 Forecasting basis and justification

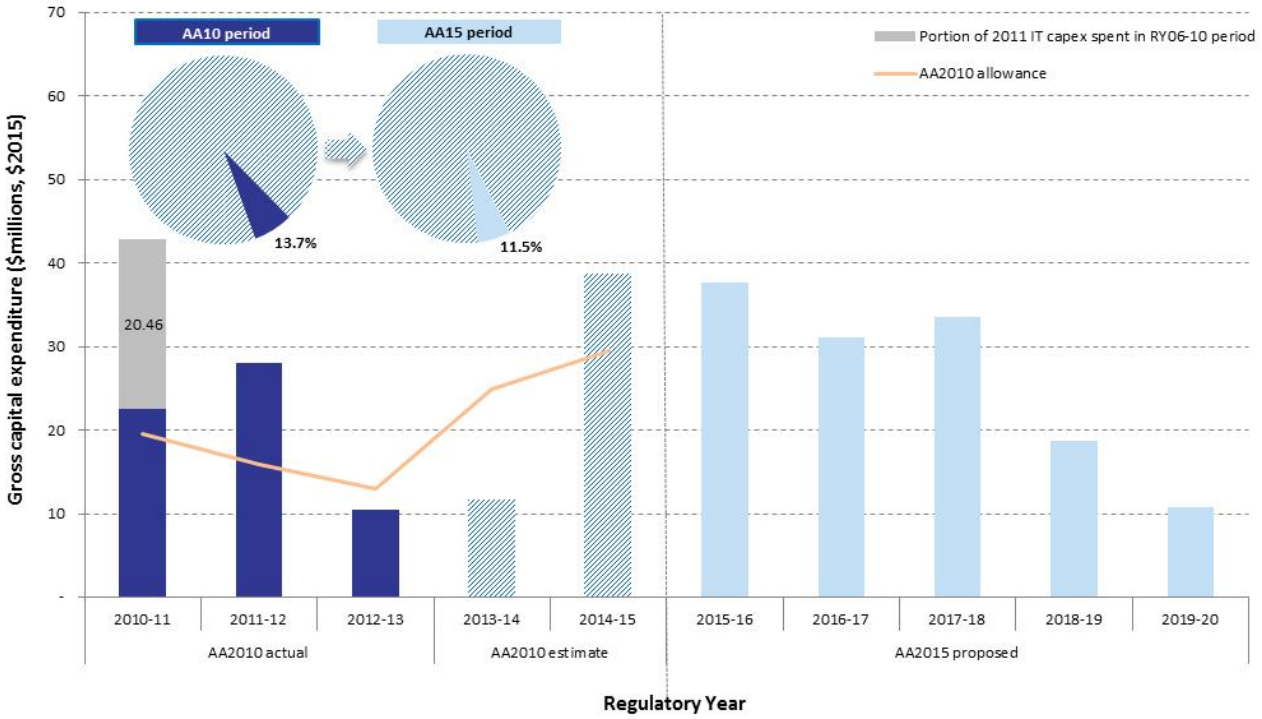
257. Mine subsidence expenditure is forecast by analysing historical mine subsidence projects. The amounts forecast are an estimate of JGN's share of the gross costs (the other shares being allocated to EGP and Gorodok) before recovery from BHP Billiton or the Mine Subsidence Board. Those recoveries, when received, are treated as capital contributions.

258. Mines subsidence expenditure is primarily justified on the basis of rules 79(2)(c)(i) and (ii).

6.3.8 INFORMATION TECHNOLOGY

259. IT capex involves projects to develop and maintain IT capacity and deliver improved IT capabilities necessary to support business operations, including to ensure compliance with regulatory requirements.

Figure 6–11: Information technology capex – 2011 to 2020



(1) As reported in JGN's annual RIN response for 2010-11, IT capex for 2010-11 includes an amount, shown here as $20.46M, that was spent in the previous AA period.

6.3.8.1 Factors influencing the forecast for the 2015-20 AA period

260. Forecast IT capex is driven a number of needs, including to:

- sustain the IT asset base through upgrades, optimising asset performance, and providing for growth
- complete the large scale GASS+ replacement project which commenced in 2014 and will be completed in 2017
- replace systems that have come to the end of their useful or economic life and retiring systems and technologies that have become redundant as new systems replace their business and technical purpose
- add new systems and technologies to modernise JGN's IT capability in areas such as geographic information systems, field mobility, business intelligence and analytics, where JGN has gaps when benchmarked against comparable businesses.

261. Some of the projects planned for the next AA period have been deferred from the current AA period because scarce resources were engaged in implementing changes to support compliance with the NSW transitional NECF obligations. These resources were not included in the 2010-15 AA capex forecast and did not meet the materiality threshold for cost pass through under the 2010 AA.

6.3.8.2 Forecasting basis and justification

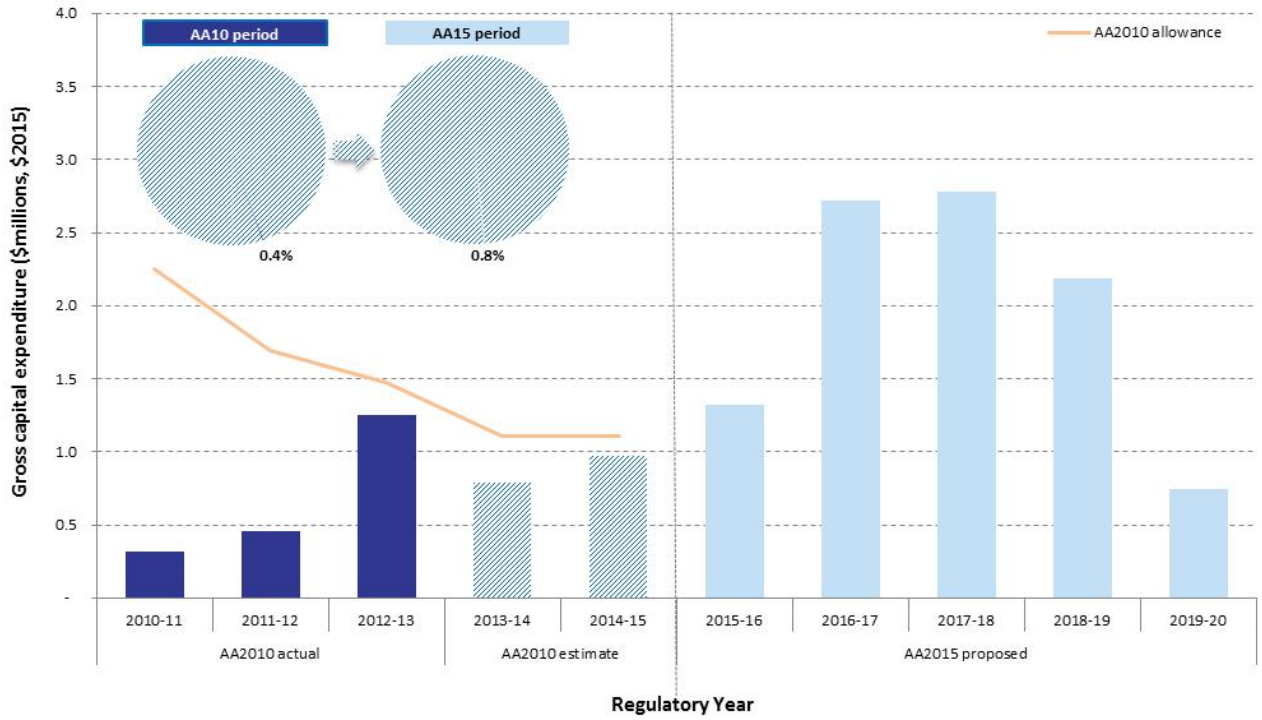
262. IT expenditure is necessary to replace and or/upgrade the IT systems and hardware required to support the operation of the JGN network and associated business activities such as billing and accounting. In most cases that expenditure will be justified by one or more of the sub-rules in rule 79(2)(c).

263. Further detail is provided in the forecast capital expenditure report provided as appendix 6.7.

6.3.9 SCADA

264. Facilities in this category monitor and control network assets, and contribute to the performance of core business functions including billing, gas despatch and distribution, and demand management.

Figure 6–12: SCADA capex – 2011 to 2020



6.3.9.1 Factors influencing the forecast for the 2015-20 AA period

265. SCADA capex is driven by:

- gas network growth which requires additional remote telemetry units to monitor and, in some cases, control new network assets
- replacement of aging hardware
- replacement and updating of SCADA software.

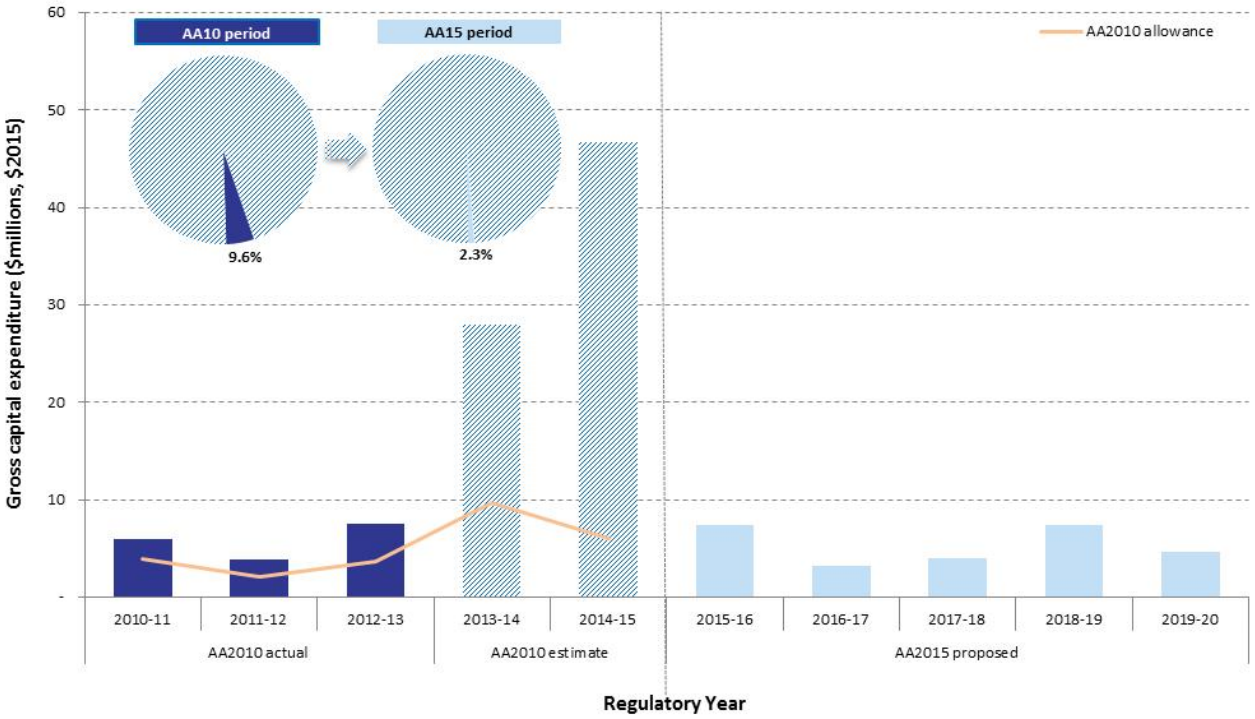
6.3.9.2 Forecasting basis and justification

266. The SCADA system is critical to the management and operation of the network. The forecast expenditure is required to replace and/or upgrade SCADA and communication hardware and software assets thereby maintaining the integrity of the system, and to accommodate growth. The expenditure is justified under rules 79(2)(c)(i), (ii) and (iv).

6.3.10 OTHER – NON-DISTRIBUTION

267. Expenditure in this category covers motor vehicles, property and smaller non-network capital items such as tools, furniture and office equipment.

Figure 6–13: Other – non-distribution capex – 2011 to 2020



6.3.10.1 Factors influencing the forecast for the 2015-20 AA period

268. JGN will incur significant once-off property-related costs in the current AA period, principally for office and depot relocations and to develop a new meter testing facility. There are no similar costs forecast for the 2015-20 AA period.

269. In the past, this category has also included capitalised costs associated with JGN's AA obligations including development of JGN's AA submission, preparation of RIN responses, and ring fencing and other compliance reporting. For the next AA period, these costs will be treated as opex (refer appendix 7.3).

6.3.10.2 Forecasting basis and justification

270. JGN requires vehicles to manage and operate its network. Vehicles are replaced in accordance with good industry practice that reflects the lowest long-run cost of vehicle operations. Accordingly, motor vehicle/fleet capex is justified under rule 79(2)(c)(iv).

6.4 SCENARIO ANALYSIS

271. JGN has analysed a number of scenarios[39] to assess the long-term outcome for customers, as measured by required revenue per customer, of varying capex during the 2015-20 AA period:

- *scenario 1*—service levels maintained within the range of current acceptable limits – this scenario is the base case for the scenario analysis

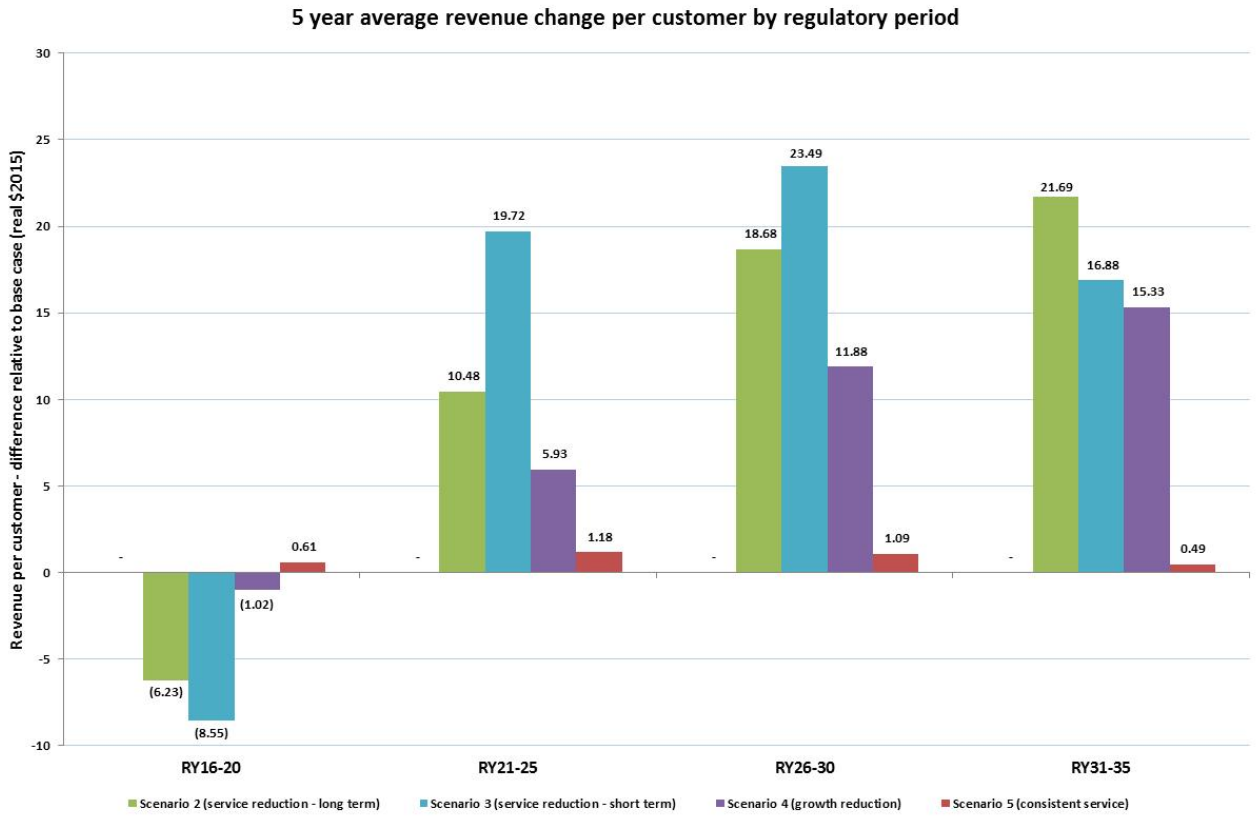
[39] This analysis is described in greater detail in appendix 6.1.

- *scenario 2*—a permanent service reduction – assessing the effect of reducing capex with a consequential reduction in the level of service
- *scenario 3*—temporary service reduction – a short term reduction in capex requiring catch-up at a later time to maintain service standards
- *scenario 4*—growth reduction – the effect of curtailing investment in growth
- *scenario 5*—providing a consistent level of service to all customers – to assess the long-term cost of expenditure to rehabilitate areas of the network where quality of service is currently sub-standard.

272. In each case, the analysis takes into account the consequential effects on opex and market growth of changing capex.

273. Figure 6–14 summarises the results of the analysis.

Figure 6–14: Capex scenario analysis



274. In each of scenarios 2, 3 and 4, customers face higher costs in the long-term than in the base case. Scenario 5 shows that expenditure required by JGN to provide a consistent level of service to all customers results in only a modest cost increase for customers generally.

275. Comparing the scenarios, scenario 5 is assessed to deliver the most preferable long-term outcome for customers. Those customers and customer representatives that JGN has consulted support this view.

6.5 KEY INPUTS AND ASSUMPTIONS

276. This section describes the key inputs and assumptions that underpin JGN's capex forecast. Those factors are: the demand forecast, asset condition assessment, unit rates and project cost estimates, provision for scope uncertainty, wages growth, and material costs escalation.

6.5.1 DEMAND FORECAST

277. Forecast customer connection numbers are an input to forecast market expansion expenditure. JGN's demand forecast includes forecast numbers of new connections and is described in detail in chapter 5.

278. Forecast capacity development expenditure is required to relieve localised capacity constraints which occur when peak hourly demand exceeds the capacity of the network to deliver to the area. Those areas are identified through reports of poor supply, analysis of pressure data obtained from SCADA and winter pressure gauging, load growth trends for the area and network modelling. There is no direct relationship between the aggregate annual demand forecast described in chapter 5 and the localised conditions and observations that drive capacity development expenditure.

6.5.2 ASSET CONDITION ASSESSMENT

279. As part of its asset management processes, JGN constantly monitors the condition and performance of all asset types and identifies those that require renewal and replacement. Monitoring techniques include:

- analysis of public leakage reports and supply interruption reports
- programmed leakage surveys and analysis of UAG measurements
- in-line inspections and integrity digs
- statistical sampling of meter populations
- analysis of maintenance records from JGN's works management system.

6.5.3 COST ESTIMATES

280. JGN engaged K Lowe Consulting to provide advice on the margin paid by JAM to ZNX (2) Pty Ltd (**Zinfra**) under the Field Services Agreement between JAM and Zinfra (**FSA**) that applies to the southern region of the JGN network (refer appendix 6.8). Under the FSA, Zinfra performs small and routine program activities for JAM, either itself or through a panel of contractors. This forecast margin is included in the market expansion forecast, reflecting the nature of the majority of the work undertaken by Zinfra for JAM. K Lowe Consulting concluded that the management margin (assuming all KPIs under the FSA are met by Zinfra) falls within the EBIT margin benchmark range. It is therefore within the range of margins earned by other contractors providing asset management services of the same or similar nature.

281. The costs of most small and routine program activities such as meter replacements and new connections are based on unit rates applied to the forecast volumes of work. JGN maintains an extensive database of unit rates at the activity level derived from observed historical costs and competitively tendered rates. Projects in this category account for 56 per cent of total forecast capex for the 2015-20 AA period.

282. The forecast costs of larger and non-standard projects are estimated individually as described in section 6.2.3. Most capacity expansion and facilities renewal projects are in this category.

283. As described in section 6.2.3, projects included in the capex forecast are at an early gate stage in the project life cycle. JGN engaged Evans and Peck (**E&P**) to review and provide an expert opinion on JGN's capital cost

estimation method and, in particular, to validate the allowances that JGN includes in its estimates to provide for the scope-related cost increases that occur on average for all projects between initial scoping at early gates and project completion.

284. E&P concludes that JGN's capital cost estimating method satisfies the requirements of rules 74 and 79(1)(a) in the NGR and, in particular, that the allowances that JGN makes for scope uncertainty are appropriate and consistent with rules 74 and 79(1)(a). E&P's report is provided as appendix 6.9.

6.5.4 WAGES GROWTH AND MATERIALS COST ESCALATION

285. JGN's costs are affected by changes in key labour and materials input costs. JGN engaged BIS Shrapnel (**BIS**) to provide an expert opinion regarding the outlook for wages and relevant material cost escalation over the seven year period to 30 June 2020. JGN has adopted BIS's forecasts of comparable wages growth rates for Enterprise Bargaining Agreement (**EBA**) and non-EBA wages growth and its forecasts of price escalation for concrete, steel, plastic, aluminium, and brass as inputs to its capex forecast. BIS's forecasts are summarised in Table 6–4 and its underlying expert report is included as appendix 6.10.

Table 6–4: Real cost escalators (per cent) – summary

Escalators	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
EBA	0.80	0.64	1.23	1.75	1.97	2.19	2.27
Non-EBA	0.22	0.54	1.24	1.61	1.52	1.19	1.45
Concrete	-1.00	4.50	4.50	-0.50	-2.00	-1.10	0.50
Steel	7.42	5.11	0.98	-0.20	7.96	-8.87	-5.11
Plastic	6.44	1.39	-1.08	-0.22	6.49	-6.21	-3.56
Aluminium	4.76	1.45	5.56	3.86	11.00	-6.53	-2.44
Brass	7.88	3.39	1.94	2.13	9.53	-8.84	-5.31

Source: BIS Shrapnel

286. The weight applied to each escalator in each distribution capex category is derived from an analysis of the actual split for JGN's financial year ending 31 March 2013 (FY13) in consultation with project managers and key personnel.

6.5.5 ABILITY TO ATTRACT CAPITAL

287. JGN notes that its proposed capital program requires a significant cash outlay over the 2015-20 AA period totalling $1,148.5M. JGN's financial capacity to undertake this large capital program depends on the outcomes of this AA review and, in particular, the rate of return and price path. That is, there is a strong interdependency between JGN's forecast capex and the proposed rate of return discussed in chapter 9 and the price path discussed in chapter 12. Together these determine the cash flow which must be sufficient to sustain JGN's forecast prudent capex.

6.6 SUMMARY OF FORECAST CONFORMING CAPITAL EXPENDITURE

288. JGN believes that the capex forecasts are the best forecasts possible in the circumstances because:

- each project and program is supported by specific substantiation document (for example, demand forecast, OB, or feasibility assessment) which explains the prudency of each project or program

- fit-for-purpose cost estimation methods have been applied and reviewed by independent experts
- forecast real cost escalators that are relevant to the types of materials and labour inputs included in the forecast capex program have been sourced from an independent expert and applied in the forecasting process.

Table 6–5: JGN gross capex – forecast ($2015, $millions)

Details	2015-16	2016-17	2017-18	2018-19	2019-20	Total 2016-20
Market expansion	86.47	91.13	91.49	90.34	91.49	450.91
Capacity development	21.29	21.78	27.30	22.76	18.87	111.99
Mains and services renewal	14.92	19.33	15.37	10.51	11.99	72.13
Facilities renewal and upgrade	28.67	25.52	31.75	33.94	24.82	144.70
Meter renewal and upgrade	37.85	39.88	41.93	39.45	36.24	195.35
IT	37.63	31.04	33.47	18.66	10.82	131.61
SCADA	1.32	2.72	2.78	2.19	0.75	9.76
Other – non-distribution	7.36	3.26	4.00	7.44	4.71	26.77
Mine subsidence	1.79	0.42	0.00	0.00	0.00	2.21
Government authority work	0.61	0.61	0.63	0.63	0.64	3.11
Total	**237.91**	**235.69**	**248.71**	**225.91**	**200.32**	**1,148.54**

7. OPERATING EXPENDITURE

Box 7–1 Key messages – operating expenditure

JGN's opex program delivers critical activities to support the operation and maintenance of our assets, and the continued efficient administration and management of Australia's largest gas distribution business.

JGN has employed two methods for forecasting its opex costs in the next AA period:

- *the AER's preferred base, step and trend approach*—applied to the overall opex amount within the adjusted base year (2013-14), net of opex cost categories that are subject to specific annual forecasts over the 2015-20 AA period, which accounts for 84 per cent of our opex forecast
- *specific year-by-year forecasts*—for the remaining items where base year costs are not representative of the future.

Forecast opex for the next AA period is $818.0M ($2015) compared with expected opex over the current AA period of $802.2M ($2015).

JGN has incorporated an independent expert's forecast productivity adjustment of 1.03 per cent per annum into its opex forecast to reflect our drive to continually improve our opex efficiency, and share the benefits with our customers (refer chapter 11 – Incentive Mechanisms).

289. JGN must submit the best forecast of opex that JGN would incur as a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services over the 2015-20 AA period.

290. This chapter explains how JGN has developed the best possible opex forecast in the circumstances, and demonstrates how its opex forecast complies with the relevant provisions of the NGR. The chapter is structured as follows:

- section 7.1 provides an overview of JGN's opex forecasts for the next AA period
- section 7.2 describes JGN's operating cost categories
- section 7.3 outlines JGN's maintenance planning approach
- section 7.4 explains JGN's opex forecasting method
- section 7.5 demonstrates that JGN's base year opex is efficient
- section 7.6 presents and explains JGN's opex forecast
- section 7.7 describes the expected benefits to customers from delivering the opex forecast.

7.1 SUMMARY

291. Opex is a major component of network expenditure accounting for approximately 29.9 per cent of JGN's total cost of service over the 2015-20 AA period. Forecast opex for the next AA period is $818.0M ($2015)

compared with expected opex over the current AA period of $802.2M ($2015) (see section 4.3 for more details on current period opex).[40]

292. JGN's forecast opex over the 2015-20 AA period is shown in Table 7–1. The forecast opex model is provided as appendix 7.1.

Table 7–1: JGN forecast opex ($2015, $millions)

Details			Next AA period				
	2013-14 (adjusted base year)	2014-15	2015–16	2016–17	2017–18	2018–19	2019–20
O&M	106.47	103.39	105.71	105.52	106.64	106.87	107.49
Non-O&M (A&O)	22.77	21.21	21.78	21.95	22.18	26.74	25.66
Non-O&M (Other)	37.11	34.24	33.15	33.36	33.52	33.64	33.80
Total forecast opex	**166.35**	**158.84**	**160.64**	**160.83**	**162.34**	**167.26**	**166.96**

293. JGN believes that its opex forecast is the best forecast possible in the circumstances and that it is arrived on a reasonable basis that reflects the costs of a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services. This conclusion is based on:

- the findings of EI's review of JGN's productivity performance
- the productivity factor incorporated into JGN's opex forecast
- JGN's opex forecast method being fit-for-purpose and consistent with the AER's preferred methods where appropriate.

7.2 OPERATING COST CATEGORIES

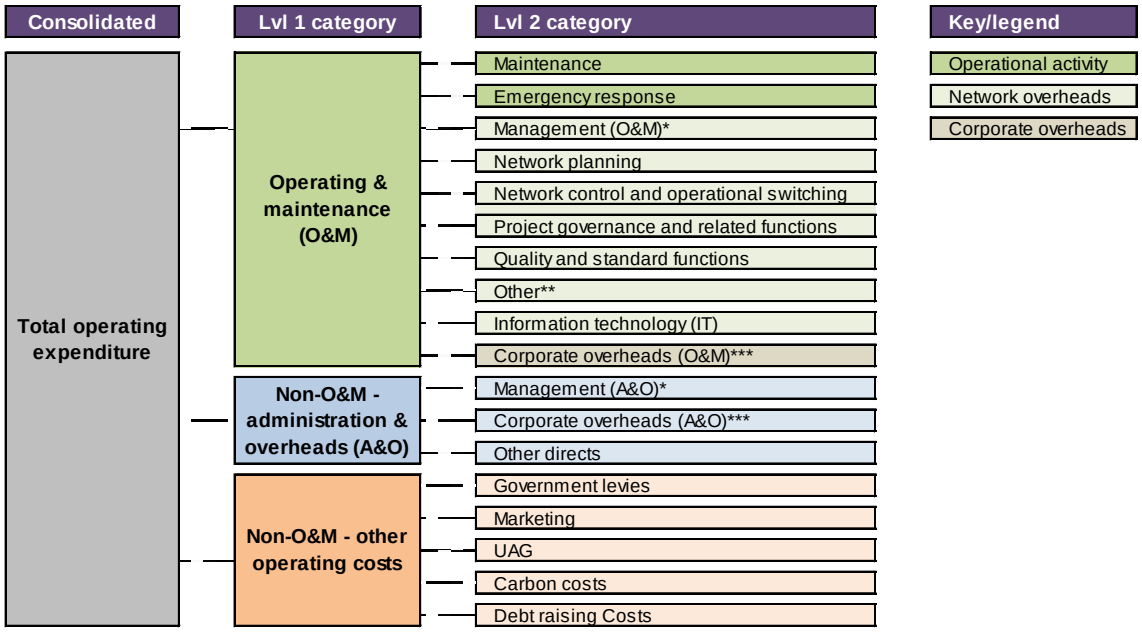
294. JGN separates its opex into three clearly defined high level categories:

- operating and maintenance (**O&M**)
- non-operating and maintenance—administration and overheads (**A&O**)
- non-operating and maintenance—other operating costs.

295. The first two of these relate to JGN's controllable operating costs, while the third category is a function of external factors outside JGN's control, with the exception of marketing costs. The composition of these major cost categories is illustrated in Figure 7–1.

[40] The forecast opex includes debt raising costs which are a benchmark allowance. Once these are excluded, the forecast opex is $797.5M ($2015).

Figure 7–1: JGN's operating cost categories



(1) * Management (O&M) relates to the general management of the network business, including management and support staff.

(2) * Management (A&O) relates to activities such as developing marketing strategy, managing customer relationships and perform market analysis and research for both residential and business customers, preparation and management of the regulated tariffs or strategy development, existing and new contract negotiations as well as business services.

(3) ** Other includes OH&S functions, training, network billing and customer service and call centre.

(4) *** Corporate overheads relate to corporate support and management services by the corporate office that can be either directly identified with specific operational activity (O&M) or allocated on a causation basis (A&O).

7.2.1 OPERATING AND MAINTENANCE (O&M)

7.2.1.1 Maintenance

296. Maintenance consists of operational repairs and maintenance of the distribution system including high, medium and low pressure assets as well as testing, investigation, validation and correction costs not involving capex. Maintenance includes both:

- *routine maintenance*—recurrent/programmed activities undertaken to maintain assets, performed regardless of the condition of the asset. Activities are predominantly directed at discovering information on asset condition and are undertaken at intervals that can be predicted
- *non-routine maintenance*—activities predominantly directed at managing asset condition or rectifying defects (excluding emergency call-outs). The timing of these activities depends on asset condition and decisions on when to maintain or replace the asset.

297. Insufficient maintenance funding will compromise asset condition and therefore the delivery of reliable network services in the long-term interests of customers. In the shorter term reduction in operations and maintenance expenditure and resourcing can have adverse consequences for safety.

7.2.1.2 Emergency response

298. Emergency response involves immediate operations and/or repairs necessary to restore failed components to an operational state where supply has been, or is in imminent threat of being, interrupted or where assets have

been damaged or rendered unsafe by a breakdown. This reflects customer expectations for a responsive network service that must be supported by sufficient emergency response funding.

7.2.1.3 Network overheads

299. Network overhead costs refer to the provision of network control and management services that cannot be directly identified with a specific operational activity (such as routine maintenance or emergency response). Insufficient funding for these activities will result in ineffective and unreliable network monitoring, management and reporting, thus compromising the safe, prudent and efficient delivery of network services.

300. This category comprises of the following functions:

- *management (O&M)*—general management of the JGN network business, including management and support staff not directly involved with any other functions listed in the network overhead categories
- *network planning*—developing visions, strategies and plans for the development of the JGN network. This includes functions such as demand forecasting, network analysis, preparation of planning documentation and area plans, as well as management directly associated with these functions. Importantly, this excludes planning costs for specific projects, which are attributed to direct costs
- *network control and operations*—control room operations and staff, management of field crews, dispatch operators, associated support staff, as well as management directly associated with these functions
- *project governance and related functions*—includes all costs associated with the approval and management control of network projects or programs. This includes the cost of functions such as project management offices, works management, project accounting or project control groups where these costs are indirectly charged to specific projects or programs
- *quality control and standard functions*—management of the quality and reliability of supply and associated functions. It also includes all functions associated with developing, maintaining and complying with network technical standards, service standards or quality of supply standards, as well as:
  - *network records*—developing and maintaining network records such as information in geographic information systems, network outage information, network capacity/ratings and network loading records
  - *asset strategy*—developing and maintaining strategies for the ongoing management of network assets. It excludes network planning strategy development and maintenance that is part of the network planning function, as well as network operational strategy development and maintenance that is part of the network control function
- *other*—other activities such as training, occupational health and safety (**OH&S**) functions, network billing and customer service and call centre activities.
- *information technology (IT)*—provision and management of IT infrastructure and services. These costs include salaries and other employee-related expenses, procurement of software and hardware, maintenance support costs, telecommunication costs, procurement of external advice and system support costs. Insufficient funding for IT services will impact the provision of critical back-office support to network operations and JGN's ability to safely and properly manage network assets and staff.

7.2.1.4 Corporate overheads (O&M)

301. This category comprises of the following functions:

- *corporate overheads (O&M)*—corporate support and management services by the corporate office that can be directly identified with specific operational categories. Corporate overheads are allocated to JGN using time writing data and other causal allocators. The activities that underlie these costs directly support the delivery of network services.

7.2.2 NON O&M – ADMINISTRATION AND OVERHEADS (A&O)

302. JGN's A&O relate to the proper management of JGN as a corporate entity and regulated business and allow JGN to meet its legal and regulatory obligations. This category comprises:

- *management (A&O)*—activities related to developing marketing strategy, managing customer relationships and perform market analysis and research for both residential and business customers, preparation and management of regulated tariffs and strategy development, existing and new contract negotiations. This also includes business services activities relating to customer and stakeholder claims including billing services.
- *corporate overheads (A&O)*—corporate support and management services by the corporate office that cannot be directly identified with specific operational activity. Corporate overhead costs typically include those for executive management, legal and corporate secretariat, human resources, finance, and other corporate head office activities or departments.
- *other directs*—relates to management of JGN's owned and leased land and other general and administrative expenses.

303. Management and corporate overhead costs are allocated to JGN using a causal allocator, where the allocation base is the most significant driver of consumption or utilisation of the resources or services of the costs or other account item that is being allocated.

7.2.3 NON O&M – OTHER OPERATING COSTS

7.2.3.1 Government levies

304. Government levies comprise annual licence and authorisation fees paid to the NSW Government and mains taxes paid each year by JGN to local government councils.

305. JGN pays licence fees in respect of the five pipeline licences that it holds for the pipelines that make up the trunk and an authorisation fee in respect of the reticulator's authorisation it holds for the remainder of the network. The fees are paid annually on invoices raised by DTIRIS for the pipeline licence fees (as provided in the Pipelines Act), and by IPART for the authorisation fee (as provided in the Gas Supply Act).

306. Local governments are authorised to charge mains taxes under section 611 of the Local Government Act 1993 (NSW). The charges are calculated as a percentage of the amount of revenue that JGN derives in the relevant local government area and amounts paid are subject to independent review.

7.2.3.2 Marketing

307. JGN has a marketing program that promotes natural gas as a fuel of choice. The program offers incentives to customers to install new natural gas appliances in their households while also driving new economic connections. The marketing function is critical to encouraging gas consumption and new economic connections to our network, to lower average networks prices in the long-term interests of customers.

7.2.3.3 Unaccounted for gas

308. JGN incurs costs replenishing gas that is lost, or unaccounted for, during distribution through the network. Under its RSA, JGN is responsible for the supply of gas in order to replenish UAG. A procedure defining how JGN meets this responsibility is detailed within the RSA. A UAG cost pass through event currently applies to each year's annual tariff variation for demand and price variations from forecast. JGN proposes a new automatic adjustment factor for UAG in the reference tariff variation mechanism (see chapter 14).

7.2.3.4 Carbon costs

309. This opex category relates to any costs associated with a government carbon scheme. Currently this captures costs associated with, primarily, fugitive emissions resulting from the operation of the carbon pricing mechanism (**CPM**).

Carbon pricing mechanism

310. JGN is currently obligated to surrender sufficient permits to meet its emissions liabilities under the Commonwealth Government's CPM, as prescribed in the Clean Energy Act 2011 (Cth) (**CE Act**). Under that legislation, JGN would incur a market-based, or 'floating', carbon price from July 2015 onwards.

311. The Australian Government has indicated its intention to repeal the CPM, however it has yet to successfully pass legislation to achieve this. It is expected that the Government will have an opportunity to negotiate successful passage of the legislation when new Senate members take up their positions from 1 July 14.

Fugitive emissions

312. The CE Act sets out the emission sources that are covered in the CPM. Fugitive emissions are the only emission sources that JGN is obligated to surrender permits for under the CE Act. The National Greenhouse and Energy Reporting (**NGER**) laws set the technical requirements for measuring carbon emissions that apply to emitters in the CPM.

313. In gas transmission and distribution, fugitive emissions may result from compressor maintenance at compressor stations, maintenance on pipelines, gas leakage and accidents. Emissions for transmission and distribution are treated differently under the NGER laws' prescribed calculation methods:

- *transmission pipe emissions*—under the NGER laws, pipelines with pressure greater than 1,050 kPa are treated as transmission pipelines (this includes JGN's trunk mains), with leakage calculated as a function of pipe length
- *distribution pipe emissions*—pipelines with pressure less than or equal to 1,050 kPa are treated as distribution pipelines with leakage calculated as a function of gas sales.

314. The majority of JGN's emissions are fugitive emissions from its distribution system.

7.2.3.5 Debt raising costs

315. The SGSPAA Group incurs costs when it raises funds, both debt and equity, to spend on JGN's capital program. These costs are passed through to JGN.

316. Debt raising costs are incurred each time debt is rolled over and may include underwriting fees, legal fees, company credit rating fees and other transaction costs.

317. JGN proposes expensing debt raising costs as a "Non-O&M – other operating" cost.

318. Further detail is provided in appendix 7.2.

7.3 MAINTENANCE PLANNING

319. Maintenance planning covers both planned and unplanned (including emergency response) elements of maintenance. JGN's approach to maintenance planning is based upon good industry practice as defined by the

appropriate Australian Standards suites—AS4645 and AS2885—covering gas distribution networks and gas pipelines respectively. Both standards are founded on a performance (or risk) based approach.

320. JGN's maintenance planning is aligned to Jemena's Asset Management Policy and therefore ensures that sufficient controls are in place to manage the risks identified in formal safety assessments or safety management studies. Considerations relevant to JGN's maintenance strategy include:

- criticality of network assets, being either individual asset classes, components of these asset classes or individual assets within the asset class. Criticality for this purpose includes the potential for adverse consequences arising from supply interruption, damage to property or personnel and/or environmental damage
- asset-specific criteria which may include the current condition of the asset, design life or age, the cost of the asset, available asset operating information, supplier recommendations and available support (including spares availability), statutory requirements or the asset's function within the distribution system.

321. Further information on maintenance planning is provided in JGN's AMP (refer appendix 6.2).

7.4 FORECASTING METHOD

322. JGN has employed two method for forecasting opex in the next AA period:

- *base, step and trend approach*—applied to the adjusted base year opex amount, which excludes opex cost categories that are subject to specific annual forecasts over the 2015-20 AA period
- *specific year-by-year forecasts*—for items where base year costs are not representative of the future.

323. JGN has adjusted the base year by subtracting costs relating to non-recurrent events and circumstances that are not expected to endure. JGN has then trended its adjusted base year costs forward, escalating or de-escalating the forecast by applying a rate of change.

324. Step changes are then added to the trended adjusted base year. Step changes involve increases or decreases in costs due to new regulatory obligations, changes in good industry practice and JGN's operating environment. These costs reflect forecast prudent and efficient opex not captured by the base year expenditure or trend escalation.

325. Appendices 7.2, 7.3 and 7.4 provide further information in support of JGN's opex forecasting method, base year efficiency and proposed step changes over the next AA period.

326. The opex step change forecasts are set out in Table 7–2.

Table 7–2: Opex step changes summary ($2015, $millions)

Details	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
NECF	0.52	1.97	1.04	1.14	1.14	1.14	6.44
Customer engagement	0.06	0.19	0.06	0.19	0.00	0.06	0.49
JGN AA review 2020	0.00	0.00	0.00	0.04	4.52	3.33	7.89
Annual regulatory reporting	0.00	0.39	0.39	0.39	0.39	0.39	1.93
Marketing	0.00	1.32	1.32	1.32	1.32	1.32	6.59
Insurance premiums	0.09	0.12	0.12	0.12	0.12	0.12	0.58

Details	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Total	**0.66**	**3.97**	**2.92**	**3.19**	**7.48**	**6.35**	**23.92**

327. JGN commissioned Core Energy, BIS and EI to develop independent expert demand, energy and customer number forecasts; real cost escalation forecasts; and opex PFP forecasts respectively. These expert reports are provided in appendices 5.1, 6.10 and 4.3 respectively.

328. For the 2015-20 AA period, JGN proposes a new approach to forecasting UAG costs as explained in appendices 7.5, 7.6 and 7.7. Historically, the single UAG benchmark has been a reasonable and workable mechanism for forecasting UAG levels and benchmarking. This is because annual gas consumption has grown in the volume (non-daily metered) market and has, for the demand (daily metered) market, been stable or slightly declining. However, the second of those two conditions is now changing as industrial demand for gas is materially declining as explained in chapter 5. In the light of this changed circumstance JGN is proposing the use of dual UAG benchmarks. This proposal has a sound technical basis that is more cost-reflective and provides a better model of UAG behaviour on the JGN network.

329. JGN has engaged Incenta[41] to advise on an appropriate debt raising cost allowance. JGN proposes benchmark efficient debt raising costs of 21.2 per cent per year on its outstanding debt balance at the start of the year, including capex (net of disposals and capital contributions) that is assumed to occur at the start of the year, to compensate for the cost of:

- issuing the bonds in an assumed debt portfolio
- establishing and maintaining bank facilities required to meet Standard & Poor's (**S&P**) liquidity requirements condition for maintaining an investment grade credit rating
- S&P's requirement to re-finance debt three months ahead of the re-financing date.

330. Incenta's report is provided as appendix 7.8.

7.5 PRODUCTIVITY PERFORMANCE

331. JGN is satisfied that its base year opex forecast is the best possible forecast in the circumstances, and represents the costs of a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

332. JGN has achieved this by commissioning an independent report from EI to analyse the TFP and PFP performance of JGN's network, as noted in chapter 4. The independent report from EI, which assesses JGN's input productivity for its historical and forecast opex costs over the period 1999 to 2013, concludes that:

- JGN is a good performer in terms of both opex partial productivity levels and growth rates, and has had similar TFP levels to two of the three Victorian GDBs for the last decade
- JGN has had the highest or second highest level of opex multilateral partial productivity for the last 15 years. JGN's opex partial productivity increased by over 80 per cent over this period
- in relation to the opex cost function econometric analysis:
  - JGN is among the most efficient GDBs in terms of opex cost efficiency when the effects of scale, customer density, network age and network fragmentation are taken into account

[41] Incenta Economic Consulting, *Debt raising transaction costs – Jemena*, May 2014, p. 3.

- JGN's opex efficiency is not statistically different from the efficient frontier level
- JGN's forecast average annual opex partial productivity growth rate over the period 2015-16 to 2019-20 is 1.03 per cent when returns to scale, the impact of operating environment factors and technological change are allowed for.

333. EI's expert report is provided in appendix 4.3.

7.6 FORECAST OPERATING EXPENDITURE

334. Table 7–3 summarises JGN's forecast opex for the next AA period.

Table 7–3: JGN forecast O&M costs over next AA period ($2015, $millions)

				Next AA period				
Level 1 category	Level 2 category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
O&M	Maintenance	28.69	28.07	28.27	28.50	28.75	28.86	29.01
	Emergency response	4.52	4.47	4.50	4.54	4.57	4.59	4.62
	Management - O&M	10.15	10.02	10.09	10.18	10.26	10.30	10.36
	Network planning	8.43	8.32	8.38	8.45	8.52	8.56	8.60
	Network control and operational switching	6.60	6.52	6.56	6.62	6.67	6.70	6.74
	Project governance and related functions	2.50	2.47	2.49	2.51	2.53	2.54	2.55
	Quality and standard functions	3.37	3.32	3.35	3.37	3.40	3.42	3.44
	Other	12.08	12.50	14.17	13.22	13.55	13.41	13.54
	Information technology (IT)	10.99	10.85	10.93	11.02	11.11	11.16	11.21
	Corporate overheads - O&M	17.07	16.85	16.98	17.12	17.26	17.33	17.42
	Pigging/Integrity digs, adhoc mains renewal	2.09	0.00	0.00	0.00	0.00	0.00	0.00
Non-O&M (A&O)	Corporate overheads - A&O	10.04	10.00	10.10	10.19	10.27	10.31	10.37
	Management - A&O	3.46	3.42	3.44	3.47	3.50	3.51	3.53
	Other directs	9.27	7.79	8.23	8.30	8.41	12.92	11.77

								Next AA period
Non-O&M (Other)	Government levies	4.21	4.21	4.21	4.21	4.21	4.21	4.21
	Marketing	7.66	7.56	8.93	9.00	9.06	9.09	9.13
	Unaccounted for gas (UAG)	17.49	14.71	14.20	14.25	14.25	14.27	14.36
	Carbon costs	7.75	7.76	1.88	1.87	1.86	1.85	1.85
	Debt raising costs	0.00	0.00	3.92	4.03	4.13	4.21	4.25
Consolidated	**Total JGN opex**	**166.35**	**158.84**	**160.64**	**160.83**	**162.34**	**167.26**	**166.96**

7.7 BENEFITS TO CUSTOMERS

335. JGN's opex proposal represents the prudent level of expenditure required to maintain existing service levels, and JGN has proposed this level of expenditure because it believes that maintaining current levels of service is in the long-term interest of consumers. This view is supported by feedback received through our customer engagement program.

336. JGN's forecast opex program in the 2015-20 AA period will provide the following benefits to our customers:

- provision of the safe, reliable and secure gas supply that customers expect through integrated long-term asset management planning, supported by robust data and information management processes, and investment in maintenance programs that manage risk and meet customer service requirements
- delivery of network services at lowest long-run cost, through the use of optimised asset maintenance practices and efficient asset replacement decisions, aligned where possible with augmentation projects
- support for the development of a lower emission energy future by managing asset risk in order to maximise the capacity and capability of the network through responsive maintenance and innovative asset management practices.

337. JGN's 20 year asset strategy, provided as appendix 6.1, highlights that:

- reducing asset replacement expenditure and changing the maintenance strategy to operate to fail, results in lower short-term operating costs. However in the long-term, planned maintenance expenditure will be replaced with larger reactive maintenance expenditure, and an increase in reportable incidents in the order of 20 to 50 per cent above current acceptable levels
- under a service reduction scenario JGN would reduce asset replacement expenditure and reduce or delay non-urgent gas mains repairs, lowering short-term maintenance expenditure. In the medium to longer term reactive maintenance costs would increase accompanied by an increase in leaks in the order of 50 per cent over the long term.

7.7.1 KEY PERFORMANCE INDICATORS FOR THE NEXT AA PERIOD

338. Rule 72(1)(f) requires that the AAI for a full AA proposal include KPIs to be used by the service provider to support expenditure to be incurred over the AA period. The rule does not refer to either capex or opex specifically, or to any particular KPIs that should be included in the AAI.

339. JGN proposes to retain the existing opex KPIs (current period performance is set out in chapter 4). Table 7–4 sets out JGN's proposed opex KPIs, based on JGN's demand and opex forecasts.

Table 7–4: Proposed KPIs: Operating cost per metre and cost per customer site ($2015)

	2015-16	2016-17	2017-18	2018-19	2019-20
Operating cost per metre	6.12	6.06	6.05	6.17	6.09
Operating cost per customer site	127.27	124.24	122.45	123.38	120.51

8. CAPITAL BASE

Box 8–1 Key messages – capital base

JGN's capital base as at 1 July 2015 is estimated to be $3,045.8M and is forecast to be $3,810.2M at 30 June 2020 (both amounts $nominal).

The projected increase in JGN's capital base over the next AA period is principally due to the capex required to ensure ongoing reliable, safe and secure supply to our customers (refer chapter 6).

JGN proposes a depreciation schedule that reflects our reasonable needs for cash flow to meet financing, non-capital and other costs. JGN will continue to apply the real straight-line depreciation method to the opening regulatory value of each asset class for each financial year. This profile produces a cost recovery path for new assets that is better aligned to expected market growth than alternatives such as historical cost straight-line or declining balance.

340. This chapter sets out how JGN proposes to roll forward the RAB over the current AA period taking into account its capex, disposals and depreciation and then project that value forward to the end of the next AA period.

341. This chapter is structured as follows:

- section 8.1 provides an overview of JGN's proposed RAB roll forward over the next AA period
- section 8.2 provides details on JGN's opening RAB in the current AA period
- section 8.3 sets out the closing RAB for the current AA period
- section 8.4 details the projected RAB for the next AA period
- section 8.5 sets out JGN's approach to depreciation for the next AA period
- section 8.6 sets out JGN's capital contributions to be deducted from the RAB roll forward
- section 8.7 sets out JGN's conforming capital expenditure over the current and next AA periods
- section 8.8 sets out JGN's disposals or 'scrappings' to be deducted from the RAB roll forward
- section 8.9 describes JGN's treatment of equity raising costs
- section 8.10 explains JGN's capital redundancy policy.

8.1 SUMMARY

342. JGN has determined that the combined total of its RAB at 1 July 2015 is $3,045.8M and is forecast to be $3,810.2M at 30 June 2020 (both amounts $nominal), as shown in Table 8–1. This is based on JGN's opening RAB in the current AA period adjusted for actual, estimated and forecast capex, capital contributions and disposals.

Table 8–1: Forecast value of RAB at 30 June 2020 ($nominal, $millions)

Asset class	Opening RAB at 1-Jul-10	Opening RAB at 1-Jul-15	Closing RAB at 30-Jun-20
Wilton-Wollongong trunk	8.44	8.53	8.40
Wilton-Newcastle trunk	129.47	129.23	129.04
NSW distribution network	2,174.80	2,908.03	3,672.76
Combined total	**2,312.71**	**3,045.78**	**3,810.20**

343. In its direction dated 9 June 2009, the AER required JGN to consolidate the AAs for its four covered pipelines subject to the condition that it maintain separate capital bases for each of the Wilton to Newcastle and Wilton to Wollongong trunk pipelines and the NSW distribution system (including the Central West distribution system), in addition to the aggregated capital base.[42]

8.2 OPENING CAPITAL BASE FOR THE CURRENT AA PERIOD

344. The opening RAB as at 1 July 2010 is the closing RAB as at 30 June 2010 of $2,312.7M (total) from the 2010 AAI. That amount includes estimated net capex of $94.2M for 2009-10. Actual net capex for 2009-10 was $96.9M. The difference ($2.7M), uplifted at the weighted average cost of capital (**WACC**) for 5 years, is included as an adjustment of $4.5M in 2015. Details of the adjustment are shown in Table 8–2.

Table 8–2: Adjustment for difference between estimated and actual net capex in 2010 ($nominal, $millions)

Asset class	Closing RAB	Difference between estimated and actual net capex for 2010			WACC uplift	Adjustment in 2015
	30-Jun-10	Estimate	Actual	Difference		
Wilton-Wollongong trunk	8.44	0.00	0.00	0.00	0.00	0.00
Wilton-Newcastle trunk	129.47	2.21	0.05	-2.17	-1.42	-3.58
NSW distribution network	2,174.80	91.95	96.83	4.88	3.19	8.07
Combined total	**2,312.71**	**94.17**	**96.88**	**2.71**	**1.77**	**4.49**

(1) Net capex is capex after accounting for capital contributions and disposals. The variance between estimated and actual gross capex for 2009-10 was $0.06M $nominal ($99.99M – $99.93M) or less than 0.1 per cent.

[42] AER, *Decision on Jemena Extension*, 9 June 2009.

8.3 CLOSING CAPITAL BASE FOR THE CURRENT AA PERIOD

345. JGN proposes to account for inflation by indexing the capital base. This is consistent with the approach taken in past revisions of JGN's AA, with the NGR, and with the precedent set in the majority of Australian regulatory decisions. Therefore, JGN has adjusted its capital base as follows:

capital base = opening capital base + indexation at CPI + conforming capital expenditure – depreciation – capital contributions + conforming assets from speculative investment account – redundant assets + re-used redundant assets – asset disposals.[43]

346. The following projections of the capital base are based on actual data for capex, capital contributions and asset disposals for the years 2010-11, 2011-12 and 2012-13, JGN's current outlook for 2013-14 and forecast data thereafter. In addition:

- economic and remaining asset lives are as presented in section 8.5.2
- consumer price index (**CPI**) values are as set out in Table 8–3.

Table 8–3: Increase in CPI (per cent)

Financial year	Annual increase in the CPI (per cent)
2011 actual	2.65
2012 actual	3.10
2013 actual	2.20
2014 actual	2.75
2015 forecast	3.00

(1) Values up to and including 2014 are year on year CPI inflation for the year to December for the eight capital cities as published by the Australian Bureau of Statistics. The value for 2015 is as forecast by the Reserve Bank of Australia in its May 14 *Monetary Policy Statement* for the year to June 2014.

(2) JGN proposes to update the 2015 forecast for actual inflation to December 2014, consistent with the RAB roll-forward approach.

(3) Source: Australian Bureau of Statistics and Reserve Bank of Australia.

347. In rolling forward the capital base to 2015, JGN has not included any conforming assets from a speculative investment account, classified any assets as redundant assets, or re-used any assets previously classified as redundant.

348. JGN has deducted forecast depreciation in rolling forward its capital base from 2010-11 to 2014-15 in accordance with clause 3.1(c) of its 2010 AA.

349. Tables 8–4 to 8–7 set out JGN's roll forward of the combined total capital base and for each of the Wilton to Wollongong and Wilton to Newcastle trunk pipelines and the NSW distribution system (including the Central West distribution system) respectively over the current AA period.

[43] Rule 77.

Table 8–4: Roll forward of combined total capital base over current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14	2014-15
Opening balance	2,312.71	2,456.60	2,611.22	2,697.06	2,839.30
Add net capex at start of year (2)	76.25	82.80	63.46	88.06	117.68
Add indexation of assets (3)	63.42	78.81	58.96	76.45	88.71
Add net capex at end of year (2)	78.27	85.37	64.86	90.47	121.21
Less depreciation (4)	-74.06	-92.35	-101.44	-112.74	-125.61
Adjustment	0.00	0.00	0.00	0.00	4.49
Closing balance	**2,456.60**	**2,611.22**	**2,697.06**	**2,839.30**	**3,045.78**

(1) Values for 2013-14 and 2014-15 are estimates based on JGN's current outlook. Historical amounts reflect the information that it has maintained in accordance with the AER's direction dated 9 June 2009 and clause 10.1 of the 2010 AA.
(2) Net capex = gross capex (including equity raising costs) less capital contributions less asset disposals.
(3) Indexation of assets = (opening balance + net capex at start of year) x CPI for the year.
(4) Depreciation for the current period = AER approved forecast depreciation.
(5) These notes also apply to the other tables in chapter 8, where applicable.

Table 8–5: Roll forward of Wilton to Wollongong trunk pipeline capital base over current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14	2014-15
Opening balance	8.44	8.46	8.51	8.49	8.50
Add net capex at start of year	0.00	0.00	0.00	0.00	0.00
Add indexation of assets	0.22	0.26	0.19	0.23	0.26
Add net capex at end of year	0.00	0.00	0.00	0.00	0.00
Less depreciation	-0.20	-0.21	-0.21	-0.22	-0.23
Adjustment	0.00	0.00	0.00	0.00	0.00
Closing balance	**8.46**	**8.51**	**8.49**	**8.50**	**8.53**

Table 8–6: Roll forward of Wilton to Newcastle trunk pipeline capital base over current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14	2014-15
Opening balance	129.47	130.15	131.34	131.33	131.94
Add net capex at start of year	0.00	0.00	0.00	0.00	0.00
Add indexation of assets	3.44	4.04	2.90	3.61	3.96
Add net capex at end of year	0.00	0.00	0.00	0.00	0.00
Less depreciation	-2.76	-2.85	-2.91	-2.99	-3.09
Adjustment	0.00	0.00	0.00	0.00	-3.58
Closing balance	**130.15**	**131.34**	**131.33**	**131.94**	**129.23**

Table 8–7: Roll forward of NSW distribution system capital base over current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14	2014-15
Opening balance	2,174.80	2,317.99	2,471.37	2,557.25	2,698.86
Add net capex at start of year	76.25	82.80	63.46	88.06	117.68
Add indexation of assets	59.76	74.51	55.88	72.62	84.50
Add net capex at end of year	78.27	85.37	64.86	90.47	121.21
Less depreciation	-71.10	-89.30	-98.32	-109.53	-122.29
Adjustment	0.00	0.00	0.00	0.00	8.07
Closing balance	**2,317.99**	**2,471.37**	**2,557.25**	**2,698.86**	**2,908.03**

350. The closing balance values for 2014-15 constitute the opening capital base for the next AA period.

8.4 PROJECTED CAPITAL BASE IN THE NEXT AA PERIOD

351. The projected capital base in the next AA period is set out in Table 8–8, Table 8–9, Table 8–10 and Table 8–11.

Table 8–8: Roll forward of combined total capital base over next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Opening balance	3,045.78	3,214.99	3,376.40	3,544.14	3,682.52
Add net capex at start of year	116.72	119.00	128.96	119.89	108.83
Add indexation of assets	80.52	84.88	89.25	93.29	96.53
Add net capex at end of year	119.70	122.03	132.25	122.95	111.60
Less depreciation	-147.73	-164.50	-182.72	-197.75	-189.29
Adjustment	0.00	0.00	0.00	0.00	0.00
Closing balance	**3,214.99**	**3,376.40**	**3,544.14**	**3,682.52**	**3,810.20**

Table 8–9: Roll forward of Wilton to Wollongong capital base over next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Opening balance	8.53	8.52	8.50	8.47	8.44
Add net capex at start of year	0.00	0.00	0.00	0.00	0.00
Add indexation of assets	0.22	0.22	0.22	0.22	0.21
Add net capex at end of year	0.00	0.00	0.00	0.00	0.00
Less depreciation	-0.23	-0.24	-0.24	-0.25	-0.26
Adjustment	0.00	0.00	0.00	0.00	0.00
Closing balance	**8.52**	**8.50**	**8.47**	**8.44**	**8.40**

Table 8–10: Roll forward of Wilton to Newcastle trunk pipeline capital base over next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Opening balance	129.23	129.35	129.40	129.37	129.25
Add net capex at start of year	0.00	0.00	0.00	0.00	0.00
Add indexation of assets	3.29	3.29	3.29	3.29	3.29
Add net capex at end of year	0.00	0.00	0.00	0.00	0.00
Less depreciation	-3.16	-3.24	-3.33	-3.41	-3.50
Adjustment	0.00	0.00	0.00	0.00	0.00
Closing balance	**129.35**	**129.40**	**129.37**	**129.25**	**129.04**

Table 8–11: Roll forward of NSW distribution system capital base over next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Opening balance	2,908.03	3,077.12	3,238.50	3,406.30	3,544.84
Add net capex at start of year	116.72	119.00	128.96	119.89	108.83
Add indexation of assets	77.01	81.37	85.74	89.78	93.02
Add net capex at end of year	119.70	122.03	132.25	122.95	111.60
Less depreciation	-144.34	-161.02	-179.15	-194.09	-185.53
Adjustment	0.00	0.00	0.00	0.00	0.00
Closing balance	**3,077.12**	**3,238.50**	**3,406.30**	**3,544.84**	**3,672.76**

8.5 DEPRECIATION

8.5.1 SUMMARY

352. JGN has established a depreciation schedule that reflects the economic lives and cash flow needs of the business consistent with the NGR requirements.

353. Table 8–12 summaries JGN's forecast deprecation over the next AA period, determined by applying the real straight-line depreciation method.

Table 8–12: Forecast depreciation over next AA period ($nominal, $millions)

Depreciation	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Total	147.73	164.50	182.72	197.75	189.29	881.99

354. JGN notes that its proposed depreciation schedule has been designed, in combination with other aspects of its 2015 AA submission, to allow for its reasonable needs for cash flow to meet financing, non-capital and other costs (rule 89(1)(e)).

8.5.2 ASSUMPTIONS ON ECONOMIC LIFE OF ASSETS FOR REGULATORY DEPRECIATION

355. JGN proposes to determine the annual amount of regulatory depreciation for each asset class by applying the real straight-line depreciation method to the opening regulatory value of each asset class for each regulatory year. Real straight-line depreciation (as distinct from historical cost straight-line) involves deducting the same real amount of depreciation in each year of an asset's life. This is consistent with:

- JGN's election to account for inflation by indexing the capital base
- the method contained in the AER's published post tax revenue model for electricity networks (**PTRM**).

356. The real straight-line depreciation profile produces a cost recovery path for new assets that is better aligned to expected market growth than alternatives such as historical cost straight-line or declining balance (rule 89(1)(a)). The profile does not "involve deferral of a substantial proportion of depreciation" as contemplated by rule 89(2).

357. The economic lives that JGN has adopted for its 2015 AA submission are set out in Table 8–13.

Table 8–13: Economic lives of JGN assets (years)

Asset Class	Economic Asset Life (years)
System Assets	
Trunk Wilton-Sydney	80
Trunk Sydney-Newcastle	80
Trunk Wilton-Wollongong	80
Contract Meters	20
Fixed Plant - Distribution	50
High Pressure (**HP**) Mains	80
HP Services	50
Medium Pressure (**MP**) Mains	50
MP Services	50
Meter Reading Devices	20
Country POTS	50
Tariff Meters	20
Buildings	48
Computers	5
Software	5
Fixed Plant	10
Furniture	10
Land	n/a
Leasehold Improvements	10
Low value assets	10

Asset Class	Economic Asset Life (years)
Mobile Plant	10
Vehicles	4

358. These economic lives are the same as those that the AER has approved and JGN has used for the current AA period and are consistent with the design lives used by JGN in engineering evaluations. As the expected economic lives of assets are unchanged, rule 89(1)(c) is not enlivened.

359. The real straight-line depreciation schedule, with adjustment for inflation through indexation of the capital base, will result in the value of each asset being recovered once over the asset's economic life (rules 89(1)(b) and (d)). The cash flows that result when depreciation is determined in this way, when taken together with other aspects of JGN's 2015 AA submission including the proposed price path set out in chapter 12, are consistent with JGN's reasonable needs to meet financing, non-capital and other costs, while maintaining a benchmark credit rating of BBB (refer chapter 9, rule 89(1)(e)).

8.5.3 FORECAST DEPRECIATION

360. Forecast regulatory depreciation for the next AA period, calculated using the method set out above, is provided in Table 8–14.

Table 8–14: Forecast depreciation over next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Wilton-Wollongong trunk	0.23	0.24	0.24	0.25	0.26	1.21
Wilton-Newcastle trunk	3.16	3.24	3.33	3.41	3.50	16.64
NSW distribution network	144.34	161.02	179.15	194.09	185.53	864.13
Total	**147.73**	**164.50**	**182.72**	**197.75**	**189.29**	**881.99**

361. As stated previously, JGN has deducted forecast depreciation in rolling forward the capital base over the current AA period in accordance with clause 3.1(c) of its current AA. As provided in rule 90(2), JGN elects in its 2015 AA proposal for the next AA period to use forecast depreciation, adjusted for the difference between forecast and actual CPI, in rolling forward the capital base to the beginning of the AA period beginning on 1 July 2020.

8.6 CAPITAL CONTRIBUTIONS

362. In most cases where a user requests a new or changed service, it will be necessary for JGN to expend capital to meet the request. JGN will request a capital contribution from the user where the present value of incremental costs associated with meeting the user's request (including capital and ongoing operating and maintenance costs) exceeds the present value of the incremental revenue that will be generated by the new or changed service. If the user declines to pay the contribution, the work does not proceed.

363. Where the user agrees to pay the contribution and the work proceeds, the user's contribution to the capital cost of the asset is excluded from the capital base. It is only JGN's contribution to the cost of the asset, i.e. the total cost of the asset less the user's contribution, that enters the capital base. This mechanism prevents JGN from benefiting, through increased revenue, from the user's contribution consistent with rule 82(4). The result is also that JGN's capex is justifiable, consistent with rule 79(2).

364. Table 8–15 and Table 8–16 set out JGN's capital contributions over the current and next AA period, respectively.

Table 8–15: Capital contributions over the current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14 estimate	2014-15 forecast	Total
Total contributions received(2)	7.49	3.71	5.34	6.70	10.03	**33.28**

(1) Values for 2013-14 are estimates based on JGN's current outlook for the year. Values for 2014-15 are forecast.

(2) Capital contributions are assumed to be received 50 per cent at the start of the year, and 50 per cent at the end of the year, and are converted to year-end dollars.

365. The component of forecast capital contributions for the next AA period that relates to customer-initiated works is based on the historically observed ratio, over 8 years to 2013, of contributions to market expansion capex. The forecast also includes contributions that JGN expects to receive (under an existing agreement) from Endeavour Coal Pty Ltd towards the cost of mine subsidence expenditure (see section 6.3.7) which is required to prevent and mitigate damage to its pipeline caused by longwall mining activities in the vicinity of the pipeline. JGN considers this basis of forecasting to be reasonable and that it produces the best forecast in the circumstances.

Table 8–16: Capital contributions over the next AA period ($nominal, $millions)

Details	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Total contributions received(1)	4.45	3.68	3.55	3.58	3.75	**18.99**

(1) Capital contributions are assumed to be received 50 per cent at the start of the year, and 50 per cent at the end of the year, and are converted to year-end dollars.

8.7 CONFORMING CAPITAL EXPENDITURE

366. Conforming capital expenditure is gross capital expenditure less the amount of capital contributions. Table 8–17 and Table 8–18 set out JGN's conforming capital expenditure over the current and next AA period, respectively.

Table 8–17: Conforming capital expenditure over the current AA period ($nominal, $millions)

Details	2010-11	2011-12	2012-13	2013-14 estimate	2014-15 forecast	Total
Gross capital expenditure	168.49	174.87	135.38	185.47	249.02	913.23
Less capital contributions	7.49	3.71	5.34	6.70	10.03	33.28
Conforming capital expenditure	161.00	171.15	130.04	178.77	238.99	946.51

(1) Values for 2013-14 are estimates based on JGN's current outlook for the year. Values for 2014-15 are forecast.

(2) Capex are assumed to be received 50 per cent at the start of the year, and 50 per cent at the end of the year, and are converted to year-end dollars.

Table 8–18: Conforming capital expenditure over the next AA period ($nominal, $millions)

Details	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Gross capital expenditure	241.00	244.82	264.91	246.76	224.38	1,221.86
Less capital contributions	4.45	3.68	3.55	3.58	3.75	18.99
Conforming capital expenditure	236.55	241.14	261.36	243.18	220.63	1,240.85

(1) Capex are assumed to be received 50 per cent at the start of the year, and 50 per cent at the end of the year, and are converted to year-end dollars.

8.8 DISPOSALS

367. JGN has adopted the approach to forecast disposals that the AER has accepted for Jemena's electricity business in Victoria and for other gas distribution businesses. That is, no disposals are forecast for the next period except by exception (e.g. proceeds from sale of property) and actual proceeds from sale on disposal are deducted from the RAB when it is rolled forward from the end of the current AA period.[44]

368. Forecast disposals for the next AA period are assumed to be 5 per cent of annual capital expenditure for fleet motor vehicles from 2013-14 onwards.

369. Table 8–19 and Table 8–20 set out JGN's asset disposals over the current and next AA periods, respectively.

Table 8–19: Asset disposals over the current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14 estimate	2014-15 forecast	Total
Total asset disposals(1)	6.48	2.98	1.71	0.24	0.09	11.51

(1) Asset disposals are assumed to be received 50 per cent at the start of the year, and 50 per cent at the end of the year, and are converted to year-end dollars.

Table 8–20: Asset disposals over the next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Total asset disposals(1)	0.13	0.11	0.15	0.34	0.19	0.92

(1) Asset disposals are assumed to be received 50 per cent at the start of the year, and 50 per cent at the end of the year, and are converted to year-end dollars.

44 This is a change from the approach that JGN adopted for the current regulatory period where forecast asset disposals for the period were based on the RAB written down value (**WDV**) of actual disposals during the 2005-10 AA period. The forecast amount was deducted from the projected RAB for the current AA period. At the same time, forecast opex for the period included an allowance for loss on disposal; that is, the difference between the WDV and forecast sale proceeds. The RAB WDV of assets actually disposed of during the 2010-15 AA period has been deducted when rolling the RAB forward from 2010.

8.9 EQUITY RAISING COSTS

370. Equity raising costs are costs required to be paid by an entity when it undertakes capital raising.

371. These costs are incurred in maintaining the entity's capital structure and credit rating or financial integrity if lumpy capex is expected, but exclude costs relating to merger or acquisition activity.

372. JGN proposes capitalising equity raising cost in its RAB using the method most recently adopted by the AER.

373. Given JGN's forecast cost of service for the next AA period, the forecast value of equity raising costs is immaterial. Hence, JGN does not include any equity raising costs in this proposal, but this may change if either the forecast cost of service or equity raising cost assumptions change.

374. Further detail is provided in appendix 7.2 and the calculation is included in appendix 12.1.

8.10 CAPITAL REDUNDANCY POLICY

375. JGN's 2015 AA proposal does not include a capital redundancy policy, noting the operation of rule 85.

9. RATE OF RETURN

Box 9–1 Key messages – rate of return

Receiving a fair rate of return is essential for JGN to continue to invest in its $3,042.9M network in a manner that best supports our customers' long-term interests. The return on capital aims to compensate JGN's debt and equity holders for the opportunity cost of lending/investing their funds in the JGN network—and these funds are essential to deliver safe and reliable gas and service outcomes to JGN's customers.

For the 2015-20 AA period JGN proposes an allowed rate of return (specified as a nominal vanilla WACC) of 8.67 per cent per annum. This rate reflects many elements of the AER's rate of return guideline, including the AER's proposed trailing average return on debt approach and associated transition.

However, to ensure that JGN can continue attracting necessary funds, we depart from the AER's guideline by estimating:

- the return on equity using an approach that:
  - considers a range of relevant models, recognising that no model is perfect, and therefore it is not appropriate to pick one primary model over others
  - combines return on equity estimates from these models in a way that provides a more sustainable, stable and robust 'consensus' forecast than is likely from the AER's foundation model approach
  - reflects the requirements of the NGR and the AEMC's guidance on how to interpret these requirements
  - is transparent and relatively simple to apply
- the return on debt using a lower benchmark credit rating (BBB) and by nominating future averaging periods in a way that makes it easier for us to efficiently align our debt management practices to the return on debt.

376. This chapter sets out JGN's proposed allowed rate of return for the 2015-20 AA period. This chapter is structured as follows:

- section 9.1 summarises the allowed rate of return proposal
- section 9.2 summarises the outcomes from the AER's rate of return guideline
- section 9.3 explains how the proposed WACC and underlying parameters were estimated and how they are consistent with the rule requirements.

9.1 SUMMARY

377. The return on capital aims to compensate JGN's debt and equity holders for the opportunity cost of lending or investing their funds in the JGN network—and these funds are essential to deliver safe and reliable gas and service outcomes to JGN's customers.

378. To ensure sufficient compensation consistent with the NGL and NGR, JGN proposes an allowed rate of return (specified as a nominal vanilla WACC) of 8.67 per cent per annum as set out in Table 9–1. This return is a significant reduction on that allowed for the current AA period (of 10.43 per cent).

379. In determining the rate of return, JGN considered each of the factors set out in rule 87(5). We consider that this rate of return proposal achieves the objective set out in rule 87(3). JGN's WACC model—which calculates our proposed rate of return—is provided in appendix 9.1.

Table 9–1: JGN's proposed WACC

Parameters	JGN proposal (per cent)
Return on equity	10.71
Return on debt	7.30
Inflation	2.55
Leverage	60.00
Gamma	25.00
Corporate tax rate	30.00
Nominal vanilla WACC	**8.67**

(1) Return on debt, return on equity, and nominal WACC are estimated using data from the sample averaging period of the 20 business days to 12 February 2014 (inclusive).
(2) Gamma is discussed in chapter 10 and appendix 10.1.
(3) Values may not add due to rounding.

380. JGN proposes to update these estimates (and the underlying risk-free rate) using the actual averaging period set out in appendix 9.2, consistent with the AER's rate of return guideline[45] (**rate of return guideline**). This period is proposed in advance so that JGN gets an opportunity to align its actual funding costs with the rate of return.

9.2 MARKET CONDITIONS AND THE RATE OF RETURN

381. The rate of return reflects the costs of raising funds to invest in our network. If this rate is too high, then customers may over pay. If this rate is too low or volatile, JGN will have difficulty raising funds to deliver our capital program, and therefore the safety and reliability needs of our customers.

382. Although we have our own funding costs, the rate of return should reflect the benchmark costs of raising debt and equity funds. This means we must consider what the market requires by way of return before investing capital in a network like JGN's, not what our own lenders or shareholders require. This also means that as market conditions change so too should the rate of return.

383. Current market conditions benefit both JGN and our customers. During the 2010 AA review interest rates and perceptions of risk were high as global and domestic markets were still grappling with the GFC. At that time our actual funding costs were high and so too was our allowed rate of return (10.43 per cent).

384. Since then, interest rates and some perceptions of risk have fallen, and so too have our funding costs and the rate of return. Our proposed rate of return (8.67 per cent) reflects these falls, and passes the benefit of these on to customers.

385. In determining the rate of return for this proposal, JGN looked closely at the new rules and the rate of return guideline.

[45] AER, *Better Regulation Rate of Return Guideline*, December 2013.

9.3 NEW RULES AND GUIDELINE

386. The rate of return rules (in the NGR) were recently changed to put greater emphasis on meeting an overall rate of return objective and considering a wider range of evidence. This is a key change to the rules, and one that the AEMC made after considering stakeholder views and past regulatory practice.

387. JGN considers that these changes are a major improvement. As well as allowing more flexibility, the rule change process itself forced a rethink of how the rate of return was estimated in the past. For instance, the AER can now use past data to estimate the return on debt (under a trailing average) and is not bound to use a single model to estimate the return on equity (as was the case for electricity networks previously).

388. This 'rethink' was also built into the rules, by requiring the AER to publish a rate of return guideline every three years that sets out how it intends to estimate the rate of return, or WACC, for both electricity and gas networks. Although this guideline is non-binding, it encourages continued evolution of rate of return estimation in Australia and makes this accessible to all stakeholders—serving as a starting point for regulatory proposals like this one.

389. The AER published its first rate of return guideline in December 2013 after consulting widely with consumer groups, network businesses, investors, banks, rating agencies and other stakeholders. Common ground was reached on many elements of rate of return estimation, including on using a trailing average and independent third party data providers to estimate the return on debt, and on assuming a 10 year term and leverage of 60 per cent for the rate of return. There was also common ground reached on what models are relevant for estimating the return on equity, although there are some different views on how (and whether) to use these.

390. Our proposal starts with the new rules and the rate of return guideline, and focuses on areas where there is disagreement. We recognise that the thinking on the rate of return evolves over time, but consider that our proposal best promotes the long-term interest of consumers by balancing the need to attract efficient investment in the network with the risk of overpaying for the investment.

9.4 RATE OF RETURN ESTIMATION

391. The allowed rate of return is split into a return on equity, a return on debt, and leverage—and each is estimated separately. Consistent with the rate of return guideline and rule 87(4), JGN proposes estimating this return as a nominal vanilla WACC using the Officer formula:[46]

392. $$WACC^n = R_e^n \times (1 - L) + R_d^n \times L,$$

where:

- R_e^n is the nominal return on equity
- R_d^n is the nominal return on debt
- L is the level of gearing, and is taken as the ratio of debt to the total value of the firm.

393. The return on equity, return on debt and leverage are discussed in the next sub-sections, along with forecast inflation and the risk-free rate.

[46] R. R. Officer, 1994, *The cost of capital of a company under an imputation tax system*, Accounting and Finance, vol.34, p.10.

9.4.1 RETURN ON EQUITY PROPOSAL

394. The return on equity is the return required by shareholders when providing equity capital. Unlike with the return on debt (discussed below), it is not possible to directly observe what investors require by way of equity returns. This means JGN must use models and other evidence to estimate this.

395. Consistent with the explanatory statement to the rate of return guideline, our proposal recognises that no model is perfect or provides all relevant information on the return on equity.[47] Each model is based on assumptions that may or may not reflect reality. We deal with this by considering a range of relevant models, testing these against the rule requirements, and then weighting these to arrive at a single return on equity estimate.

396. Specifically, JGN proposes combining estimates from four cost of equity models, namely:

- the Sharpe-Lintner (**S-L**) capital asset pricing model (**CAPM**)
- the Black CAPM
- the Fama-French three-factor model
- the dividend discount model.

397. To use each model JGN must first estimate a number of parameters. Some of these are common to several models, such as the risk-free rate and equity beta, but some are not. JGN relies on independent experts to estimate most of these parameters, as set out in appendices 9.4 to 9.7, and differs from the rate of return guideline on our estimates of equity beta and the expected return on the market. Specifically, our:

- S-L CAPM beta estimate (0.82, compared to 0.70 in the rate of return guideline) recognises that there is limited Australian data available to derive a reliable estimate, and so partially relies on foreign data from the US
- return on the market estimate (11.33 per cent, compared to 10.5 per cent in the rate of return guideline) relies principally on forward-looking estimates of that return and properly incorporates the value of imputation credits, consistently with how the tax building block is calculated within JGN's proposed forecast revenue model (appendix 12.1).

398. We then take a weighted average of the estimates from each model to get a return on equity of 10.71 per cent, as shown in Table 9–2. By taking an average that places positive weight on each model, JGN recognises that no one model is clearly superior to others (or provides all relevant information). Taking an average also promotes stable returns over time. Our weighting of the model outputs is based on independent expert advice as to the relative strengths and weaknesses of each of the models.

Table 9–2: Return on equity estimates (per cent)

Model	Return on equity estimate	Weighting
S-L CAPM	10.01%	12.5%
Black CAPM	10.62%	25.0%
Fama-French model	10.87%	37.5%
Dividend discount model	10.92%	25.0%
Weighted average	**10.71%**	**100.0%**

[47] For instance, see AER, *Explanatory Statement, Rate of Return Guideline*, December 2013 p. 64.

399. Although our proposal differs from the rate of return guideline, JGN considers it better meets the rule requirements and the NGO than that proposed by the AER. In estimating the return on equity, we considered prevailing condition in the market for funds (as required by rule 87(7)). Appendix 9.3 further details our cost of equity proposal. Supporting expert reports are provided in appendices 9.4, 9.5, 9.6, 9.7, 9.8 and 9.9.

9.4.2 RETURN ON DEBT PROPOSAL

400. The return on debt is the required yield (or interest) on issued debt. Unlike with the return on equity, we can observe this yield by looking at the price and promised payments on traded bonds for firms with a similar degree of risk as a benchmark entity in JGN's circumstances (measured by a credit rating).

401. The return on debt is a function of:

- *benchmark characteristics*—JGN proposes a 10-year term and BBB credit rating, which recognises that gas networks are inherently riskier than a combined gas/electricity benchmark (as applied in the rate of return guideline)
- *data source*—JGN proposes using the yield estimate for the benchmark characteristics published by an independent third party that best fits traded bond data over the relevant averaging period, consistent with recent decisions by the Australian Competition Tribunal
- *implementation*—JGN proposes using a 10-year trailing average approach and transitioning to this over 10 years, consistent with the rate of return guideline.

402. Over our sample averaging period the yield curve published by the Reserve Bank of Australia (**RBA**) provides the closest fit to traded bond data. Using this curve, JGN proposes a return on debt of 7.30 per cent for the sample averaging period.

403. To implement the trailing average JGN needs to update the return on debt for each year of the AA period. To do this, we propose to nominate averaging periods for estimation of the prevailing return on debt in later years, and use a process that automatically selects the independent third party estimate that best fits the traded bond data for each averaging period. This method is set out in more detail in appendix 9.10 of this AAI and is codified in clause 5 of our 2015 AA proposal.

404. Our proposed method is also summarised in Box 9–2, and explains how the return on debt is updated for each year and how the resulting change in annual revenues (and tariffs) is automatically effected through a formula in JGN's revenue forecast model. Annual updating of the return on debt is a change from the current AA period, and follows from changes to the NGR and the rate of return guideline.

405. JGN considered each of the factors set out in rule 87(11) in determining the proposed return on debt. Appendix 9.1 shows how we estimated the return on debt. Appendices 9.10 and 9.11 further details JGN's return on debt proposal, including why JGN proposes using the RBA curve for our sample averaging period and how the return on debt will update over time.

Box 9–2 Return on debt update process

JGN proposes a four step process for updating the return on debt each year over the next AA period and reflecting this in tariffs:

- **Steps 1 and 2**: estimate a 'spot rate' return on debt for the relevant year, where:
  - the averaging period for the spot rate is nominated by us and either accepted or rejected by the AER in advance of that period and, if rejected, an alternative period is set by the AER (**step 1**)
  - the spot rate is estimated using the independent third party data source that best fits the traded bond data over that averaging period, where the fit is measured statistically (**step 2**).

  JGN gives effect to this step using a process that automatically selects the best fitting independent third party estimate. This process is set out in detail in appendix 9.10 and is codified in clause 5 of our 2015 AA proposal. The process is specified in as much detail as possible, so that it applies automatically and within a relatively short timeframe.

  The estimate produced by step 2 is not the return on debt that will be used to update total revenue and tariffs for that year—rather, it is one parameter in the calculation of the updated return on debt (see step 3 below).
- **Step 3**: update the trailing average using the approach and transition set out in the AER rate of return guideline to derive the updated return on debt figure to apply for the relevant year. This is the return on debt used to update total revenue and tariffs. The updated trailing average return on debt is a function of the 'spot rate' estimated in step 2 for that year, and the spot rates for previous years.

  The return on debt is updated using an automatic application of a weighted average formula, consistent with the rate of return guideline. The weighted average formula is set out in appendix 9.10 of this AAI and is codified in clause 5 of our 2015 AA proposal.
- **Step 4**: update total revenue and tariffs entering the return on debt figure from step 3 into JGN's revenue forecast model (appendix 12.1) and resolving for the relevant X factors in years three to four of the next AA period. As required by the NGR, the change in total revenue resulting from any update to the return on debt is effected by automatic application of a formula that is set out in JGN's revenue forecast model (appendix 12.1). Once the updated return on debt is entered, this model updates forecast revenues and X factors automatically using the formulae embedded within it.

This process is further described in appendix 9.10 and specified in our 2015 AA proposal.

Our process seeks to ensure that the return on debt for each year reflects the best estimate for a given averaging period, while at the same time ensuring that the update to revenues and tariffs is automatic, as required by the rules. In doing so, our process recognises that JGN does not know what independent third party data source will give the best estimate for future averaging periods—and therefore seeks to make this call (again automatically) once the relevant traded bond data is available.

9.4.3 INFLATION

406. JGN proposes an inflation forecast of 2.55 per cent. Forecast inflation is the geometric average of the forecast annual inflation for each of the ten years from 2015 to 2024 as set out in Table 9–3.

Table 9–3: Forecast inflation (per cent)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Inflation Forecast	3.00	3.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Geometric Average										2.55

(1) Inflation forecasts are for the year to June.

Source: Reserve Bank of Australia, Statement on Monetary Policy, 9 May 14.

407. The ten annual inflation forecasts:

- for the first two years, are the expected inflation outcomes stated in the RBA's most recent Statement on Monetary Policy
- for the subsequent eight years, are the midpoint of the RBA's long-term inflation target range. The range is two per cent to three per cent, so the midpoint is 2.50 per cent.

408. This approach is consistent with the AER's approach in the recent price determinations for the Victorian GDBs and the 2010 AAI.

9.4.4 LEVERAGE

409. JGN proposes a leverage ratio of 60 per cent, consistent with the rate of return guideline.

410. This ratio is considered efficient for a stand-alone gas distribution business, and is consistent with the proposed figure for the return on equity and the allowance for debt margin.

9.4.5 NOMINAL RISK FREE RATE

411. The nominal risk free rate is 4.12 per cent, using the annualised yield on 10 year Commonwealth Government Securities (**CGS**) over the sample averaging period (i.e. the 20 business days to 12 February 2014 inclusive). These yields were the indicative mid rates published by the RBA.

412. JGN estimates the yield on 10-year CGS maturing over the 20 business days to 12 February 2024 by interpolating on a straight-line basis the yields on the CGS bonds maturing at 21 April 2023 and 21 April 2024. Appendix 9.1 shows how JGN estimates this yield.

413. Consistent with the rate of return guideline, JGN considers that CGS yields represent the best proxy for the risk-free rate of return in Australia and is not aware of any other relevant source of evidence for the risk-free rate.

10. COST OF TAX

Box 10–1 Key messages – cost of tax

Company tax is a significant cost for all companies. Adequate compensation for the cost of tax—net of the assumed value of imputation credits distributed to investors—is necessary to ensure sufficient funds are available to provide investors with an adequate return, and attract new investors as required.

JGN proposes:

- using diminishing value tax depreciation to estimate the value of the tax asset base as at the beginning of the 2015-16 regulatory year and to roll that value forward through the next AA period.
- adopting the legislated income tax rate of 30 per cent
- using a gamma value of 25 per cent, which reflects our interpretation of the NGR, the 2011 decision of the Australian Competition Tribunal, and current expert advice
- setting the opening tax asset base value as at 1 July 2015 as $996.7M ($nominal) and the closing value as at 30 June 2020 as $1,447.9M ($nominal). The total estimated net cost of corporate income tax for the next AA period is $126.3M ($nominal).

414. This chapter describes how JGN has estimated the cost of tax. It is structured as follows:

- section 10.1 summarises JGN's cost of tax proposal
- section 10.2 describes the methods and values that JGN has adopted for the key inputs to estimating the cost of tax
- section 10.3 provides details of JGN's estimates of the value of the tax asset base (**TAB**) and cost of corporate income tax.

10.1 SUMMARY

415. Consistent with the approach that JGN adopted for the 2010 AA, JGN has adopted a post-tax framework to estimate its total revenue requirement. That framework in turn requires that the cost of corporate tax be estimated as a separate building block. Apart from capex and opex, the principal inputs to that calculation are tax depreciation, which is a function of the value of the TAB, the statutory income tax rate, and the value of imputation credits (**gamma**). JGN proposes to:

- use diminishing value tax depreciation to estimate the value of the TAB as at the beginning of the 2015-16 regulatory year and to roll that value forward through the next AA period
- adopt the legislated income tax rate of 30 per cent
- use a gamma value of 25 per cent.

416. The opening TAB value as at 1 July 2015 is $996.7M ($nominal) and the closing value as at 30 June 2020 is $1,447.9M ($nominal). The total estimated cost of corporate income tax for the next AA period is $126.3M ($nominal). The cost of corporate income tax is estimated in accordance with the formula set out in rule 87A.

10.2 JGN'S PROPOSED APPROACH

417. This section describes the methods and values that JGN has adopted for the key inputs to estimating the cost of corporate income tax. Those are the tax depreciation method, the expected statutory income tax rate and the value of imputation credits.

10.2.1 TAX DEPRECIATION METHOD

418. JGN proposes to use diminishing value tax depreciation to estimate the value of the TAB as at the beginning of the 2015-16 regulatory year and to roll that value forward through the next AA period. The reasons for this proposal are that:

- JGN elects using diminishing value tax depreciation for the bulk of its assets when determining its tax liability with the Australian Tax Office
- a rational benchmark efficient entity could be expected to use the diminishing value method because it minimises near term tax liability
- the AER approved JGN's use of the diminishing value method for the 2010-15 AA period, so continued use of this method maintains consistency between periods.

10.2.2 EXPECTED STATUTORY INCOME TAX RATE

419. JGN proposes to use the legislated corporate tax rate of 30 per cent as the expected statutory income tax rate.

10.2.3 VALUE OF IMPUTATION CREDITS (GAMMA)

420. Gamma represents the value of tax imputation credits to investors. To the extent that investors in the business value imputation credits, this value is deducted from the business' tax allowance. It is important to establish an accurate estimate of gamma, since it affects the overall level of return received by investors, and therefore their willingness to invest necessary capital. If gamma is set too high (i.e. if the value of imputation credits to investors is over-estimated), the overall return to investors will be reduced, thus potentially affecting JGN's ability to attract capital and invest in the network.

421. JGN considers that gamma should be estimated as a market wide parameter for the Australian economy and defined as the product of:

- *the imputation credit payout ratio*—the face value of imputation credits distributed by the firm as a proportion of the face value of imputation credits generated by the firm in the period
- *the utilisation rate (**theta**)*—the value of distributed credits to investors as a proportion of their face value.

422. The AER adopts this same definition in its rate of return guideline.[48]

423. Consistent with the rate of return guideline, JGN proposes an imputation credit payout ratio of 0.70. JGN considers this reflects the best available evidence on payouts by Australian firms.

424. JGN also proposes a theta of 0.35, drawing upon the most recent evidence of the market value of distributed credits. Although this differs from the rate of return guideline, JGN considers this better meets the rule requirements and the NGO.

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[48] AER, *Better Regulation Rate of Return Guideline,* December 2013, p. 23.

425. Appendix 10.1 further details JGN's gamma proposal, including why we consider that our proposed value for gamma better reflects the value of imputation credits to investors. An expert report from SFG supports our proposal, and is provided as appendix 10.2.

10.3 PROPOSED COST OF TAX

426. Table 10–1 shows how JGN's TAB rolls forward over the current AA period.

Table 10–1: Roll forward of tax asset base over the current AA period ($nominal, $millions)

	2010-11	2011-12	2012-13	2013-14	2014-15
Opening balance	600.05	679.32	753.53	786.68	867.62
Add capex	159.90	169.27	132.21	182.74	245.28
Less depreciation	-80.64	-95.06	-99.07	-101.80	-116.20
Closing balance	679.32	753.53	786.68	867.62	996.69

427. Table 10–2 shows how JGN's TAB rolls forward over the next AA period and provides details of the cost of tax calculation for that period.

Table 10–2: Estimate of the cost of corporate income tax for the next AA period ($nominal, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Opening TAB	996.69	1,103.21	1,201.66	1,309.14	1,390.34
Plus capex	240.81	244.66	264.71	246.37	224.14
Less depreciation	-134.29	-146.21	-157.24	-165.18	-166.59
Closing TAB	1,103.21	1,201.66	1,309.14	1,390.34	1,447.89
Revenue requirement (post tax)(1)	506.03	537.69	572.32	606.96	610.66
Plus capital contributions	4.45	3.68	3.55	3.58	3.75
Less opex(2)	-164.73	-169.13	-175.05	-184.96	-189.32
Less interest expense	-138.59	-146.10	-153.61	-160.57	-166.15
Less tax depreciation	-134.29	-146.21	-157.24	-165.18	-166.59
Taxable income	72.86	79.92	89.96	99.84	92.35
Tax loss carried forward	0.00	0.00	0.00	0.00	0.00
Tax rate(3)	0.39	0.39	0.39	0.39	0.39
Tax payable	28.20	30.94	34.82	38.65	35.75
Value of imputation credits	-7.05	-7.73	-8.71	-9.66	-8.94
Net cost of corporate tax	21.15	23.20	26.12	28.99	26.81

(1) Revenue requirement = building block revenue (excluding tax wedge).

(2) Opex includes debt raising costs.

(3) Tax rate is the grossed up tax rate equal to rt / (1 – (1 – γ) * rt). Grossing up recognises that, for purposes of the building block calculation, the net cost of corporate tax forms part of JGN's pre-tax revenue requirement and is itself subject to tax.

11. INCENTIVE MECHANISMS

Box 11–1 Key messages – incentive mechanisms

JGN proposes applying an efficiency benefit sharing scheme to 2015-20 AA period opex. This is in response to feedback received from JGN's Customer Council. This scheme will further motivate us to seek operating efficiencies while ensuring these are shared with our customers.

Our proposed incentive mechanism reflects the same design the AER has approved for other gas networks, taking into account the AER's expenditure incentives guideline (November 2013).

428. This chapter sets out JGN's proposal under rule 98 for an incentive mechanism to apply to JGN's opex for reference services for the 2015-20 AA period.

11.1 EFFICIENCY BENEFIT SHARING SCHEME

429. An efficiency benefit sharing scheme (**EBSS**) does not currently apply to JGN. JGN discussed the intent of an EBSS with its Customer Council on 26 February 2014. The Customer Council supported the application of an EBSS to JGN's opex.

430. As a result of this feedback, JGN proposes the application of an EBSS to 2015-20 AA period opex. The proposed EBSS is broadly consistent with that specified in the AA's recently approved for Envestra (Victoria) and SP AusNet[49], taking into account the EBSS set out in the AER's expenditure incentives guideline.[50]

431. The operation of the EBSS is expressed in a proposed fixed principle set out in clause 12 of the 2015 AA proposal. The primary features of the proposed EBSS are:

- JGN will keep the benefit (or will incur the cost) of delivering actual opex lower (higher) than forecast opex in each year of an AA period
- the EBSS carries forward JGN's incremental efficiency gains for the length of the carryover period
- this carryover period length will be five years
- the carryover amounts will be an additional 'building block' when setting JGN's reference service revenue for the AA period commencing 1 July 2020.

432. JGN considers that the proposed EBSS is consistent with the revenue and pricing principles because it incentivises efficient investment in opex programs while providing JGN with a reasonable opportunity to recover at least its efficient operating costs through the adjustment for specified uncontrollable costs.

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49 See for instance, AER, *SP AusNet Gas Access Arrangement Revision 2013-17, Part B Reference Tariffs and Reference Tariff Policy*, March 2013.

50 AER, *Better Regulation Expenditure Incentive Guideline*, November 2013

12. TOTAL REVENUE AND PRICE PATH

Box 12–1 Key messages – total revenue and price path

JGN has determined its total revenue requirement using the building block approach (in accordance with rule 76 of the NGR). JGN's total revenue requirement for the next AA period is $2.74B. This will allow us to meet the levels of safety and services valued by our customers over the next AA period while prudently balancing our cost and price pressures into future AA periods.

This revenue requirement allows us to offer our customers a price reduction, and offset some of the pressures on end-retail prices, as we:

- share the benefits of lower post-GFC debt funding costs with our customers
- realise the benefits of customer connections growth achieved over the current AA period through our targeted marketing efforts.

We have engaged with our customers on our price path for the next AA period. Our customers want us to mitigate expected increases in wholesale gas prices and minimise the changes in end-retail prices.

Our proposed price path for reference services therefore smooths our required revenue for the haulage reference service to promote retail price stability over the next AA period by proposing real price reductions in every year of the period. This will offset some of the increases in end-retail prices resulting from wholesale gas price pressures.

433. JGN has determined its total revenue requirement using the building block approach (in accordance with rule 76). The building block components are:

- a return on the projected capital base described in chapters 8 and 9
- depreciation of the projected capital base set out in chapter 8
- a forecast of opex detailed in chapter 7
- a forecast of tax detailed in chapter 10.

434. This chapter sets out JGN's total revenue requirement and price path. JGN's forecast revenue model is provided as appendix 12.1.

12.1 TOTAL REVENUE REQUIREMENT

435. JGN's total required revenues for each year of the next AA period are set out in Table 12–1.

Table 12–1: JGN total revenue ($2015, $millions)

Building block	2015-6	2016-17	2017-18	2018-19	2019-20	Total
Return on capital	267.28	274.77	281.72	287.17	289.77	1,400.71
Return of capital (depreciation)	65.55	75.71	86.68	94.47	81.80	404.21
Opex	160.64	160.83	162.34	167.26	166.96	818.03
Tax	20.63	22.06	24.22	26.21	23.64	116.77
Total revenue	**514.09**	**533.39**	**554.96**	**575.11**	**562.17**	**2,739.71**

436. Having determined the total costs of JGN's service and revenue requirements, JGN has allocated these costs and revenues between pipeline services and between customers in accordance with rule 93(2). Section 13.3 sets out the method used to allocate costs to services.

12.2 PROPOSED PRICE PATH

437. JGN has determined its smoothed price path in accordance with the NGR.

438. In the course of preparing its 2015 AA submission, JGN undertook extensive engagement with customers to determine how to respond to the changes occurring in the gas market in a way that promotes our customers' long-term interests. Customer feedback was that:

- rising gas prices and affordability are a concern which depends on the end-retail price not just JGN's distribution prices
- they value JGN considering the end-retail price when setting distribution prices to promote the stability of end-retail prices over the next five years, rather than other possible options such as steep price decreases followed by steady increases
- they value JGN attracting new customers to the network to lower our average price.

439. An important aspect of our proposed price path is the recognition that our customers' long-term interests will be served through us supporting increased economic customer connections to, and use of, our network to lower average prices over time. We can support this by:

- providing smoothed real price reductions over the 2015 AA period to help off-set rises in wholesale gas prices
- continuing our volume market tariff structure of minimising fixed charges, and thereby minimising barriers to gas connections by recognising gas is a discretionary fuel in NSW
- targeting the reduction in average prices to those customers most sensitive to movements in our network prices i.e. residential customers.

440. Taking customers' feedback into account, we propose that, on average, our network prices fall by 4 per cent in 2015-16, and 2.7 per cent each year over the remainder of the period in real terms, as set out in Table 12–2.

Table 12–2: Proposed price path ($nominal, $millions)

Building block	2015-16	2016-17	2017-18	2018-19	2019-20	NPV
Total building block revenue - unsmoothed	514.09	533.39	554.96	575.11	562.17	2,259.20
Total building block revenue - smoothed	572.64	558.09	542.94	529.54	518.67	2,259.20
Real price change (A)	4.0%	2.7%	2.7%	2.7%	2.7%	N/A
Inflation (B)	2.5%	2.5%	2.5%	2.5%	2.5%	N/A
Total price change (C)	-1.6%	-0.2%	-0.2%	-0.2%	-0.2%	N/A

(1) Total price change (C) for any year equals (1 - A) x (1+ B) – 1
(2) Years are from July to June

12.3 REVENUE PER CUSTOMER

441. The affordability of gas services is particularly important to our customers. On this basis we will monitor and report reference service revenue per customer over future AA periods.

Table 12–3: Distribution segment – reference services revenue per customer ($2015)

	2015-16	2016-17	2017-18	2018-19	2019-20
Revenue per customer	451.20	429.52	407.98	389.00	372.73

(1) Customers include volume and market segments.
(2) Revenue is smoothed revenue.

Part C Tariffs

13. REFERENCE TARIFFS

Box 13–1 Key messages – reference tariffs

We are making improvements to our reference tariffs for the 2015-20 AA period to ensure we respond to the changes occurring in the gas market in a way that supports our customers' long-term interests as regards to efficient use of gas and our network over time, by:

- simplifying our tariffs and charges, including by consolidating our fixed charges and removing redundant tariff classes
- ensuring our throughput tariff structures and levels support gas competiveness, particularly for customers most sensitive to changes in our network prices
- ensuring our ancillary charges facilitate customer participation in the energy market
- publishing a TSS to provide transparency on:
  - how we structure and set network tariffs
  - our expectations for network tariff changes to 30 June 2020
  - the process we follow, including the engagement we will undertake, to change tariffs
- supporting innovation (and therefore dynamic efficiency) in the way customers use our network and natural gas by adding new tariff classes to support intermediaries who wish to supply or on-sell energy to groups of end customers beyond our delivery point (for example, for innovative cogeneration precinct developments)

We also demonstrate how our reference tariffs are compliant with the efficiency tests in the rules by showing how our tariff levels are designed to support allocative efficiency in how customers choose to use natural gas.

443. As outlined in chapter 3, JGN is proposing to offer a single reference service—the haulage reference service—over the 2015-20 AA period. This is in response to customer and stakeholder feedback seeking greater simplification and harmonisation of our services, tariffs and charges.

444. Chapter 12 derives JGN's total revenue requirements for each year of the 2015-20 AA period for provision of the single haulage reference service. JGN recovers this revenue by charging Network Users for the haulage reference service.

445. This chapter sets out JGN's proposal for its reference tariffs and details how these tariffs comply with the NGR. The chapter is set out as follows:

- section 13.1 summarises the proposed changes to reference tariffs, assignment criteria and charges for the 2015-20 AA period
- section 13.2 details the proposed tariff classes and charge components
- section 13.3 explains how JGN has allocated revenue to reference services and non-reference services
- section 13.4 outlines how JGN has:
  - developed economically efficient reference tariffs

- considered transaction costs and the ability of Network Users and customers to respond to price signals
- incorporated prudent discounts within the 2015-20 AA period.

446. Within this AAI, JGN has used the term 'customer' generically given the common understanding of the term. In addition to the generic 'customer', this chapter needs to distinguish what we mean by particular 'customer' types or groups. Table 13–1 outlines some key customer terms within our AA, RSA and RTS, and why we need to differentiate between them.

Table 13–1: Understanding JGN's customers

Term	Description
Customer	Customer means: • the person who purchases the gas supplied at a delivery point; or • a consumer of hot water in a residential unit where hot water is supplied through a centralised gas-fired hot water system and whose energy consumption is individually metered by JGN to measure gas withdrawn at the relevant Delivery Point This means that Customer will be the person that has the gas account with the retailer, and is the same as the Shared Customer under the NERL. A Customer is not necessarily the end consumer if the gas is first being sold to an intermediary.
Business Customer	A Customer who uses gas for non-residential purposes. JGN uses the term Business Customer to assign customers to Demand tariff classes.
Residential Customer	A Customer who uses gas for personal, domestic or household use. JGN uses the term Residential Customer to assign customers to volume tariff classes.
End customer	Refers to the end consumer of the gas or energy that JGN delivers to a delivery point. The end customer is usually the same as the Customer, except if there is an intermediary that is supplying gas or energy to them using the gas delivered by JGN (in that case the intermediary is the Customer).
Residential end customers	End customers that consume the gas or energy for personal, domestic or household use.
Non-residential end customers	End customers that do not use or consume the gas or energy for personal, domestic or household use.
Small customer	As defined in the NERL. A residential or business customer who consumes energy at business premises below 1 TJ per annum. The term small customer is used in the description of user-requested ancillary activities.
Large customer	As defined in the NERL. A large customer is a business customer who consumes energy at business premises at or above the 1 TJ per annum. The term large customer is used in the description of user-requested ancillary activities.
User	The "User" is the person to whom JGN is supplying a pipeline service pursuant to a contract or under an access determination. Used in the context of JGN's contractual counterparty.

Term	Description
Network User	Used to refer to one or more users generally without referring to the specific "User".
Delivery point	A point at which gas is withdrawn from the network.

(1) Descriptions provided are designed to aid understanding within this chapter and are therefore not necessarily exact matches of the relevant definitions in JGN's AA, RSA, RTS or legislation.

13.1 SUMMARY OF PROPOSED CHANGES

447. For the haulage reference service, we propose to make the following:

- tariff class changes:
  - expand the availability of the haulage reference service to supply new customer types by adding six new volume market tariff classes for intermediaries[51] including:
    - *a Volume Boundary (***VB***) Coastal tariff class*—for supply to multiple occupancy premises of coastal residential and small business end customers where supply is metered by a single boundary meter
    - *a VB Country tariff class*—for supply to multiple occupancy premises of country residential and small business end customers where supply is metered by a single boundary meter
    - *four Volume Residential Distributed Generation Technology (***VRT***) tariff classes*—for supply to multiple occupancy premises (or precincts) of residential end customers receiving their energy from a large gas fired cogeneration or trigeneration system (> 50 TJ per annum)
  - close the first response tariff classes DCFR1 to DCFR11 and DMTFR1 to DMTFR5 to new Customers, grandfather DCFR6 and DMTFR3 which have eligible Customers and remove the remaining first response tariff classes without customers
  - maintain all remaining existing tariff classes, for example the two existing tariff classes for individually metered customers will remain, with most of JGN's 1.2 million customers being on these tariffs
- changes to criteria to assign customers to these tariff classes:
  - support and describe the new volume market tariff classes for intermediaries
  - clarify the tariff class that applies to a cogeneration facility which principally supplies business end customers in commercial buildings
  - add new postcodes used for assignment to location identifiers 1 to 11 and reclassify three postcodes to better allow us to provide appropriate price signals
- charge component changes:
  - consolidate the number of fixed charges into a single fixed charge for each of the Volume Individual (**VI**) Coastal and VI Country tariff classes to simplify our charges consistent with customer feedback

[51] JGN considers an intermediary to be a Customer at a single delivery point which then supplies this gas—or energy from this gas—to end customers at the premises served beyond the relevant delivery point. Recent technological and commercial developments mean some residential and business customers may be supplied gas, hot water, and potentially electricity services through 'energy intermediaries' or 'aggregators', rather than receiving services direct from our network. Under these arrangements it may no longer be JGN's role to deliver the existing services to those end customers, rather many of the core responsibilities for supplying these residential and business customers would rest with the intermediary.

- modify the block sizes and charge levels within the VI Coastal and VI Country tariff classes to:
  - respond to changes in the gas market and support our key residential markets to ensure gas, as a fuel of choice, remains competitive
  - promote efficient utilisation of our network
- modify the block sizes and charge levels for capacity charges for relevant tariff classes to better enable JGN to address a perverse pricing incentive whereby some Customers who move from:
  - a volume to a demand Customer group assignment experience a significant price reduction despite the increase in their gas consumption
  - a demand to a volume Customer group assignment experience a significant price increase despite the decrease in their gas consumption
- modify the levels of the ancillary charges, including special meter reads, to improve customer participation in the market.

448. Additionally, JGN has sought to assist its customers and stakeholders in understanding how we construct our reference tariffs, including how our network tariffs may change over time. For this reason, we have prepared a TSS to provide clear and accessible guidance on how we set reference tariffs. The TSS:

- explains how, and why, we structure and set network tariffs
- sets out our expectations for network tariff changes until 30 June 2020
- sets out the process we will follow, including the engagement we will undertake, to change network tariffs.

13.2 TARIFF CLASSES AND CHARGE COMPONENTS

449. JGN has considered the following objectives when constructing its current tariff classes and charge components for the 2015-20 AA period:

- *recover our efficient costs of operation*—we need to recover around $550M per year[52] to continue to provide safe and reliable natural gas services into the future
- *keep gas competitive*—maintain and enhance the attractiveness and position of natural gas as a value for money fuel of choice in NSW
- *price efficiently and equitably*—ensure that similar customers are grouped together and that these customers pay for gas in a way that encourages efficient use of the network
- *provide stability in our network tariffs and end-retail prices*—where possible minimise any sharp change in end customer bills
- *provide simplicity and transparency in our tariffs*—consider customer preferences, the transaction costs of providing customised tariffs and ensuring customers and stakeholders can make sense of our charges.

450. JGN has developed these objectives with support from our customers and stakeholders and we have applied them to provide for economically efficient tariff classes consistent with rule 94.

[52] Refer Table 12–2.

451. To support these objectives, JGN continues to split its tariff classes between two different Customer categories:

- volume Customers who include residential and small industrial and commercial end customers
- demand Customers who are larger commercial and industrial end customers.

452. Within the volume and demand categories, individual Customers are primarily distinguished based on their location, the characteristics of the end customer, and likelihood of their consumption being more or less than 10 TJ of gas per year. In most cases volume Customers have consumption below 10 TJ per annum and demand Customers have consumption above 10 TJ per annum—which is a common delineation across jurisdictions. However, section 13.2.1 outlines that to accommodate intermediaries, there may be limited instances where it is not appropriate for JGN to apply the 10 TJ delineation and provides necessary changes to the assignment criteria.

453. Sections 13.2.3 to 13.2.5 then discuss the full set of tariff classes and charge components for volume and demand Customers, including ancillary charges.

13.2.1 PROVIDING REFERENCE TARIFFS FOR INTERMEDIARIES

454. JGN's current reference service and assignment criteria are based on supply to a single Customer that is the ultimate end consumer of energy occupying the premises. We refer to this 'end consumer' as the end customer. This approach has been developed to promote growth and customer interests in the NSW gas market. As a result of this history the 1.2 million Customers now supplied from the JGN network are almost all individual end consumers (including consumers of hot water from a residential centralised gas hot water system), and their individual consumption is measured by JGN's gas and residential hot water meters.

455. JGN has considered the potential benefits to customers from recent technological and commercial developments and the level of interest in reference tariffs being available to energy intermediaries. Such intermediaries take gas at a delivery point in a multiple occupancy premises and then on-supply or on-sell energy to individual residential and small business end customers at that site.

456. As outlined in chapter 3, to facilitate these developments and encourage innovative, efficient and customer-focused energy services, we have expanded our proposed reference tariffs to allow market choice. This choice is between conventional individually metered gas supply configurations and new configurations where JGN supplies the end customers through an intermediary.

457. Three different types of intermediary have been considered when grouping delivery points of intermediaries into tariff classes including supplying gas to a:

- boundary meter that is then on-sold to end customers by the intermediary
- cogeneration unit supplying principally business end customers
- cogeneration unit supplying residential buildings or precincts.

458. While JGN is proposing to make reference tariffs available to a range of Customer supply configurations, JGN will continue to group Customers together with regard to the characteristics and energy requirements of the ultimate end customers of energy at the site. This is to ensure that similar types of end customers pay similar prices, consistent with our pricing objectives. Over the long term this enables all Customers to share in efficiency gains of supplying end customers in new ways.

13.2.1.1 Supplying gas to a boundary meter that is then on-sold to end customers by the intermediary (VB)

459. This scenario is where JGN supplies gas to a single boundary meter of an apartment block or shopping centre for on-supply of energy to the group of residential and small business end customers occupying the premises. The energy requirements of the end customers[53] are the same as similar premises where JGN provides individual gas and residential hot water metering for each end customer.

460. Such intermediaries might exceed the 10 TJ per year threshold, but will maintain a volume classification given the gas is being transported to supply residential and small business end customers.

13.2.1.2 Cogeneration supplying principally business end customers (VI or Demand)

461. This is an intermediary who operates a gas fired cogeneration plant to supply electricity and thermal energy principally[54] to business customers at the premises or precinct (for example, an office building). The substantive energy requirements of these end customers are their electrical needs, common area cooling and common area heating. This is not the same as the energy requirements of these end customers were they to be met by individually metered gas supply. Rather the requirements would be similar to a single business customer of an equivalent aggregate size which uses a gas fired cogeneration system for its own use.

462. JGN therefore considers intermediaries supplying groups of business customers are most similar to individual business customers of a similar aggregate size, and will assign them to a volume classification where they are expected to consume less than 10 TJ per annum, and a demand classification where consumption is greater than 10 TJ per annum.

13.2.1.3 Cogeneration supplying residential buildings or precincts (VB or VRT)

463. This is an intermediary who operates a gas fired cogeneration plant to supply electricity and thermal energy principally to residential customers in a high-rise residential building or precinct. Application of cogeneration to residential applications is emerging in NSW. The types of energy requirements of end customers supplied from a cogeneration system will vary depending on the design of each building's energy system and the scale of the system. JGN expects that the basic energy requirements met by these systems will be part or all of the residential end customers' electrical, hot water, heating and cooling requirements.

464. For small installations[55] the residential hot water load would be the defining thermal output. The energy requirements of end customers met by such systems would be similar to the energy requirements of other JGN end customers that consume hot water from a residential centralised gas hot water system. The cogeneration unit and its back up boilers replace the conventional gas fired boilers. Therefore, these intermediaries are similar to the volume boundary intermediaries who supply gas to a boundary meter that is then on-sold to end customers.

465. For larger installations serving multi-building precincts, greater investment in the energy system and more diverse system demand will result in gas being utilised for residential customers in significantly new and different ways. Such intermediaries will be assigned to the volume Customer group reflecting the energy requirements of the end customers, however a tariff category will assign intermediaries operating large systems separately as VRT Customers.

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53 Typical energy requirements of residential customers in medium-density buildings are for cooking, residential centralised hot water, and bayonet point appliances. For business customers in shopping centres energy requirements are typically for catering appliances.

54 As a guide, JGN will consider a group of end customers to be substantially non-residential where less than 50 per cent (by number) of the group use the energy principally for personal, domestic or household purposes.

55 Small installations are expected to be less viable and supply less of the total end customer energy requirement, requiring more supplementary input from the electrical grid.

13.2.2 ASSIGNMENT CRITERIA

466. JGN uses assignment criteria to group its Customers into its tariff classes. JGN's tariff assignment criteria classifies delivery points based on three elements—tariff Customer groups, tariff categories, and classification by location.

467. Demand Customers and other Customers grouped by tariffs with capacity based charges must have a reasonable MDQ specified per delivery point as they have a larger individual impact on the network than volume customers.

468. JGN will continue to group volume and demand Customers by 'country' and 'coastal' locations and to group coastal demand Customers and VRT Customers by postcode. This enables locational variations to be reflected in tariff classes. This promotes cost-reflectivity in our network tariffs.

469. JGN has made changes to the Customer groups and tariff categories to describe the new volume tariff classes, which requires the following changes to assignment criteria:

- three tariff categories (VI, VB and VRT) will be utilised for assignment of volume tariffs:
  - VI category applies where JGN measures the gas or hot water consumption of the individual end customer as part of the haulage reference service. This is the same criteria as JGN's existing volume tariffs—JGN's existing 1.2 million Volume Coastal (V-Coastal) and Volume Country (V-Country) Customers will continue to be assigned to the coastal and country VI tariff classes
  - VB and VRT describe the assignment criteria for the new intermediary tariff classes where JGN does not measure the energy consumption of individual end customers
- the assignment criteria for both demand (> 10 TJ p.a.) and volume (< 10 TJ p.a.) Customer groups have been clarified to specifically refer to gas fired cogeneration installations which supply energy to groups principally of business end customers in commercial buildings. This reflects JGN's commercial practice of incentivising growth in non-traditional gas markets, and providing transparency and certainty in pricing to assist ongoing market development, consistent with stakeholder feedback
- the postcodes used for assignment to location identifiers 1 to 11 have been updated to include the locations of new and prospective demand Customers. Additionally, JGN has reclassified three postcodes to ensure an appropriate pricing signal that has been required due to relative changes in utilisation of the network.

13.2.3 VOLUME TARIFF CLASSES

470. JGN's 2010 AA has two tariff classes for volume Customers based on the cost of the infrastructure required to supply these Customers:

- *V-Coastal tariff class*—applicable to volume Customer delivery points located in the Wilton network section
- *V-Country tariff class*—applicable to volume Customer delivery points located in country network sections.

471. JGN considers this delineation of country and coastal volume market Customers remains economically efficient and therefore appropriate to continue in the 2015-20 AA period.

472. JGN proposes to further enhance the economic efficiency of its tariff classes by responding to changes occurring in the gas market. JGN's volume market tariff classes include supply to intermediaries that then on-sell energy to individual residential end customers at the site.

473. JGN's current reference services are available to delivery points which deliver gas to premises for use of a single 'ultimate end user of energy'—including individually metered residential hot water supplied through a centralised gas fired hot water system. As described in section 13.2.1, JGN proposes to include tariff classes

that support both individually metered Customers and where JGN supplies gas to an intermediary that on-sells energy to individual residential and small business end customers.

474. The proposed volume tariff classes for the haulage reference service are set out in Table 13–2.

Table 13–2: JGN's proposed volume reference tariff classes

Tariff category	Number of tariff classes	Tariff classes	Types of customers	Why included
Volume individual metered	2	VI-Coastal VI-Country (previously V-Coastal and V-Country)	• Most of our 1.2 million existing Customers, including residential and small and medium businesses consuming up to 10 TJ per annum • New Customers consuming up to 10 TJ per annum with individual metering by JGN.	Maintains exiting tariff classes for most of JGN's existing and new Customers.
Volume boundary metered (new)	2	VB-Coastal VB-Country	Residential end customers in higher-density residential developments and small business customers in commercial developments supplied energy by an energy intermediary that sits between the boundary meters and the end customers.	Increasing demand for boundary metered supply to higher-density developments where energy intermediaries then on-sell energy to residential or business end customers. We want to encourage innovative, efficient and customer focused energy services.
Residential distributed generation technology (new)	4	VRT-03, VRT-04, VRT-06, VRT-10	Residential end customers supplied energy by an intermediary using a large-scale generation unit in a residential precinct (consuming more than 50 TJ per annum).	Recent technological, market and policy developments mean residential customers in large precincts may be supplied electricity, heating or cooling from a gas fired plant (cogeneration or trigeneration). We want to encourage innovative, efficient and customer focused energy services, and promote gas usage to lower average prices for all Customers.

475. Examples of intermediaries, who will fall into one of the six new tariff classes, include:

- a strata body corporate (or building owner) buying gas for a centralised gas hot water boiler in a residential building, or buying gas to supply to the residents of the building will be VB
- an energy supplier that specialises in owning and operating gas boilers for residential centralised gas hot supply to end customers in residential buildings will be VB

- an operator of a large scale gas fired cogeneration energy system supplying electricity and thermal energy to principally residential buildings or precincts that use more than 50 TJ of gas per year will be VRT. Operators of smaller scale systems consuming less than 50 TJ per year will be VB.

476. An example of an intermediary who will not fall into one of the six new tariff classes is a gas fired cogeneration owner and operator supplying electricity and thermal energy to principally commercial buildings or precincts. These Customers will be assigned to a VI tariff class if less than 10 TJ and into a DC or other demand tariff class if greater than 10 TJ.

477. JGN has designed the two new VB tariff classes on the basis that similar customers should face similar tariffs (it is the same pipelines and other assets required to transport gas to supply energy to these end customers, whether they are individually or boundary metered). To provide equity in cost recovery, these new 'boundary metered' tariff classes should pay on average similar prices to individually metered volume Customers.

478. However, to maintain cost-reflective tariffs JGN must take account of the fact that intermediaries bring about some savings for JGN through reduced infrastructure requirements behind the boundary meter. This is primarily the operating and capital savings resulting from the reduced demand for individual meters and the need for us to read those meters.

479. Stakeholders have told us that:

- scale is an important factor for the viability of cogeneration systems—only larger scale gas cogeneration systems (~2 MW electrical output or more) are technically and economically viable over the long term due to the high development and capital costs required for distributed energy systems
- the availability and certainty of reference tariffs at demand tariff rates being available is required to aid and promote the long-term development of this new energy market.

480. JGN has designed the VRT tariffs to respond to this feedback. The limit of 50 TJ per annum conservatively compares to an electrical generator slightly smaller than 2 MW and the VRT tariffs mirror demand tariff structures and rates. JGN has established four VRT tariff classes across dense urban locations in the coastal area, however JGN proposes to have the ability to add new VRT tariff classes if these are requested by Customers in other locations.

481. JGN therefore proposes that the VRT tariff classes can access discounted rates relative to the VB tariff classes. The discounts are designed to provide incentives for load growth and improved network utilisation from large-scale innovative energy technologies in the residential market.

482. Smaller cogeneration installations at residential medium-density sites will qualify for the VB volume boundary reference tariffs.

483. JGN has proposed to accommodate these new tariff classes for intermediaries to encourage innovative, efficient and customer focused energy services. While JGN considers this is important, our customer engagement has also indicated that these changes to the 'customer experience', including access to individual metering, retail choice and customer protection measures are of concern for customers, particularly vulnerable customers. The regulatory and policy frameworks that support these new arrangements are still developing, and we consider measures may be required to protect the 'customer experience' and to further promote their long-term interests, for example, by offering new customers the flexibility to choose individual metering and billing.

13.2.3.1 Volume charge components

484. Tariffs for VI and VB Customers will comprise the following:

- a fixed supply charge (in dollars per annum)

- banded usage (or 'block') charges (in dollars per GJ).

485. The full schedule of proposed reference tariffs and charges are included in the 2015 AA proposal.

Fixed supply charge

486. The fixed supply charge is an annual charge that applies to each delivery point. The single charge presents a simplification from the three fixed charges that have applied for each delivery point in the 2010-15 AA period.

487. The fixed charge is priced to encourage utilisation but still signals to the Customer:

- the fixed cost nature of natural gas distribution
- the cost to connect Customers to the network having regard to the size, location and type of network user

Banded usage charges

488. For VI Customers, JGN will continue to charge for consumption based on banded volume throughput charges with six blocks that provide lower prices for volume consumed in higher blocks.

489. JGN proposes to continue with six blocks that reflect the declining costs of meeting incremental demand. However, the block sizes have been modified to better reflect the changes in the gas market and the changing mix of residential and business customers in the volume market (refer Table 13–3).[56]

Table 13–3: VI Coastal and VI Country block sizes mapped to typical usage driver

Block	Size (GJ p.a.)	Typical usage driver
1	0 – 7.56	Residential cooking
2	7.56 – 15	Residential cooking and hot water or heating
3	15 – 33	Residential cooking, hot water and heating
4	33 – 1002	Heating and small commercial load
5	1002 – 5004	Small commercial load
6	Above 5004	Light industrial

490. JGN's tariff strategy, as set out in the TSS (refer appendix 1.7), is to target reductions in the cost of service (building block costs) to Block 2 to:

- support our key residential markets to ensure gas, as a fuel of choice, remains competitive
- promote efficient utilisation of our network, and lower our network tariffs.

491. VB Customers will be subject to different block sizes to VI Customers to recognise:

- the declining cost of meeting incremental demand
- the similar cost of infrastructure to supply gas to these end customers (excluding the differences in metering). However, the VB tariffs have been set at a level which recognises that they have lower costs for infrastructure after the boundary meter.

[56] For example, new gas end customers such as those in medium or high-density developments use less gas than existing end customers (refer chapter 5).

492. Pricing VB tariff classes over four declining blocks reflects the expectations that larger business customers with higher energy bills will seek their own gas connection in order to access competitive retail offers for gas supply. The usage charges for the VB tariffs have been set similar to the prices for the first four blocks only that apply to residential and small business customers.

13.2.4 DEMAND TARIFF CLASSES AND CHARGE COMPONENTS

493. JGN's current charges for services to demand Customer delivery points are on a zonal basis that reflects the Customer's location within the local network. Additionally, JGN will continue to differentiate between demand delivery points with different meter set capacities to reflect the different costs.

494. JGN proposes retaining the 12 location-based demand tariff classes as well as the option for throughput pricing for large customers as separate tariff classes. This means JGN's demand Customers will continue to be assigned to one of the reference tariff classes established by JGN (and shown in Table 13–4) to reflect their location within the local network and the manner in which they are billed for usage.

495. JGN proposes to grandfather the first response tariff classes to new Customers.[57] JGN engaged with each of its large customers with sufficient load to qualify for the first response tariff classes (refer appendix 1.4). JGN outlined the benefits of the first response tariff classes and the need for JGN to manage the demand and financial risk from leaving these tariffs open to reassignment in the 2015-20 AA period. JGN invited these Customers to demonstrate their interest in the tariff between December 2013 and May 2014.

496. For the 2015-20 AA period JGN therefore proposes 20 demand tariff classes, including two grandfathered[58] first response tariff classes.

497. JGN groups its demand tariff classes together by tariff category. With the closure of the first response category to new Customer assignments[59] there are now three different categories open for demand classes:

- *capacity*—this is the default category for demand Customers. However, Customers can select either of the other demand tariff categories, subject to assignment procedures and meeting the stated criteria
- *throughput*—assignment to this tariff is currently made on user request. This tariff category sets a ceiling for cost of network transportation that allows the price of gas to remain competitive with alternate fuels
- *major end customer throughput*—assignment to this tariff is currently made on user request. This tariff category is designed for very large end customers located in the Sydney metropolitan area.

498. The proposed demand tariff classes for the haulage reference service are set out in Table 13–4. The numbers associated with the tariff classes are 'identifiers'. These identifiers relate to groups of postcodes and are set out within JGN's 2015 AA proposal. Consistent with the 2010 AA, JGN continues to rank the cost relativities of supplying demand Customers in different postcodes using a system of cost-reflective drivers.

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57 JGN's intent was for the first response tariff classes to attract a set of location-based capacity charge tariffs for very large Customers who agreed to participate as 'first response' respondents in network load-shedding events.

58 A grandfathered tariff class is one which we have extended to those Customers currently assigned to that class or for other Customers that have indicated a bone fide intention to take up the tariffs during our consultation process. We have grandfathered two first response demand tariff classes that were open in the 2010-15 AA period until at least 2020. Other first response demand tariff classes have been removed.

59 Note that we will still publish a tariff for Customers with grandfathered first response tariffs. These tariffs will simply not be open to new entrants.

Table 13–4: JGN demand reference tariff classes

Tariff category	Number of tariff classes	Tariff class names	Types of customers	Why included
Capacity country	1	DC Country	Most of our large industrial Customers	Maintains existing tariff classes
Capacity coastal	11	DC1 to DC11		
Throughput	1	DT		
Major end-user (throughput)	5	DMT1 to DMT5		
First response	2	DCFR-06 & DMTFR-03	Several large industrial Customers with flexibility in operations to reduce demand as a first priority response	Grandfathered tariff classes to maintain existing benefit these Customers provide

13.2.5 ANCILLARY CHARGES

499. JGN ancillary charges seek to recover the cost of user-initiated activities. As described in section 3.2, JGN proposes to make a single adjustment to the structure of ancillary charges. This is to simplify the disconnection charges for small customers by providing a single disconnection charge for those customers. The temporary disconnection charge will apply to large customers seeking the temporary disconnection of meters. This change is consistent with NECF standard customer connection contracts for small customers introduced during the 2010-15 AA period, which provide for disconnection, but not temporary disconnection as such.

500. Simplifying our tariffs and charges is consistent with the feedback from our customer and stakeholder engagement to facilitate customer participation in the energy market (refer appendix 1.4).

501. The user-requested ancillary activities, which attract an ancillary charge, are set out in chapter 3. Ancillary charge levels are included in our RTS within the 2015 AA proposal and our TSS.

502. The proposed ancillary charges are set to recover JGN's costs of providing the relevant activities to volume and demand Customers and ensure other Customers are not required to inefficiently cross-subsidise the costs of these user-initiated activities. They have been determined based on JGN's incremental costs and are consistent with benchmarks from other jurisdictions.

503. JGN proposes to reduce the current prices charged for special meter reads. Volumes of special meter reads have increased substantially since the price path was set for the current AA period, lowering the incremental costs of providing these activities. JGN considers that lowering the charge for special meter reads will improve customer participation in the energy market.

504. JGN's proposed disconnection charge takes into account the costs of providing temporary disconnection and permanent disconnection activities. Historically, JGN has provided materially higher numbers of temporary disconnections than permanent disconnections and the price reflects this weighting. Additionally, JGN's disconnection charge includes reconnecting gas to the site. JGN considers that this will remove a barrier to customers reconnecting to gas, increasing the utilisation of the network.

505. JGN's proposed decommissioning and meter removal charge reflects the costs of disconnecting and removing the gas meter from the site, as well as disconnecting the service from the main. These activities can involve accessing the plastic or steel mains by saw-cutting the road and digging down to the main, disconnecting the service from the main by cutting the service and capping the stub, backfilling the excavated site and making a temporary restoration. These activities often require traffic management.

13.3 ALLOCATION OF REVENUE TO SERVICES

506. Chapter 3 outlined that JGN is proposing a single reference service—the haulage reference service—to meet customer preferences. The NGR require JGN to allocate its total revenues to reference and non-reference services.

507. JGN's cost allocation method takes the required cost of service (building blocks), deducts revenues associated with non-reference services (including negotiated revenues) and from non-pipeline services and then allocates the residual costs to the haulage reference service.

508. JGN calculates the revenue for other non-reference services based on the forecast level of activity for those services and their prices. Revenue not related to pipeline services includes third party hits income, rental income, property enquiry income and doubtful debts recovered income. JGN does not allocate this revenue to a reference service as the underlying costs are excluded from JGN's building block revenues. Deducting these revenues from the building block revenues ensures costs are not duplicated by allocations to reference services.

13.4 EFFICIENT PRICING

509. This section outlines how JGN's tariffs support allocative efficiency and reflect its different customer bases. It provides:

- demonstration of efficient prices including JGN's estimates of:
  - stand-alone and avoidable costs
  - long run marginal costs (**LRMC**)
- JGN's consideration of transaction costs
- JGN's consideration of customer's ability to respond to price signals
- JGN's prudent discounts.

13.4.1 THE EFFICIENCY MEASURES

13.4.1.1 Stand-alone and avoidable costs

510. Rule 94(3) requires that the expected revenue recovered for each tariff class should lie on or between the stand-alone cost of providing the reference service and the avoidable cost of not providing the reference service.

511. JGN's stand-alone and avoidable cost estimates for each tariff class, and the approach to calculating these, are contained in appendix 13.1. The appendix demonstrates that JGN's expected revenue for each tariff class lies between the two efficiency measures.

13.4.1.2 Long run marginal cost

512. Rule 94(4) requires the distribution network service provider to take into account LRMC in setting tariffs.

513. JGN has calculated LRMC for each of its volume tariff classes using the average incremental approach. JGN's model has produced LRMC values of zero for the demand market as there is no growth in this market during the forecast horizon. That is, JGN does not expect the demand market to drive incremental growth-related

investment on JGN's network. This is consistent with the incremental cost to the shared network being specific to individual demand Customers' characteristics.

514. Table 13–5 details LRMC for JGN's volume tariff classes.

Table 13–5: LRMC for JGN proposed tariff classes ($nominal)

Proposed Tariff Class	LRMC
VI-Coastal	14.93
VI-Country	17.19
VB-Coastal	12.35
VB-Country	12.20
VRT-03	12.63
VRT-04	12.16
VRT-06	12.00
VRT-10	12.00

515. Table 13–6 details our estimated LRMC values for our tariff components in the volume market.

Table 13–6: LRMC for each tariff class by tariff component

Tariff Class	Tariff Component		
	Fixed $/annum(1)	Variable $/GJ chargeable demand	Variable $/GJ
VI-Coastal	43.56	n/a	13.03
VI-Country	93.71	n/a	13.11
VB-Coastal	6.21	n/a	12.08
VB-Country	6.21	n/a	11.93
VRT-03	15.12	11.97	n/a
VRT-04	5.81	11.90	n/a
VRT-06	5.81	11.75	n/a
VRT-10	5.81	11.75	n/a

(1) Note that the values are calculated per end customer. That is, for the boundary metered tariffs, $6.21 is the LRMC for supplying each end customer behind the meter and not the LRMC of each boundary metered Customer.

516. Appendix 13.1 details JGN's approach to calculating LRMC.

Taking LRMC into account

517. Factors applicable to the consideration of LRMC for gas network pricing, and which explain why LRMC estimates are not equivalent to JGN's tariff levels, are:

- the NGR permit JGN to recover its building block cost of services which includes a return on sunk costs (i.e. our RAB) and fixed opex and can therefore be expected to exceed LRMC—this point is acknowledged by rule 94(5)

- at an aggregate network level, JGN's capacity requirements are not driven so much by load peaks as by volume market expansion (i.e. new Customers)
- customers told us they prefer variable volume based charges as they see fixed charges as a barrier to gas connection (see appendix 1.4)
- LRMC estimates can be subjective and rely on assumptions and quality of input information
- ensuring natural gas, as a discretionary fuel, remains competitive—recovering some costs via usage rather than fixed charges empowers customers to be able to control their bills and increases the attractiveness to connect new customers
- seeking stability in end-retail prices—LRMC estimates can be volatile when re-made over time. JGN has considered the relativities between the LRMC estimates between the tariff classes.

518. Gas networks are very different from electricity distribution businesses which must also take account of LRMC when setting tariffs. Gas, and in particular in the JGN network, has lower penetration and utilisation than electricity and faces competition from other fuel sources. In addition, climate is a significant determinant of the customer mix and utilisation of the network. These factors affect the application of LRMC to signal the impact of incremental consumption because JGN seeks to increase the efficient utilisation of its network. While the rules provide that tariffs are to take into account LRMC, since the building blocks revenue is greater than LRMC, not every tariff class and tariff parameter can be set at LRMC.

519. JGN notes that, although volume Customers are largely driving incremental demand, we do not experience capacity constraints to the extent that electricity networks do. For this reason, JGN is not subject to the same incentives to price throughput at LRMC. JGN also takes into account customer preferences for low usage based charges to encourage energy efficiency.

520. Demand Customers have large loads and are considered on an individual basis when they connect to JGN's network. Consistent with rule 79(2)(b), these considerations examine the incremental revenues from the Customer relative to the incremental costs. Where the expected costs exceed the revenues JGN charges a capital contribution to the connecting Customer. The fact that these users pay a contribution for any capacity development costs not covered by JGN's existing charges means JGN's net LRMC can be expected to trend towards its prices for these Customers.

521. Finally, marginal costs are essentially forward looking since they reflect the expected change in costs that arise from changes in demand. Because they are forward looking invariably the estimates are subjective, reliant on the assumptions made and quality of the input information. JGN has kept this in mind when taking into account its LRMC estimates. JGN's TSS provides further discussion of how it has taken LRMC into account.

13.4.2 TRANSACTION COSTS

522. Rule 94(2)(b)(i) requires each tariff class to be constituted with regard to the need to avoid unnecessary transaction costs. It also requires that a tariff, and each charging parameter for a tariff class, be determined with regard to the transaction costs associated with the tariff or each charging parameter.

523. JGN has considered transaction costs such as metering charges and administrative costs when determining its tariffs and tariff classes. This includes how to establish an appropriate balance of transaction costs that supports JGN's pricing objectives noted in section 13.2.

524. JGN considers its decision to retain a structure for charges based on Customer size (volume versus demand) is economically efficient for a number of reasons. For example, it would be inefficient to charge individually metered volume Customers consuming less than 10 TJ a year on capacity as that would require more sophisticated daily metering and data handling. Such metering costs are avoided by charging these Customers on throughput using basic metering equipment.

525. Similarly, postage stamping[60] tariffs for coastal and country areas avoids transaction costs for VI and VB Customers. It would be considerably more costly to charge these Customers based on zonal location for limited benefit in terms of network savings arising from any demand response. JGN considers the minor additional administrative burden to offer tariff classes for intermediaries is justifiable to ensure greater cost reflectivity for these volume tariffs and reflect the demand for these boundary metered tariffs.

526. In comparison to the VI and VB Customers, JGN charges demand Customers on capacity as they have the necessary metering equipment for daily reads. In addition, unlike VI and VB, demand and VRT Customers are charged based on location. This is because:

- the size of the Customers' usage and associated impact on the network warrant the additional costs of targeted price signalling (i.e. to manage capacity demands and network location decisions)
- this addresses the bypass risk that JGN may otherwise face as it does not have an exclusive franchise area.

527. JGN introduced the existing tariff classes for demand Customers in 2010 reducing transaction costs for retailers and customers at that time. The proposed closure of the first response tariffs to new Customers will further reduce transaction costs as JGN and retailers will not need to maintain those tariff classes for which there has been no first response uptake.

528. In addition, JGN's simplified reference services will also avoid transaction costs associated with having multiple fixed charge components for each tariff class. This will improve customer understanding of our charges and improve participation in energy markets, including reducing the administrative costs and complexity of retail comparator websites.

529. JGN considers that its proposed tariffs and tariff classes for the 2015-20 AA period provide the correct balance between minimising transaction costs and ensuring that customers have incentives to respond to pricing signals.

13.4.3 RESPONSE TO PRICE SIGNALS

530. Rule 94(4)(b)(ii) requires that where a tariff consists of two or more charging parameters, each parameter for a tariff class must be determined having regard to whether the customers belonging to the relevant tariff class are able or likely to respond to price signals.

531. JGN considers that it has structured its tariffs and charging components to allow Customers and end customers to respond to price signals. It is for this reason that JGN has made the changes to volume and demand Customers' blocks discussed in section 13.2 and has sought to minimise the fixed charge to empower customers to control their bills.

532. JGN uses a declining block structure for its volume and demand tariffs. Therefore, Customers face reduced costs for additional gas usage. JGN considers that this is an appropriate price signal for Customers where the marginal costs of supplying additional units is materially lower than the average costs, encouraging increased network utilisation.

13.4.4 JGN'S PRUDENT DISCOUNTS

533. JGN has a small number of prudent discount arrangements in place. Consistent with rule 96(2), the provision of these prudent discounts goes towards improving the efficiency of the network. The discounted revenue from

[60] 'Postage stamping' refers to the practice of applying the same price or set of prices within a specified location. Note that JGN still differentiates prices within the coastal or country areas depending on Customer or end customer characteristics.

these users contributes to the revenue for this AA. Without this revenue, all other sites would be subject to higher reference tariffs. JGN's prudent discounts are itemised in appendix 13.1.

14. ANNUAL REFERENCE TARIFF VARIATION

Box 14–1 Key messages – annual reference tariff variation

- JGN's annual reference tariff variation mechanism and process has worked reasonably well over the current AA period. Our proposal reflects this, as well as some incremental refinements to:
  - enhance the operation of the mechanism
  - reflect stakeholder requests for greater transparency and more notice time about annual price adjustments
  - accommodate our proposed implementation of the annual cost of debt adjustment.
- We also propose:
  - retaining a weighted average price cap form of price control to allow us to respond to market developments, retain efficient price signals and maintain our incentive to grow the gas market and thereby support lower average network prices over time
  - making some customer-driven improvements to our price control formulae
  - to bring forward when our annual tariffs become available and limit the administrative burden of annual changes
  - adding detail and transparency of our annual tariff variation process, including our customer and stakeholder engagement commitments, in a new publicly available TSS.

534. Chapter 13 explained the proposed reference tariff classes and structures to apply during the 2015-20 AA period. This chapter details our proposal for annual reference tariff adjustments, including JGN's form of price control, price control formulae and the annual process for the regulatory approval of the tariffs by the AER.

535. The chapter is split into the following sections:

- section 14.1 sets out JGN's proposal to retain a tariff basket form of annual tariff variation mechanism for its haulage reference service
- section 14.2 explains the proposed annual tariff variation approval process
- section 14.3 explains JGN's approach to setting ancillary charges.

536. JGN proposes to broadly retain the current method for varying reference tariffs over the 2015-20 AA period. JGN considers that these mechanisms are consistent with the revenue and pricing principles of the NGL and support the NGO by allowing tariffs to remain allocatively and dynamically efficient over the AA period.

537. JGN proposes to retain a tariff basket form of price control for its haulage reference services. A tariff basket form of control allows JGN to respond to market developments and retain efficient price signals over the life of the 2015-20 AA period. The tariff basket price control is the predominant form of price control for gas

networks[61] and retains consistency with JGN's current tariff variation arrangements, which are both relevant considerations for the AER when deciding the reference tariff variation mechanism for the 2015-20 AA period.[62]

538. For the 2015-20 AA period, JGN proposes amendments to the price control formula to incorporate approved pass throughs and annual true-ups including:

- annual true-up for the trailing average benchmark cost of debt via the X factor as explained in chapter 9 and in detail in appendix 9.10
- automatic annual adjustments for licence fees, carbon cost, change in tax and UAG—this takes true-up mechanisms between annual allowances and realised costs out of the cost pass through process, thereby simplifying and streamlining the annual tariff variation process and better aligning the formula with that applicable to other GDBs
- the method for incorporating costs arising from cost pass through events that are subject to a materiality threshold where these have been approved by the AER.

539. Additionally, JGN is seeking to enhance publicly-available tariff information by publishing a TSS (included at appendix 1.7) on the customer information section of Jemena's website. The TSS includes an indication of expected price trends and an outline of the process and consultation that JGN would undertake prior to making changes to any tariff class, tariff structure, or the real price of user-requested ancillary charges. JGN would also explain any material differences between the TSS forecasts and actual annual variations in its annual tariff variation submission to the AER.

540. JGN is seeking to use the TSS to increase the transparency of ancillary charges. The TSS outlines that ancillary service charges are set to recover costs and do not provide any additional price signalling function. It also makes it clear that ancillary charges would be set for the initial year of the 2015-20 AA period and adjusted annually for inflation, except for limited circumstances where JGN has consulted customers and had a real price change approved by the AER.

14.1 HAULAGE REFERENCE SERVICES

541. For its haulage reference service, JGN proposes to maintain a tariff basket annual tariff variation mechanism as permitted under rule 97(2)(b) in the form of a weighted average price cap (**WAPC**) formula for the 2015-20 AA period.

542. JGN will implement this WAPC using the CPI-X price control formula and annual tariff variation mechanism.

543. A WAPC constrains the overall movement in reference tariffs within the AA period. It provides JGN incentives, consistent with the long-term interests of customers, to:

- increase volumes and network utilisation as it does not constrain the revenue that JGN might recover, supporting productive and allocative efficiency
- price at marginal cost to help ensure that customers susceptible to bypassing the network are retained, again supporting allocative efficiency.

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61 Multinet, SP AusNet, Envestra Qld, Envestra Vic, Envestra Albury, Envestra SA, Envestra Wagga Wagga, APT Allgas are all subject to a WAPC. ActewAGL is regulated under a schedule of fixed prices.

62 Rule 97(3)(c) and 97(3)(d).

544. The tariff basket approach is consistent with customers' long-term interests by always balancing to the weighted average price. A tariff basket approach allows JGN to respond to market changes and maintain efficient tariff structures consistent with rule 97(3)(a). Further, a WAPC means JGN, and not its customers, bears the risk where actual demand is different from the AER allowance. This places the risk with JGN as the party best placed to manage it. It also motivates JGN to:

- encourage growth, therefore increasing asset utilisation to the benefit of its customers
- price according to the incidence of its costs.

545. The proposed WAPC formula is shown in Box 14–2.

546. The right hand side of the equation determines the weighted average of notional revenues in the current AA year compared to the AA year in which the proposed tariffs are to apply. This notional revenue relies upon quantities from two years prior. This is consistent with practice in other jurisdictions. This is also consistent with rule 97(3)(b) because it reduces the administrative burden on the AER relative to the alternative of using estimated data for this purpose.

547. The left hand side of the equation provides the price cap that allows tariffs to increase by no more than the CPI less the X factor,[63] cost pass throughs and true-up amounts for licence fees, carbon costs, tax and UAG. These are included because:

- the X factor parameter gives effect to the price path set out in section 12.2 and aligns the NPV of JGN's cost of service with its forecast revenues
- the CPI parameter adjusts JGN's haulage reference services for inflation
- cost pass throughs are adjustments for a predetermined set of unforeseen events[64] outside of JGN's control where JGN's costs are higher or lower than threshold requirements[65] due to these events—these adjustments can be both positive and negative
- true-ups are required for licence fees, carbon costs, tax and UAG to ensure that only the actual outturn cost of these get passed on to consumers—these true-ups can be both positive and negative.

548. Individual reference tariffs will continue to be restricted by a side constraint formula also shown in Box 14–2. This restricts changes to revenues from individual tariffs to 10 per cent over and above the increase permitted by the left-hand side of the tariff control formulae variations. This provides additional certainty to customers on annual price movements.

549. The reference tariff mechanism has been designed to ensure that forecast revenues for the 2015 AA period equalise (in present value terms) to the portion of total revenue allocated to reference services for the 2015 AA period.

63 Note that the X factor will be updated each year based on the implementation of the trailing average cost of debt.

64 Clause 3.4 of the AA details allowed pass through events.

65 Clause 3.4 of the AA details threshold levels.

Box 14–2 Tariff control formulae and side constraint formulae

Tariff basket price control formula:

$$(1+CPI_t)(1-X_t)(1+A_t)(1+PT_t) \geq \frac{\sum_{x=1}^{n}\sum_{y=1}^{m} p_t^{xy} q_{t-2}^{xy}}{\sum_{x=1}^{n}\sum_{y=1}^{m} p_{t-1}^{xy} q_{t-2}^{xy}}$$

Subject to the rebalancing side constraint formula:

$$(1+CPI_t)(1-X_t)(1+A_t)(1+PT_t)+0.1 \geq \frac{\sum_{x=1}^{n}\sum_{y=1}^{m} p_t^{xy} q_{t-2}^{xy}}{\sum_{x=1}^{n}\sum_{y=1}^{m} p_{t-1}^{xy} q_{t-2}^{xy}}$$

Where JGN has n reference tariffs, which each have up to m tariff components, and where:

t is the financial year for which the tariffs are being set;

p_t^{xy} is the proposed tariff for component *y* of reference tariff x in financial year *t*, i.e. the new tariff to apply from the commencement of financial year *t*;

p_{t-1}^{xy} is the tariff for component *y* of reference tariff x that is being charged at the time the variation notice is submitted to the AER for assessment;

q_{t-2}^{xy} is the quantity of component *y* of reference tariff x that was sold in financial year *t-2*;

CPI_t means, for financial years beginning after 30 June 2015:

i. the CPI for the December quarter immediately preceding the start of the relevant financial year; divided by

ii. the CPI for the December quarter immediately preceding the December quarter referred to in paragraph (i)

iii. minus one

provided that if the Australian Bureau of Statistics does not, or ceases to, calculate and publish the CPI, then in this access arrangement CPI will mean an inflation index or measure agreed between the AER and the Service Provider

X_t means the *X* factor for each financial year, determined in accordance with the PTRM, applying the annual return on debt calculated for the relevant financial year

A_t is the automatic adjustment factor

PT_t is the cost pass through factor.

14.1.1 AUTOMATIC ADJUSTMENT FACTOR

550. The proposed symmetrical automatic adjustment factor (A_t) set out in the tariff control formula allows JGN to pass through annual costs/savings across a number of uncontrollable cost categories:

- *licence fee factor*—due to realised licence fees varying from the allowed annual licence fee. This has been updated to remove the reference to the Gas Market Company, include the Energy and Water Ombudsman (**EWON**) and capture fees levied due to JGN's ownership (not just operation) of the network
- *UAG factor*—to procure gas to meet its UAG obligations as compared to its annual allowance. JGN proposes a new approach to assessing UAG costs (in appendix 7.7)
- *carbon cost factor*—to meet any costs incurred (directly or indirectly) different to the annual allowance arising from an obligation imposed under a 'carbon scheme'.[66] This includes JGN's liability for carbon tax under the CE Act, which commenced in 2012. JGN will incur ongoing costs to comply with obligations under the Clean Energy Legislative Package while the relevant clauses of the CE Act remain in effect. The construct of the carbon cost factor enables pass through of any savings that would occur should the relevant clauses of the CE Act be repealed. The factor is drafted broadly to reflect the significant degree of carbon policy uncertainty over the next AA period
- *change in tax factor*—to meet any new or changed tax obligations, defined consistently with the 2010 AA pass through event, over and above the annual allowance.

[66] A 'carbon scheme' refers to any law or regulation with respect to the production or emission of, or to reduce, limit, cease, prevent, offset, remove or sequester greenhouse gas emissions.

Box 14–3 Automatic adjustment factor

$$A_t = \frac{(1+A'_t)}{(1+A'_{t-1})} - 1$$

where

A_{t-1} is:

(a) zero when t-1 refers to financial year 2015-16; or

(b) value of A'_t determined in the financial year t-1 for all other years

and

$$A'_t = \frac{(L_{t-2}+U_{t-2}+C_{t-2}+T_{t-2})\left[(1+realWACC_t)^2(1+CPI_{t-1})\right]}{(1-X_t)\sum_{x=1}^{n}\sum_{y=1}^{m} p_{t-1}^{xy} q_{t-2}^{xy}}$$

where:

L_{t-2}	is the licence fee factor amount, as defined in the AA, for Financial Year t-2
	When t-2 is financial year 2014-15, L_{t-2} is $L_{2014} + L_{2015}$*(1+*real* $WACC_t$)*(1+CPI_{t-2}),
	where:
	L_{2014} is the licence fee factor amount, as defined in the AA, for Financial Year 2013-14
	L_{2015} is the licence fee factor amount, as defined in the AA, for Financial Year 2014-15
	real $WACC_t$ is 6.67 per cent
	CPI_{t-2} is the value of CPI_t determined in 2014-15 in accordance with the AA
U_{t-2}	is the UAG factor amount, in accordance with the AA, for financial year t-2
C_{t-2}	is the carbon cost factor amount, in accordance with the AA, for financial Year t-2
	when t-2 is the financial year 2014-15 C_{t-2} = 0
T_{t-2}	is the change in tax factor amount for financial year t-2
real $WACC_t$	is 6.67 per cent
CPI_t	has the same meaning as set out in the 2015 AA proposal.
CPI_{t-1}	is the value of CPI_t determined in the Financial Year t-1
X_t	has the same meaning as set out in the 2015 AA proposal.
p_{t-1}^{xy}	has the same meaning as set out in the 2015 AA proposal.
q_{t-2}^{xy}	has the same meaning as set out in the 2015 AA proposal.

551. The automatic adjustment factor operates so that all adjustments are made two years following that in which costs are incurred. This is why each of the licence fee factor, UAG factor, carbon cost factor and change in tax factor are described as 't-2'. Making the adjustment two years after costs are incurred ensures actual data is available in time for JGN to make its annual tariff variation proposal a month earlier than under the 2010 AA, in March of each year. Stakeholders expressed a preference for earlier visibility of network prices during JGN's customer engagement.

552. To move to consistent t-2 adjustments JGN needs to transition from its current pass through timings where licence fee is t-2, UAG is t-1 and carbon is t. JGN has not yet sought to make a change in tax adjustment in the current AA period, so no transition is required. Table 14–1 demonstrates the transition to t-2 and reflects the definitions required in Box 14–3. Specifically, this demonstrates that:

- the 2016-17 true-up needs to include a true-up of licence fees incurred in 2013-14 and 2014-15
- the value of carbon true-up in 2016-17 for 2014-15 costs should be zero as these costs are being recovered in 2014-15.

Table 14–1: Year of administrative true-ups

Automatic adjustment factor **Year cost incurred (this row)**	**Year of true-up (year in table body)**				
	2012-13	**2013-14**	**2014-15**	**2015-16**	**2016-17**
Licence fee factor	2014-15	***2016-17***	***2016-17***	***2017-18***	***2018-19***
UAG factor	2013-14	2014-15	***2016-17***	***2017-18***	***2018-19***
Carbon cost factor	2012-13	2013-14	2014-15	***2017-18***	***2018-19***
Change in tax factor	No recovery required	No recovery required	***2016-17***	***2017-18***	***2018-19***

(1) Administrative true-up in 2010-15 AA period in black

(2) Administrative true-up in 2015-20 AA period in ***bold italic***

14.1.2 COST PASS THROUGH FACTOR

553. The proposed cost pass through factor set out in the tariff control formula provides the mathematical method by which any AER approved cost pass through is incorporated into the tariff basket. The pass through factor formula is contained in Box 14–4.

Box 14–4 Pass through factor formula

$$PT_t = \frac{(1+PT'_t)}{(1+PT'_{t-1})} - 1$$

Where

PT'_{t-1} is:

a) zero when t-1 refers to financial year 2014-15

b) the value of PT'_t determined in the financial year t-1 for all other financial years in the access arrangement period,

and

$$PT'_t = \frac{AP_t}{(1+CPI_t)(1-X_t)(1+A_t)\sum_{x=1}^{n}\sum_{y=1}^{m} p_{t-1}^{xy} q_{t-2}^{xy}}$$

where

AP_t has the same meaning as set out in the 2015 AA proposal

CPI_t has the same meaning as set out in the 2015 AA proposal

X_t has the same meaning as set out in of the 2015 AA proposal

A_t is the automatic adjustment factor for year t

p_{t-1}^{xy} has the same meaning as set out in the 2015 AA proposal

q_{t-2}^{xy} has the same meaning as set out in the 2015 AA proposal.

14.2 TARIFF VARIATION PROCESS

554. Clause 3 of the 2015 AA proposal details the proposed reference tariff variation process. This is consistent with the process currently applying during the 2010-15 AA period with minor adjustments to cater for the AER rate of return guidelines and customer driven improvements in the timing of the annual reference tariff proposal submission.

555. In summary, for its annual process:

- JGN will submit its annual reference tariff variation proposal to the AER for approval by 15 March of each year prior to the relevant financial year in which the proposed tariffs are to apply
- JGN will include any update to the X factor for the return on debt adjustment previously approved by the AER as described in chapter 9 and appendix 9.10
- JGN's annual reference tariff proposal will include a pricing model that demonstrates compliance with the tariff variation mechanism

- the AER will review this proposal for compliance with the tariff variation mechanism and approve or reject the proposal consistent with the AA terms
- JGN will actively engage with stakeholders on the tariff variations as outlined in the TSS and prior to AER approval
- JGN will undertake any necessary consultation prior to submitting its annual reference tariff proposal and provide explanations of tariffs consistent with its undertakings in the TSS.

556. There may be very limited instances where JGN seeks to vary its tariff outside of the annual process. This would be via an intra-year tariff variation process. In summary:

- JGN can propose to the AER to vary tariffs effective from a date other than the start of the financial year
- the proposal will be made 50 business days prior to the proposed date it would take effect and include the adjustments to apply for the remainder of the financial year
- JGN's intra-year reference tariff proposal will include a pricing model that demonstrates compliance with the tariff variation mechanism
- the AER will review this proposal for compliance with the intra-year tariff variation mechanism and approve or reject the proposal consistent with the AA terms
- JGN will engage with stakeholders in manner consistent with its TSS.

557. JGN considers that this tariff variation process complies with rule 97 as:

- the submission of a formulaic model minimises administrative burden on the AER by providing an objective and transparent means for the AER to exercise its oversight and powers of approval for reference tariff variation
- excluding bringing forward the date of our annual tariff variation notice proposals to March each year, it aligns with equivalent processes in other jurisdictions.

14.3 ANCILLARY CHARGES

558. JGN proposes to maintain its charges for user-requested ancillary activities in real terms over the 2015-20 AA period unless the underlying costs materially change.

559. JGN provides the ancillary services charges and process for annual adjustments in its TSS. The ancillary charges variation process will occur as part of JGN's annual haulage reference tariff variation process. JGN will submit its annual tariff proposal to the AER including a pricing model that demonstrates how JGN has escalated the ancillary charges.

15. PASS THROUGH EVENTS

Box 15–1 Key messages – pass through events

In formulating JGN's 2015 AA pass through proposal, we have looked for opportunities to align our list of cost pass through events with those adopted in other networks' recently approved AAs where this is practical and appropriate for JGN's circumstances. JGN's approach reflects an allocation of risk to the party best placed to manage the risk.

JGN supports the application of a materiality threshold to pass through events within the context of providing JGN with a reasonable opportunity to recover its efficient costs and promoting efficient investment in the network. JGN proposes a threshold that reflects an acknowledgement that uncontrollable events can have material short term and longer term impacts on a business.

560. This chapter sets out JGN's proposed cost pass through events and materiality threshold for the 2015-20 AA period. This chapter is structured as follows:

- section 15.1 sets out JGN's cost pass through proposal
- section 15.2 sets out JGN's materiality threshold proposal.

15.1 COST PASS THROUGH PROPOSAL

561. JGN proposes revisions to the list of cost pass through events included in its 2010 AA. JGN has sought to align its list of cost pass through events with those adopted in recently approved AAs where this is practical and appropriate for JGN's circumstances. The events are outside the control of JGN and therefore our approach reflects an appropriate allocation of risk.

562. JGN's proposed cost pass through event list reflects risks which are not captured in:

- the allowed rate of return—the risk coefficients in JGN's proposed rate of return assume a normal (i.e symmetric) distribution of returns whereas cost pass through events capture risks which are asymmetric in nature
- the capex or opex forecasts because each relevant event specifically excludes any costs captured by those forecasts (e.g. base year insurance costs)
- any other relevant mechanism or allowance.

15.1.1 AUTOMATIC ADJUSTMENT FACTORS

563. The 2010 AA includes the following pass through events, amongst others:

- licence fee event
- UAG event
- relevant tax event
- Carbon Pollution Reduction Scheme event.

564. Each of these events addresses circumstances over which JGN has essentially no control, and are therefore appropriate to continue as cost pass through events. More specifically:

- JGN's licence fees are variable amounts, set by public bodies each year, with amounts determined by these bodies—without JGN input—based on a range of factors. The amounts vary year on year, so that JGN will not know the actual cost of these fees until after the end of the relevant year to which they relate
- UAG costs incurred for any period will depend on factors largely outside JGN's control including actual gas load and the price at which JGN is able to purchase gas competitively from the wholesale gas market to replenish UAG quantities. UAG quantities are forecast in advance as a percentage of market gas loads, with the actual volumes for a regulatory year not known until some time after the end of that year. UAG prices are forecast based on current gas prices that JGN pays for UAG as a result of its 2013 annual tender, however the actual prices that JGN will pay depend on outcomes of future procurement processes. It is likely that future gas prices will increase substantially relative to the price JGN currently pays
- changes in tax laws are matters for the Federal and State Governments, as well as local governments in the areas in which JGN operates. Whilst JGN may make submissions to relevant government bodies in relation to such changes, ultimately the nature and extent of changes are matters over which government decides
- as for UAG, actual costs associated with the operation of the current carbon scheme under the CE Act (i.e. purchase of carbon permits) are not known until the after the end of the relevant regulatory year, once actual fugitive emissions from the network are determined, based on a formula which requires as an input the actual quantities of gas in JGN's network in the relevant period.

565. As explained in chapter 14, for the 2015-20 AA period, JGN proposes that these pass through events be converted into automatic adjustment factors because this approach:

- streamlines the 2015 AA
- recognises that each would be supported by verifiable information when the annual tariff variation notice (**TVN**) is submitted.

15.1.2 BUSINESS CONTINUITY EVENT

566. The 2010 AA defines the business continuity event as follows:

> *"Business Continuity Event" means any occurrence that may create, or may lead to, an interruption, disruption, loss and/or crisis in the Service Provider's business for which the Service Provider does not have full insurance coverage as identified in the Service Provider's Access Arrangement Information, including but not limited to, gas supply shortfall, tsunami, cyclone, pandemic illness and earthquake.*

567. This event picks up in one consolidated definition the standard-type set of catastrophic impact, "force majeure"-style events, arising from natural disasters or other uncontrollable external factors, in circumstances in which JGN had limited or no ability to adequately mitigate impacts, including via insurance.[67]

568. JGN proposes to retain this event, in a form largely as currently defined. JGN's proposed revised definition is as follows:

> *"Business Continuity Event" means any occurrence that may create, or may lead to, an interruption, disruption, loss and/or crisis in the Service Provider's business for which the Service*

[67] JGN notes that to the extent that it could take action to mitigate impacts, that would be a relevant consideration for the AER, as part of the process leading to the AER making a determination as to a cost pass through amount under clause 3.4(j) of its revised AA, which requires the AER to take into consideration JGN's decisions and actions in relation to the risk of the event.

Provider does not have full insurance coverage, including but not limited to, gas supply shortfall, tsunami, cyclone, pandemic illness and earthquake. For the purposes of this definition, the value of the Service Provider's insurance coverage is the greater of the Service Provider's insurance coverage at the time of the event and the coverage at the time the AER approves this Access Arrangement, with reference to the forecast operating expenditure allowance approved in the AER's final decision and the reasons for that decision.

569. JGN's current insurance coverage is captured in this document, through the opex forecast for the 2015-20 AA period (appendix 7.1). The new wording in this definition recognises that JGN's level of insurance coverage could conceivably change during the next AA period, but provides certainty that the level of coverage relevant to the AER's decision making as to cost pass through for any Business Continuity Event will always be at least that in place as at time the AER approves the AA.

570. This event is clearly defined and would efficiently capture a number of stand-alone events as identified separately in the AAs of other GDBs, for example:

- terrorism event
- insurer credit risk event
- insurance cap event
- natural disaster event.

571. In JGN's case, the business continuity event also captures gas supply shortfall which is particularly important for a gas distributor operating in NSW. The risk of a NSW gas supply shortfall, being an upstream issue which JGN as the gas distributor has no ability to influence or control, has been widely acknowledged including by AEMO and other market participants:

> *If production in Queensland and South Australia is prioritised for export, there will be flow-on effects to New South Wales with potential shortfalls of 50–100 TJ/d over winter peak demand days from 2018.*
>
> *Committed and advanced projects in New South Wales are not sufficient to completely alleviate these shortfalls without further support from the Moomba–Sydney Pipeline (MSP).*[68]

572. JGN considers that removal of this event would fundamentally change JGN's risk exposure, be inconsistent with the achievement of allocative efficiency, and would not be in the long-term interests of customers.

15.1.3 MARKET COSTS EVENT

573. The 2010 AA defines the market costs event as follows:

> *"Market Costs Event" means any:*
>
> *i. decision made by the AER, or any other authority;*
>
> *ii. coming into force of any new statute, regulation, order, rule, subordinate legislation or other source of legal obligation on the Service Provider;*

[68] AEMO, *Gas Statement of Opportunities for eastern and south-eastern Australia 2013*, p iv. See also P Simshauser, T Nelson, *Solving for 'x' – the New South Wales Gas Supply Cliff*, *Working Paper No. 40*, February 2014.

iii. change in any existing statute, regulation, order, rule, subordinate legislation or other source of legal obligation on the Service Provider; or

iv. change in any other document enforceable under any statute, regulation, rule or subordinate legislation;

which occurs on or after 1 July 2010, which has the effect of:

v. imposing minimum standards (including network design, operational or safety standards) on the Service Provider that are new or different from those applying immediately before 1 July 2010; or

vi. substantially altering the manner in which the Service Provider is required to undertake any activity forming part of, or ancillary to, its Reference Services (including, but not limited to, rules governing the operation of competitive gas markets or a requirement that a party other than, or in addition to, the Service Provider be required to comply with the obligation of a Service Provider for the Network under the National Gas Law and National Gas Rules);

such that the Service Provider incurs greater or lesser costs in providing the Reference Service than it did before the event occurred.

574. The purpose of this event is to capture legislative or administrative actions such as changes in laws, regulations, approval conditions, standards and the like which apply to JGN, impact its operations and the provision of reference services, but over which JGN has no ability to control, as a privately owned business (beyond making submissions in response to proposed changes, as any person or entity may do).

575. JGN proposes to harmonise this event with the "service standard event" included in the Envestra (Victoria) AA.[69] JGN's proposed event is:

"Service standard event" means a legislative or administrative act or decision that has the effect of:

i. varying, during the course of an Access Arrangement Period, the manner in which Jemena Gas Networks is required to provide a Reference Service; or

ii. imposing, removing or varying, during the course of an Access Arrangement Period, minimum service standards applicable to prescribed Reference Services; or

iii. altering, during the course of an Access Arrangement Period, the nature or scope of the prescribed Reference Services, provided by Jemena Gas Networks.

15.1.4 DECLARED RETAILER OF LAST RESORT EVENT

576. The 2010 AA defines the declared retailer of last resort (**ROLR**) event as follows:

"Declared Retailer of Last Resort (ROLR) Event" means the occurrence of an event whereby the Service Provider incurs materially higher or lower administrative costs as a result of an existing retailer for Customers being unable to continue to supply gas and those Customers being transferred to the declared retailer of last resort.

577. This event is intended to deal with circumstances in which a retailer ceases to operate, thereby triggering a "retailer of last resort" mechanism. As the distributor, JGN has no ability to influence or mitigate the operational

[69] AER, *Access arrangement final decision – Envestra Limited 2013-17*, March 2013.

circumstances of any retailer, but may be exposed to potentially material flow on impacts should such an event occur.

578. JGN proposes to harmonise this event with the Network User Failure Event in the Envestra (Victoria) AA:

> *"Network User Failure Event" means the occurrence of an event whereby a User becomes insolvent or is unable to continue to supply gas to its customers, and those customers are transferred to another User but excludes costs that could be the subject of a pass through amount pursuant to rule 531 of the National Gas Rules.*

15.1.5 REGULATORY CHANGE EVENT

579. JGN proposes a new regulatory change event, noting that a regulatory change event is also included in the Envestra (Victoria) AA:

> *Regulatory change event means a change in regulatory obligation or requirement, or the introduction or removal of a regulatory obligation or requirement, that falls within no other category of Cost Pass Through Event and affects the circumstances of the Service Provider's business, including the manner in which the Service Provider provides the Reference Service*

580. JGN is of the view that changes captured by this event would most likely be captured by the market costs event in the 2010 AA. As for the market costs event in the 2010 AA, and the proposed service standard event, the triggering of a regulatory change event is dependent on some legislative or administrative act, being a matter outside of JGN's control.

581. Given the significant uncertainty surrounding government carbon policy into the 2015-20 AA period (including the proposed DA Policy of the current Federal Government, as well as the possibility that a subsequent government elected during the 2015-20 AA period might take an alternative approach), JGN proposes that cost changes resulting from a change in carbon policy that would not be captured by the carbon cost adjustment factor but that are captured by the regulatory change event, be exempt from the materiality threshold for making cost pass through application. This is consistent with approach JGN takes for the carbon cost adjustment factor and relevant tax factor, which similarly are not subject to a materiality threshold.

15.1.6 GENERAL PASS THROUGH EVENT

582. The 2010 AA defines general pass through event as follows:

> *"General Pass Through Event" means any other pass through event which occurs in the following circumstance:*
>
> *1. An uncontrollable or unforeseeable event occurs during the 1 July 2010 to 30 June 2015 access arrangement period, the effect of which could not have been prevented or mitigated by prudent operation risk management.*
>
> *2. The costs of the event are not already included in building block revenue or reimbursed by a third party. These events will be assessed at the time of application for consistency with the relevant National Gas Rules criteria. For the purpose of this definition, an event will be considered unforeseeable if, at the time the Service Provider lodged its access arrangement revision proposal, despite the occurrence of the event being a possibility there was no reason to consider that the event was more likely to occur than not to occur during the 1 July 2010 to 30 June 2015 access arrangement period.*

583. If the proposed regulatory change event is accepted (see section 15.1.5), JGN would propose that the general pass through event be removed from the list of pass through events in the 2015-20 AA.

15.2 MATERIALITY THRESHOLD PROPOSAL

584. The 2010 AA sets out the following materiality thresholds for cost pass through events:

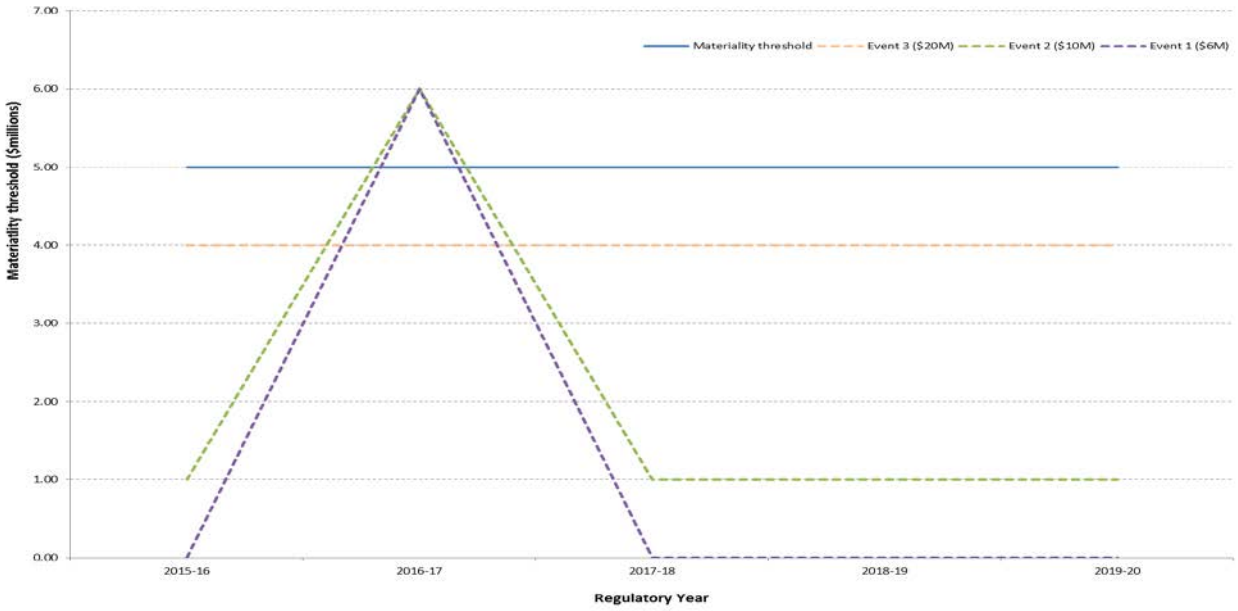
> *Subject to the AER's approval, Haulage Reference Tariffs will be adjusted to pass through the costs of one or more of the Cost Pass-Through Events, subject to each individual pass through event meeting the administrative threshold. The administrative threshold is defined below…*
>
> *…for all Cost Pass-Through Events (with the exception of the Change in Tax Event, UAG Adjustment Event and Licence Fee Adjustment Event, unless clause 3.4(f)(iv)B requires otherwise) – **at least 1 per cent of the smoothed revenue requirement specified in the final decision in the years of the access arrangement period that the costs are incurred**.*
>
> *…for Change in Tax Event, UAG Adjustment Event and Licence Fee Adjustment Event **sufficient to change the smallest increment in the Reference Tariffs as per the rounding convention**. The costs incurred by the Service Provider for the Change in Tax Event, UAG Adjustment Event and Licence Fee Adjustment Event must be supported by verifiable information (including invoices or independently verified information). If the Change in Tax Event, UAG Adjustment Event and Licence Fee Adjustment Event are not supported by verifiable information the higher administrative threshold (outlined in paragraph (i) above) applies to those events. The financial impacts for the Change in Tax Event may be supported by documentation from an auditor or accountant to verify the estimates.* [emphasis added]

585. JGN supports the application of a materiality threshold to pass through events within the context of providing JGN with a reasonable opportunity to recover its efficient costs and promoting efficient investment in the network. However, JGN considers that the current threshold specification does not provide JGN with a reasonable opportunity to recover its efficient costs and can create incongruous outcomes.

586. For example, consider Figure 15–1, where annual smoothed revenues are assumed to be $500M and so a one per cent threshold is $5M p.a. and the following circumstances arise:

- event 1 occurs in the second year of the regulatory period (2016-17), and will impose a one-off incremental cost of $6M. JGN can submit a pass through application for this event because in the year of the period that costs are incurred (i.e. 2016-17) the $5M materiality threshold is met. This outcome is appropriate given the material impact on JGN's costs and cash flows as a result of the event.
- event 2 occurs in the first year of the regulatory period (2015-16), and will impose an annual incremental cost of $1M except in 2016-17 where it imposes a cost of $6M (total cost of $10M). A possible interpretation of the provisions in the 2010 AA could result in a situation where JGN is unable to submit a pass through application for this event in respect of the costs incurred in years 2015-16, 2017-18, 2018-19 and 2019-20, because in these years of the period that costs are incurred (i.e. every year except 2016-17) the materiality threshold (being at least one per cent of the smoothed revenue requirement specified in the final decision in the years of the AA period that the costs are incurred) is not met. In JGN's view such an outcome would be inappropriate looked at in light of the overall materiality of the total cost of the event. Such a structure would also provide an incentive to a service provider to inefficiently shift costs and/or overinflate cost forecasts for those four years to meet the materiality threshold if it was held that the threshold had to be reached in respect of each year in which the costs are incurred.
- event 3 occurs in the first year of the regulatory period (2015-16), and will impose an annual incremental cost of $4M (total cost of $20M). Again, one possible interpretation of the provisions in the current AA could result in a situation where JGN is unable to submit a pass through application for this event because in every year of the period that costs are incurred the materiality threshold is not met. In JGN's view this outcome is also inappropriate because of the materiality of the total cost of the event ($20M). Such a structure would also provide a service provider with an incentive to overinflate cost forecasts to meet the materiality threshold and/or inefficiently shift costs in order that the relevant threshold is met.

Figure 15–1: Materiality threshold application



587. To the extent the existing threshold was applied such that costs could only be passed through where they were at least equal to one per cent of smoothed revenue in each of the years in which they were incurred, the outcomes from events 2 and 3:

- do not recognise the fixed cost nature of proposing and assessing pass through applications
- are inconsistent with the revenue and pricing principles and the NGO
- result in incongruous outcomes (if the event caused JGN to incur $6M in one year only, this $6M could be passed through).

588. To seek to address these issues, JGN proposes the following threshold specification[70]:

> *The Service Provider may seek the approval of the AER to pass through costs where:*
>
> *as a result of a Cost Pass Through Event (other than a Regulatory Change Event that relates to carbon), the Service Provider has incurred, or is likely to incur, higher costs in providing the Reference Service than it would have incurred but for that event and those costs are or are reasonably estimated to be:*
>
> *i. in total over the 2015-20 Access Arrangement Period, equal to or greater than 0.5 per cent of the smoothed forecast revenue specified in the Access Arrangement Information; or*
>
> *ii. in at least one of the Financial Years of the Access Arrangement Period that the costs are incurred, equal to or greater than one per cent of the smoothed forecast revenue specified in the Access Arrangement Information for the corresponding year that the costs are incurred; or*

[70] For clarity, these thresholds do not apply in the case of events that fall within any of the automatic adjustment factors. See further section 15.1.1.

as a result of a Regulatory Change Event that relates to carbon, the Service Provider has incurred or is likely to incur higher costs in providing the Reference Service than it would have incurred but for that event, regardless of whether those costs satisfy the thresholds in clause i or i above.

589. Under this specification:

- events 1 and 2 are clearly open to a pass through application because in at least one of the years that costs are incurred (i.e. 2016-17) the costs incurred meet the materiality threshold
- event 3 is clearly open to a pass through application because the total costs over the AA period ($20M) is greater than half a per cent of forecast revenue over the AA period (0.5 per cent x $2.5B = $12.5M).
- if the annual cost for event 3 was less than $2.5M p.a. (total cost less than $12.5M) JGN would not be able to submit a pass through application.

590. JGN also proposes that no materiality threshold applies to a Regulatory Change Event related to carbon policy (to the extent that those costs are not picked up by the automatic adjustment factor), other than the requirement that the event is likely to result in JGN incurring higher costs in providing a reference service. This reflects that carbon policy uncertainty over the 2015-20 AA period is impacting on incentives to invest in the energy sector, and that these costs are outside of JGN's control.

16. LIST OF SUPPORTING INFORMATION

No.	Document Title	Author
1.1	Explanation of proposed revisions to the 2010 AA	JGN
1.2	Explanation of JGN's Reference Service Agreement	JGN
1.3	Statement of 2015 AA submission interdependencies	JGN
1.4	JGN's customer, stakeholder and community engagement	JGN
1.5	JGN community and small business consultation report	Newgate
1.6	2015 AA submission compliance checklist	JGN
1.7	Geoff Swier – Economic considers for the interpretation of the NGO	Geoff Swier
1.8	Tariff structures statement	JGN
1.9	Confidentiality claim	JGN
4.1	JGN's pipeline service delivery model	JGN
4.2	Review of pricing methodology report (regional matching report)	Evans and Peck
4.3	Economic Insights – Productivity study and opex output growth	Economic Insights
5.1	Demand forecasting report	Core Energy
5.2	Core Energy model – JGN demand and customer forecast	JGN
5.3	JGN demand forecasts adapted for reference tariffs	JGN
5.4	JGN demand forecasts adapted for reference tariffs – model	JGN
6.1	JGN 20 year asset strategy	JGN
6.2	JGN Asset Management Plan 2015-20	JGN
6.3	JGN IT Strategy and Asset Management Plan 2014-20	JGN
6.4	JGN capex forecast model	JGN
6.5	Review of JGN network capital governance	SKM
6.6	Management response to SKM review	JGN
6.7	Forecast capital expenditure report	JGN
6.8	K Lowe – EBIT margin benchmarking report	K Lowe Consulting
6.9	Project estimation methodology review	Evans and Peck
6.10	BIS Shrapnel – Input cost escalation report	BIS Shrapnel
7.1	JGN opex forecast model	JGN
7.2	Operating expenditure forecasting method and base year efficiency	JGN
7.3	Operating expenditure step change report	JGN
7.4	Aon report	Aon
7.5	UAG methodology and justification	JGN
7.6	UAG – Frontier Economics report	Frontier Economics
7.7	UAG split correlation method	JGN

No.	Document Title	Author
7.8	Debt raising costs	Incenta
9.1	WACC model	JGN
9.2	Averaging period proposal	JGN
9.3	Return on equity proposal	JGN
9.4	SFG – the required return on equity for regulated gas and electricity networks	SFG
9.5	SFG – equity beta	SFG
9.6	SFG – cost of equity in the Black CAPM	SFG
9.7	SFG – the Fama-French model	SFG
9.8	SFG – alternative versions of the dividend discount model	SFG
9.9	Incenta – evidence on the return on equity from independent expert reports	Incenta
9.10	Return on debt proposal	JGN
9.11	Incenta – Bloomberg extrapolation	Incenta
10.1	Gamma proposal	JGN
10.2	SFG – an appropriate regulatory estimate of gamma	SFG
12.1	JGN forecast revenue model	JGN
13.1	Rule considerations in setting network tariffs	JGN