Jemena Gas Networks (NSW) Ltd

2015-20 Access Arrangement Information

Appendix 7.2

Operating expenditure forecasting method and base year efficiency

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GLOSSARY

A&O	Administration and Overheads
AA	Access Arrangement
AAI	Access Arrangement Information
BIS	BIS Shrapnel
Core	Core Energy Group
CPM	Carbon Pricing Mechanism
DA	Direct Action
DTIRIS	Department of Trade and Investment, Regional Infrastructure and Service
EGWWS	Electricity, gas, water and waste services
EI	Economic Insights
ERF	Emissions Reduction Fund
GDB	Gas Distribution Businesses
Incenta	Incenta Economic Consulting
IPART	Independent Pricing & Regulatory Tribunal
IT	Information Technology
JEN	Jemena Electricity Networks
JGN	Jemena Gas Networks
NECF	National Energy Customer Framework
NGER	National Greenhouse and Energy Reporting
NGR	National Gas Rules
O&M	Operating & Maintenance
opex	Operating expenditure
PFP	Partial factor productivity
RAB	Regulatory Asset Base
RIN	Regulatory Information Notice
S&P	Standard & Poor's
TFP	Total Factor Productivity
UAG	Unaccounted for Gas
WPI	Wage Price Index

1. OPEX FORECASTING METHOD

1. Jemena Gas Networks' (**JGN**) operating expenditure (**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.

2. JGN's forecast opex program in the 2015-20 access arrangement (**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.

3. This document describes JGN's opex forecasting method as required by rule 72 of the National Gas Rules (**NGR**). The relevant rule requirements are:

> *72 Specific requirements for access arrangement information relevant to price and revenue regulation*
>
> *(1) The access arrangement information for a full access arrangement proposal (other than an access arrangement variation proposal) must include the following:*
>
> *…*
>
> *(e) a forecast of operating expenditure over the access arrangement period and the basis on which the forecast has been derived;*
>
> *(f) the key performance indicators to be used by the service provider to support expenditure to be incurred over the access arrangement period;*
>
> *74 Forecasts and estimates*
>
> *(1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.*
>
> *(2) A forecast or estimate:*
>
> *(a) must be arrived at on a reasonable basis; and*
>
> *(b) must represent the best forecast or estimate possible in the circumstances.*
>
> *91 Criteria governing operating expenditure*
>
> *(1) Operating expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.*

(2) The AER's discretion under this rule is limited.

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

- *base, step and trend approach*[1]—applied to the adjusted base year, which excludes opex cost categories that are subject to specific annual forecasts over the 2015-20 AA period
- *specific year-by-year forecasts*—for the opex cost categories that JGN will incur where base year costs are not representative of the future.

5. Table 1–1 sets out the forecasting method for each opex cost category.

Table 1–1: JGN's opex cost category forecasting approach

Level 1 opex category	Level 2 opex category	Base, step and trend approach	Specific forecasts
Operating & maintenance (O&M)	Maintenance	√	
	Emergency response	√	
	Management – O&M	√	
	Network planning	√	
	Network control and operational switching	√	
	Project governance and related functions	√	
	Quality and standard functions	√	
	Other	√	
	Information technology **(IT**)	√	
	Corporate overheads – O&M	√	
Non-O&M (A&O)	Corporate overheads – A&O	√	
	Management – A&O	√	
	Other directs	√	
Non-O&M (Other)	Government levies		√
	Marketing	√	
	Unaccounted for gas (**UAG**)		√
	Carbon costs		√
	Debt raising costs		√

(1) Definitions of each level 2 opex category are set out in sections 7.2.1 to 7.2.3 of the AAI.

(2) The level 2 opex categories are consistent with the AER's category analysis regulatory information notice (**RIN**) served to Jemena Electricity Networks (**JEN**).

6. JGN's opex forecasting model reflects the steps applied by JGN in developing its opex forecast. See appendix 7.1 for a copy of the opex forecast model.

[1] For example, see AER, *Better Regulation, Explanatory Statement Expenditure Forecast Assessment Guideline*, November 2013, section 5.3.1 and AER, *Access arrangement final decision, Envestra Ltd 2013–17, Part 1*, March 2013, chapter 7.

1.1 BASE, STEP AND TREND APPROACH

7. This section describes the base, step and trend approach, which JGN has applied to forecast 84 per cent of its recurrent opex over the next AA period. This involves five steps, as described in the following sections.

1.1.1 STEP 1 – ESTABLISHING THE EFFICIENT BASE YEAR BASED ON JGN'S CURRENT AND HISTORICAL COSTS

8. JGN reviewed its current and historical opex in order to determine the amount and breakdown of the opex incurred to supply pipeline services in its base year. The proposed base year, 1 July 2013 to 30 June 2014 (**2013-14**), is the most recent year for which full-year actual costs are available (or will become available) prior to the AER's final decision being made (see section 2.1).

9. This is consistent with the method set out in the AER's expenditure forecast assessment guideline:

> *Typically, we use the revealed costs of the second or third last year in a regulatory control period as the base year. The second last year is the most recent available data at the time of the determination and likely to best reflect the forecast period. Sometimes, we use the third last year, being the most recent year of available data when the NSP submitted its regulatory proposal.*[2]

1.1.2 STEP 2 – ADJUSTING THE BASE YEAR FOR NON-REPRESENTATIVE EXPENDITURE

10. JGN then adjusts its base year opex to create a recurrent cost platform for forecasting opex in the next AA period by:

- subtracting costs that are not expected to endure (see section 2.2.1)
- subtracting any costs associated with adjustments needed to account for differences in treatment between AA periods (see section 2.2.2)
- removing categories of cost for which the base year does not provide an efficient base level from which to forecast future expenditure requirements, or for which there exists another specific forecasting method that will give a better forecast (see section 2.2.3).

1.1.3 STEP 3 – TRENDING THE BASE YEAR FORWARD

11. JGN then trends its adjusted base year opex forward, escalating the forecast for:

- real rate of change in opex (see section 2.3.1), which is made up of:
  - network growth (customer numbers and energy usage) or the 'amount of work' that will need to take place (see section 2.3.2)
  - real change in the input costs for doing the work—real escalation in the costs of labour and materials, as well as general inflation (see section 2.3.3)
  - opex partial factor productivity to account for returns to scale, operating environment factors and technical changes (see section 2.3.4).

[2] AER, *Better Regulation Forecast Expenditure Forecast Assessment Guideline Explanatory Statement,* November 2013, p.92

1.1.4 STEP 4 – ADDING SPECIFIC FORECASTS TO THE TRENDED BASE YEAR

12. JGN then adds the specific forecasts (see section 1.2) to its trended adjusted base year forecasts.

1.1.5 STEP 5 – ADJUSTING THE TRENDED BASE YEAR FOR STEP CHANGES

13. JGN then adds forecast costs arising from foreseeable incremental step changes in expenditure (see section 2.5). JGN considers that each proposed step change reflects expenditure required by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

1.2 SPECIFIC YEAR-ON-YEAR FORECASTS

14. JGN identified the following cost categories for which the base year does not provide an efficient base level from which to forecast future expenditure requirements:

- government levies
- UAG
- carbon costs
- debt raising costs.

15. These cost categories are removed from the base year, and a “zero-based” forecast developed.

16. Section 2.4 provides further detail on the methods JGN adopted for its specific forecasts.

2. KEY INPUTS AND ASSUMPTIONS

17. This section describes the key inputs and assumptions underlying JGN's opex forecast, including the basis of the specific forecasts, and substantiates these inputs and assumptions.

2.1 ESTABLISHING THE EFFICIENT BASE YEAR

2.1.1 REVIEWING JGN'S CURRENT AND HISTORICAL OPEX

18. JGN's proposed base year is 2013-14. JGN's actual cost data for the full 2013-14 year is not yet available. JGN relied upon recent estimates which comprise a mixture of actual and forecast expenditure.

19. This estimate will be updated in response to the AER draft decision using actual expenditure for 2013-14.

2.1.2 REPRESENTATIVE BASE YEAR

20. After making the adjustments set out in section 2.2, JGN is satisfied that its base year opex estimate 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. This is based on:

- JGN's actual opex costs compared with the AER allowance for the current AA period
- a time series analysis of historical opex and econometric analysis of its opex cost function.

21. Insufficient funding for recurrent opex will compromise JGN's ability to continue to effectively operate and maintain its network which will have negative implications for network safety and reliability.

2.1.2.1 Actual opex costs compared with AER allowance

22. As set out in section 4.3 of JGN's Access Arrangement Information (**AAI**), after exclusion of carbon costs (which the AER approved as a pass through event) and some corporate overheads (which were disallowed by the AER in its 2010 AA decision), JGN's opex is $739.3M ($2015), or 8.11 per cent below that allowed by the AER for the current AA period.

23. If carbon costs and disallowed corporate overheads are included in JGN's actual/estimated opex for the current AA period, the total is $802.2M ($2015). This amounts to $2.3M ($2015) (or 0.29 per cent) above the AER allowance, which is extremely close.

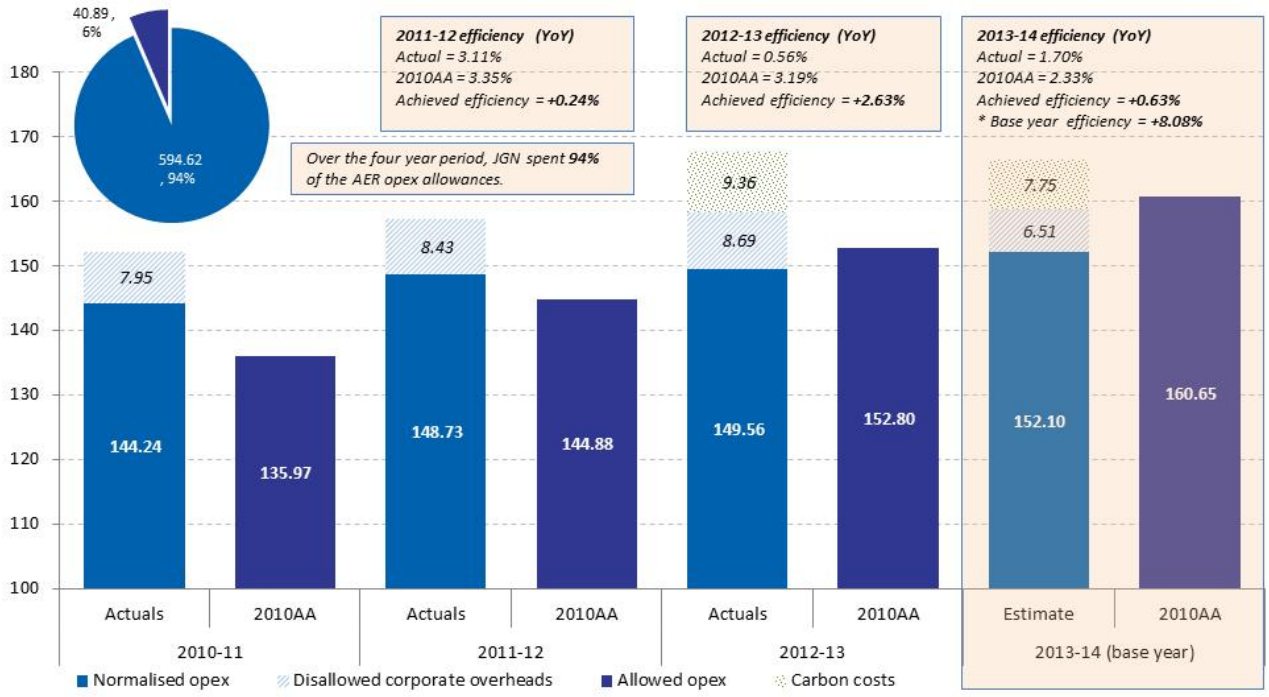
24. The normalised base year estimate (net of carbon costs and disallowed corporate overheads) amounts to $152.1M ($2015), which represents an expected efficiency of 8.08 per cent compared to the AER allowance of $160.7M ($2015) for 2013-14.

25. The trend in actual/estimated normalised opex over the three year period is stable with average year-on-year opex change of 1.78 per cent from 2010-11 to 2013-14 inclusive.

26. These year-on-year opex changes represent efficiencies of 0.24 per cent, 2.63 per cent and 0.63 per cent for 2011-12, 2012-13 and 2013-14 respectively against the AER allowance.

27. Over the four year period, JGN has spent 94 per cent of the AER opex allowance.

Figure 2–1: JGN current period opex performance ($2015, $millions)



2.1.2.2 Time series analysis of historical spend and econometric analysis of opex cost function

28. JGN commissioned an independent report from Economic Insights (**EI**) to analyse the total factor productivity (**TFP**) and opex partial factor productivity (**PFP**)[3] performance of JGN's network as follows:

- analyse time series and multilateral TFP estimates and opex PFP estimates, for the purposes of comparing JGN's productivity level and productivity growth rate performance with the Victorian, South Australian and Queensland gas distribution businesses (**GDBs**) for which similar analysis has previously been undertaken
- estimate the opex cost function and forecast opex partial productivity growth rate for JGN, in a form that is suitable for incorporation into the rate of change approach for forecasting opex in JGN's revised AA proposal.

29. For the period 1999 to 2013, EI[4] concluded that:

- JGN was a good performer in terms of opex partial productivity levels and growth rates, and it has had similar TFP levels to two of the three Victorian GDBs for the last decade
- JGN had the highest or second highest level of opex multilateral partial productivity for the last 15 years, exceeded only by SP AusNet in 2010 and 2011. JGN's opex partial productivity increased by over 80 per cent over this period.

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[3] Both TFP and PFP are comprehensive measures of both (a) actual and (b) forecast year-on-year overall economic performance, which enable targets to be set for productivity growth and its progress to be monitored.

TFP measures total output relative to an index of all inputs used. Output can be increased by using more inputs, making better use of current inputs and by exploiting economies of scale. The TFP index measures the impact of all the factors affecting growth in output rather than changes in input levels.

PFP measures one or more outputs relative to one particular input (e.g. labour productivity is the ratio of output to labour input).

[4] Economic Insights, *Relative Opex Efficiency and Forecast Opex Productivity Growth of Jemena Gas Networks, Report prepared for Jemena Gas Networks*, 14 April 2014

- The opex cost function econometric analysis shows that:
  - JGN is 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[5]
  - JGN's forecast average annual opex partial productivity growth rate over the period 2015-16 to 2019-20 is 1.03 per cent (see section 2.3.4) when returns to scale, the impact of operating environment factors and technical change are allowed for.

30. JGN notes that when assessing forecast productivity, the AER:

> *will likely consider…how close the DNSP under consideration is to the efficient frontier in [its] benchmarking analysis.*[6]

31. Our very strong productivity performance provides strong support for the efficiency of our opex forecast. The result demonstrates that JGN invests in opex programs at lowest sustainable cost and in accordance with good industry practice, promoting the long term interests of our customers.

32. EI's full report is provided in appendix 4.3.

2.2 ADJUSTING THE BASE YEAR

2.2.1 SUBTRACTING NON-RECURRENT COSTS

33. JGN identified a cost item that does not represent a typical year of recurrent opex. JGN's expected non-recurrent costs are set out in Table 2–1.

Table 2–1: JGN's non-recurrent costs ($millions)

Item	Description	One-off cost
Winmalee bushfires	Bushfires in the Blue Mountains area caused damage to houses and properties. In turn gas supply needed to be isolated to several areas to mitigate gas escape.	0.26
Total non-recurrent costs ($2014)		**0.26**
Total non-recurrent costs ($2015)		**0.27**

2.2.2 SUBTRACTING COSTS DUE TO DIFFERENCES IN TREATMENTS

34. JGN identified a number of costs that need to be subtracted from the base year opex due to differences in treatments between AA periods. JGN's cost adjustments are set out in Table 2–2:

[5] Efficient frontier level represents the ability to produce the highest possible output, using the least possible inputs over a defined period of time. This results in the lowest average total opex.

[6] AER, *Better Regulation Expenditure Forecast Assessment Guideline*, November 2013, pp.23-24

Table 2–2: JGN's cost adjustments ($millions)

Item	Description	Cost adjustments
Ad-hoc mains and services renewal	Costs expensed in the current AA period.	0.98
Pigging/integrity digs	These costs form part of capex forecast for the next AA period (see 2015 AAI, section 6.3.4.1).	1.05
Loss on scrappings/disposal of assets	Loss on disposal (relative to RAB WDV) expensed in the current AA period. Recoveries on disposal will be deducted from the RAB for the next AA period (see 2015 AAI, section 8.8).	1.34
Total cost adjustments ($2014)		**3.37**
Total cost adjustments ($2015)		**3.47**

2.2.3 REMOVING CATEGORIES OF COSTS WHERE THE BASE YEAR IS NOT REPRESENTATIVE

35. JGN also removes from the proposed base year, costs for activities that are forecast specifically. These activities are:

- government levies
- UAG
- carbon costs
- debt raising costs.

36. A separate bottom-up forecast has been developed as the best estimate of expected future costs for each of these categories (see section 2.4).

2.3 TRENDING THE BASE YEAR

2.3.1 RATE OF CHANGE

37. Rate of change contributes $6.02M ($2015) or 0.75 per cent of JGN's total opex (excluding debt raising costs).

38. The trending of base year opex is determined by the rate of change relationship described in Box 1-1.

Box 1-1 Opex rate of change formula

Rate of change = Δ real opex price - Δ opex partial productivity + Δ output quantity

The formula states that the change in opex in real terms is a function of:

- the forecast real increase in input cost (labour and materials) escalators
- the expected productivity improvement
- the expected increase in output.

39. EI sets out the theory and precedent for this approach in its report, which the AER drew upon to determine the Victorian gas distribution businesses' opex allowances[7], and is consistent with the AER's preferred methodology.[8]

40. JGN's forecast rate of change is set out in Table 2–3. This rate of change is applied to the overall opex amount that is not subject to specific forecasts, using a weighted average method.

Table 2–3: JGN opex rate of change forecast (per cent, $2015, $millions)

Parameter	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Rate of change (per cent)	-1.25	0.73	0.83	0.85	0.40	0.52
Opex change ($2014)	-1.62	-0.69	0.37	1.47	2.00	2.69
Opex change ($2015)	-1.67	-0.71	0.38	1.52	2.06	2.77
Total ($2015)						**6.02**

2.3.2 GROWTH IN GAS CONSUMPTION AND CUSTOMER CONNECTIONS

41. Network growth contributes -$16.4M ($2015) or -2.1 per cent of JGN's total opex (excluding debt raising costs).

42. Many of JGN's operating activities and costs will grow in line with the growing demand for its pipeline services:

- the level of JGN's market expansion and growth in customer connections drives increases in its outsourced O&M activity; and
- growth in gas consumption drives increases in UAG and JGN's requirement for carbon permits.

43. To determine its reasonable forecasts of growth in gas consumption and customer connections, JGN has drawn upon an independent expert report from Core Energy Group (**Core**). The full report is included in appendix 5.1. Chapter 5 of the AAI provides further detail on JGN's demand forecasts.

44. The JGN's network growth forecasts are shown in Table 2–4.

Table 2–4: JGN opex network growth forecast (per cent, $2015, $millions)

Parameter	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Network growth (per cent)	-3.86	0.03	0.77	0.63	0.60	0.69
Opex change ($2014)	-5.40	-6.15	-3.08	-2.97	-2.26	-1.44
Opex change ($2015)	-5.56	-6.34	-3.17	-3.06	-2.33	-1.48
Total ($2015)						**-16.38**

2.3.3 INPUT COST ESCALATORS

45. Input cost escalators contribute $23.7M ($2015) or 2.97 per cent of JGN's total opex (excluding debt raising costs).

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7 AER, *Access arrangement final decision, Envestra Ltd 2013–17, Part 1*, March 2013, chapter 7

8 AER, *Better Regulation Expenditure Forecast Assessment Guideline,* November 2013

46. JGN's costs are affected by changes in key labour and materials input costs. For labour, these include both internal and external (e.g. contractor) labour rates. For materials, these include aluminium, plastic, concrete, brass and steel.

47. JGN engaged BIS Shrapnel (**BIS**) to forecast these labour and material costs over the next regulatory period. BIS, a well-regarded economic forecaster, combined its economic outlook for NSW and Australia with standard forecast methods and historical data to develop forecasts that JGN thinks are reasonable.

48. JGN has used BIS's Wage Price Index (**WPI**) real wage price forecasts for the Australian electricity, gas, water and waste services (**EGWWS**) and construction sectors as proxies for its internal and external labour costs for the next AA period. BIS's estimate of JGN's input cost escalation factors are set out in Table 2–5. BIS's full report is included in appendix 6.10.

Table 2–5: JGN input cost escalation factors (per cent, real)

Parameters	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
EGWWS labour	0.64	1.23	1.75	1.97	2.19	2.27
Contract construction labour	0.54	1.24	1.61	1.52	1.19	1.45
Concrete	4.50	4.50	-0.50	-2.00	-1.10	0.50
Steel	5.11	0.98	-0.20	7.96	-8.87	-5.11
Polyethylene	1.39	-1.08	-0.22	6.49	-6.21	-3.56
Aluminium	1.45	5.56	3.86	11.00	-6.53	-2.44
Brass	3.39	1.94	2.13	9.53	-8.84	-5.31

49. JGN applied a weighted average method to derive a 'blended' rate of change for input cost escalation factors, by multiplying the escalation weights (i.e. mixture of labour and materials) by the input cost escalation factors provided by BIS.[9]

50. The blended input cost escalation factor is set out in Table 2–6.

Table 2–6: JGN blended input cost escalation factors (per cent, $2015, $millions)

Parameter	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Input cost escalation (per cent)	0.47	0.92	1.19	1.25	1.15	1.32
Opex change ($2014)	0.66	2.25	2.59	4.63	6.02	7.53
Opex change ($2015)	0.68	2.31	2.67	4.77	6.20	7.76
Total ($2015)						**23.70**

51. JGN proposes an inflation forecast of 3.00 per cent for 2014-15 and 2.55 per cent per annum over 2015-16 to 2019-20. 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 chapter 9 of the AAI. The inflation is then applied to the JGN's trended base year to convert the opex forecasts from $2015 to nominal dollars.

[9] Blended rate of change = ∑(Wi x Ei), where Wi = relative weight of each opex component (e.g. labour vs. materials) and Ei = input cost escalation factor for that component.

2.3.4 OPEX PARTIAL FACTOR PRODUCTIVITY

52. Opex PFP contributes -$1.3M ($2015) or -0.12 per cent of JGN's total opex (excluding debt raising costs).

53. As noted in section 2.1.2.2 , JGN commissioned EI[10] to estimate JGN's opex PFP. EI's model used industry level data (from the public domain) to establish a robust model of productivity growth in gas networks. The model was then applied to JGN's specific forecasts of demand, capacity and capex to estimate opex PFP.

54. This analysis indicates that JGN is expected to achieve productivity improvements averaging 1.03 per cent per annum over the next AA period (see Table 2–7). These forecast productivity gains are passed directly through to our customers and reflect JGN's commitment to efficiently managing our business.

Table 2–7: JGN opex partial factor productivity forecast (per cent, $2015, $millions)

Parameter	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Opex PFP (per cent)	-2.23	0.22	1.12	1.01	1.33	1.46
Opex change ($2014)	3.12	3.21	0.85	-0.19	-1.76	-3.40
Opex change ($2015)	3.21	3.31	0.88	-0.19	-1.81	-3.50
Average (per cent)						**1.03**
Total ($2015)						**-1.31**

2.3.4.1 Scale efficiency

55. Network growth does not result in a one for one increase in opex requirement. This is due to economies of scale, which allow JGN to obtain efficiencies from an expanded network.

56. The economies of scale that JGN is expected to realise over the next AA period are factored into the opex PFP, where EI argues that its econometric cost function analysis controlled, among other things, for these differences.

57. EI's model also incorporates a range of other factors such as capital interaction effects, the impact of changes in operating environment factors, technological change and changes in efficiency levels.

2.4 ADDING SPECIFIC YEAR-ON-YEAR FORECASTS

58. JGN has then added to its trended opex forecast, its specific year-on-year forecasts, namely:

- government levies—see section 2.4.1
- UAG—see section 2.4.2
- carbon costs—see section 2.4.3
- debt raising costs—see section 2.4.4.

[10] Economic Insights, *Relative Opex Efficiency and Forecast Opex Productivity Growth of Jemena Gas Networks, Report prepared for Jemena Gas Networks*, 14 April 2014.

2.4.1 GOVERNMENT LEVIES

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

60. Local governments are authorised to charge mains taxes under section 611 of the Local Government Act 1993. 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.

61. JGN pays licence fees in respect of the five 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 network. The fees are paid annually on invoices raised by the Department of Trade and Investment, Regional Infrastructure and Services (**DTIRIS**) for the pipeline licence fees (as provided in the Pipelines Act 1967), and the Independent Pricing and Regulatory Tribunal (**IPART**) for the authorisation fee (as provided in the Gas Supply Act 1996).

62. JGN has forecast that both its licence fees and mains tax costs will remain unchanged from the amounts within its base year over the next AA period.

63. JGN considers this reasonable because it has no basis to support a lower or higher amount and DTIRIS and IPART have not advised an intention to vary the basis for the fees.

64. The forecast government levies costs are set out in Table 2–8.

Table 2–8: JGN forecast government levies ($millions, $2015)

	2015-16	2016-17	2017-18	2018-19	2019-20
Government levies	**4.21**	**4.21**	**4.21**	**4.21**	**4.21**

65. JGN proposes that the licence fee pass through event be converted into an automatic adjustment factor to streamline the 2015 AA proposal. Chapters 14 and 15 of the 2015 AAI provide further detail.

2.4.2 UAG

66. Table 2–9 sets out the estimated future UAG-related opex costs for each year of the next AA period.

Table 2–9: JGN estimated future UAG costs ($2015, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Unaccounted for gas (UAG)	**14.20**	**14.25**	**14.25**	**14.27**	**14.36**

67. JGN has estimated future UAG costs as the product of:

- gas withdrawals for the volume and demand markets (from Core forecasts)
- a UAG loss factor rate for the relevant market—these rates were subject to independent review by Frontier Economics[11] (see appendix 7.7)
- wholesale gas prices— c-i-c

[11] Frontier Economics, *UAG coefficients statistical methodology, A report prepared for Jemena*, April 2014

[12] c-i-c

68. JGN proposes that UAG costs are an automatic adjustment factor, noting that it only applies to the withdrawals and the wholesale gas prices, not the UAG loss factor rates. Chapters 14 and 15 of the AAI provide further detail.

2.4.3 CARBON COSTS

2.4.3.1 Carbon obligations

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

70. The Government has yet to successfully pass legislation to repeal the carbon price, however the Government will have an opportunity to negotiate successful passage of the legislation when new Senate members take up their positions from 1 July 2014.

71. The centrepiece initiative of the Government's proposed direct action (**DA**) policy is an emissions reduction fund (**ERF**) with a primary aim to provide financial incentives to fund emissions reduction activities.

72. The removal of the carbon pricing obligations would effectively eliminate JGN's current carbon pricing liability. However, depending on the design of the ERF JGN may incur costs which cannot be defined on the basis of information currently available.

73. As a result of the uncertainty regarding future carbon pricing and obligations, JGN has included a conservatively low allocation for carbon pricing in its forecasts.

74. Should circumstances change materially or new information come to light prior to the AER making its final decision on JGN's 2015 AA proposal, JGN may revise these forecasts and resubmit them to the AER.

2.4.3.2 Fugitive emissions

75. The Clean Energy Act 2011 (Cth) 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 the Act. The National Greenhouse and Energy Reporting (**NGER**) laws set the technical requirements for measuring carbon emissions that apply to emitters in the CPM.

76. 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-prescribed calculation method:

- *transmission pipe emissions*—pipelines with pressure greater than 1,050 kPa are treated as transmission pipelines, 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.

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

78. Given the uncertainty regarding carbon pricing JGN has included a conservatively low cost of fugitive emissions in its forecasts (see section 2.4.2).

79. JGN has included a automatic carbon cost adjustment factor in its 2015 AA proposal. Chapters 14 and 15 of the AAI provide further detail.

80. The forecast carbon price per tonne and associated costs are set out in Table 2–10 and Table 2–11 respectively.

Table 2–10: JGN forecast carbon price per tonne ($2015, $dollars)

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Price ($/tonne CO2-e)[13]	24.87	25.40	12.19	17.97	23.46	28.67	33.51
Price adjusted by JGN	24.87	25.40	6.20	6.20	6.20	6.20	6.20

Table 2–11: JGN forecast carbon costs ($2015, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Gas distribution fugitive emissions	7.64	1.83	1.82	1.81	1.80
Gas transmission fugitive emissions	0.09	0.02	0.02	0.02	0.02
Energy audit costs	0.03	0.03	0.03	0.03	0.03
Carbon costs	**7.76**	**1.88**	**1.87**	**1.86**	**1.85**

81. In addition to its gas distribution and transmission fugitive emissions, JGN incurs costs for energy audits, which amounts to $0.03 ($2015), based on its most recent year's expenditure.

2.4.4 DEBT RAISING COSTS

82. Debt raising costs are the costs of issuing debt, including the costs of maintaining an investment credit rating needed to issue this debt. Consistent with standard regulatory practice, we propose estimating these costs for a benchmark efficient entity with the same characteristics as JGN, including:

- the forecast regulatory asset base (**RAB**) over the next regulatory period, and
- leverage of 60 per cent, consistent with JGN's proposed rate of return (see chapter 9).

83. As advised by Incenta Economic Consulting (**Incenta**), there are at least three key debt raising costs:[14]

- *transaction costs*—the costs of issuing bonds with a 10 year maturity, such as legal, investment banking and rating agency fees.
- *liquidity costs*—the costs of establishing and maintaining minimum bank facilities to cover any adverse market conditions, as required by Standard & Poor's (**S&P**) to maintain an investment grade credit rating. This requirement is typical of other major rating agencies. Maintaining an investment grade credit rating is consistent with the credit ratings assumed in the AER's rate of return guideline (BBB+) and proposed by JGN (BBB) for the benchmark entity.

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[13] Carbon price forecast, inflated to $2015 using JGN forecast inflation. See "Pre-election economic and fiscal outlook 2013, A report by the secretary to the treasury and the secretary of the department of finance and deregulation, August 2013, p. 55".

[14] Incenta Economic Consulting, *Debt raising transaction costs – Jemena*, June 2014, p. 3, appendix 7.8.

- *early refinance costs*—the costs of refinancing debt at least three months ahead of when it matures, again as required by S&P to maintain an investment grade credit rating.

84. Each of these are financing costs that a benchmark entity would incur to issue debt to fund investment in its assets. As such, we consider that each cost should form part of the debt raising cost forecast for JEN—a position supported by Incenta.[15]

85. After looking at JGN's forecast cash flows and debt funding needs, Incenta estimate that a benchmark entity would incur debt raising costs of 0.212 per cent of outstanding debt per year over the next regulatory period.[16] We consider this a reasonable estimate that reflects efficient financing costs.

86. Taking this estimate, we forecast debt raising costs over the next regulatory period using the JGN revenue forecast model (appendix 12.1)—with the resulting forecast set out in Table 2–12. JGN reports these costs as "Non-O&M (other)" when including them in its opex forecasts.

Table 2–12: JGN forecast debt raising costs ($2015, $millions)

	2015-16	2016-17	2017-18	2018-19	2019-20
Debt raising costs	**3.92**	**4.03**	**4.13**	**4.21**	**4.25**

(1) Debt raising costs benchmarks are applied in the AA15 revenue forecast model (see appendix 12.1).

2.4.5 EQUITY RAISING COSTS

87. Equity raising costs are costs required to be paid by an entity when it raises equity, either internally (via reinvested dividends) or externally from new or existing shareholders. New equity is often needed to maintain a given capital structure (i.e. 60 per cent gearing) and credit rating (i.e. BBB as proposed by JGN or BBB+ as proposed by the AER), especially when capital expenditure grows faster than revenues. The costs of raising new equity include lawyers and investment banking fees

88. We propose estimating equity raising costs for a benchmark efficient entity with the same characteristics as JGN, including:

- forecast RAB and cash flows over the next regulatory period
- leverage of 60 per cent
- dividend payout ratio of 70 per cent, consistent with JGN's proposed value of imputation credits (see chapter 10).

89. Consistent with recent AER decisions, we propose benchmark efficient equity raising costs of:

- *one per cent* on equity raised internally (through dividend reinvestment)—assuming a dividend payout of 70 per cent and dividend reinvestment take-up rate of 30 per cent, and
- *three per cent* on equity raised externally.

[15] Incenta Economic Consulting, *Debt raising transaction costs – Jemena*, June 2014, p. 3, appendix 7.8.

[16] Incenta Economic Consulting, *Debt raising transaction costs – Jemena*, June 2014, p. 3, appendix 7.8.

90. We also propose applying these percentages to JGN's forecast RAB (and assuming 60 per cent gearing) using the AER's most recent method,[17] and capitalising any equity raising costs to the RAB at the start of the next regulatory period.

91. Our calculation of equity raising costs over the next regulatory period is set out in JGN's forecast revenue model in appendix 12.1. Although we estimate zero equity raising costs for the next regulatory period at this stage, we propose retaining the calculation within JGN's revenue forecast model and updating it for any changes in forecast cash flows or RAB.

2.5 ADJUSTING FOR STEP CHANGES

92. Step changes include increases or decreases in costs due to new regulatory obligations, or changes in the operating environment that are outside the JGN's control, such as costs associated with the National Energy Customer Framework (**NECF**). These costs reflect forecast prudent and efficient opex not captured by the base year expenditure or trend escalation. Insufficient funding for step changes will deny JGN a reasonable opportunity to recover our efficient costs.

93. JGN has identified items that will affect JGN's future cost base that are not in JGN's base year. These items represent step changes in JGN's operating environment and regulatory obligations—for example, changes in standards, compliance requirements, and new asset types with new operational and maintenance requirements. JGN's step changes forecasts are shown in Table 2–13.

94. JGN has added the step changes to its trended base year opex forecast.

Table 2–13: JGN forecast step changes ($millions, $2015)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
NECF	0.52	1.97	1.04	1.14	1.14	1.14
Customer engagement	0.06	0.19	0.06	0.19	0.00	0.06
JGN AA Review 2015 & 2020	0.00	0.00	0.00	0.04	4.52	3.33
Annual Regulatory Reporting	0.00	0.39	0.39	0.39	0.39	0.39
Marketing	0.00	1.32	1.32	1.32	1.32	1.32
Insurance premiums	0.09	0.12	0.12	0.12	0.12	0.12
Total step changes	**0.66**	**3.97**	**2.92**	**3.19**	**7.48**	**6.35**

95. Appendix 7.3 provides further details on the individual step change items, their causation and the basis of their forecast costs.

[17] AER, *Powerlink Transmission determination 2012-13 to 2016-17*, April 2012

3. JGN'S OPEX FORECASTS

96. Table 3–1 and Figure 3–1 summarise JGN's forecast opex over the next AA period.

Table 3–1: JGN forecast opex ($2015, $millions)

			Next AA period				
Category	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Base cost	166.35						
One-off events	-0.27						
Cost adjustments	-3.47						
Specific annual forecasts	-29.45						
Adjusted base year	**133.17**	**133.17**	**133.17**	**133.17**	**133.17**	**133.17**	**133.17**
Trending the base year	-	-1.67	-0.71	0.38	1.52	2.06	2.77
One-off events and cost adjustments	3.74	-	-	-	-	-	-
Specific annual forecasts	29.45	26.68	20.29	20.33	20.32	20.33	20.42
Step changes	0.00	0.66	3.97	2.92	3.19	7.48	6.35
Total JGN opex (excl. debt raising costs)	**166.35**	**158.84**	**156.72**	**156.80**	**158.20**	**163.05**	**162.70**
Debt raising costs	0.00	0.00	3.92	4.03	4.13	4.21	4.25
Total JGN opex (incl. debt raising costs)	**166.35**	**158.84**	**160.64**	**160.83**	**162.34**	**167.26**	**166.96**

Figure 3–1: JGN forecast opex ($2015, $millions)

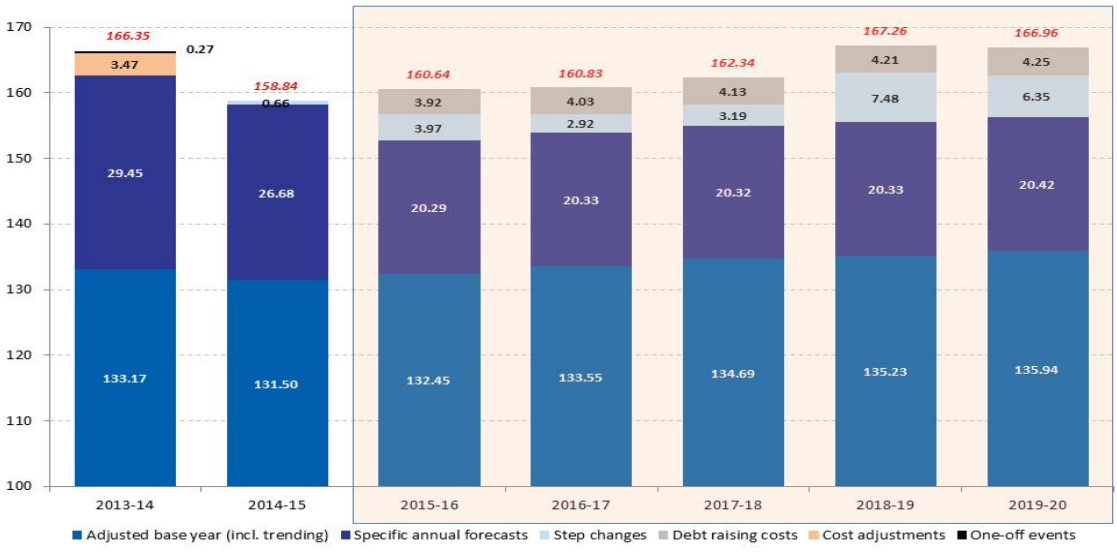

Table 3–2: JGN detailed forecast opex by category ($2015, $millions)

Level 1 category	Level 2 category	2013-14	2014-15	Next AA period				
				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, ad-hoc mains renewal	2.09	0.00	0.00	0.00	0.00	0.00	0.00
Non-O&M (A&O)	Corporate overheads – Administration and 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
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**