FINAL DECISION
Jemena Gas Networks (NSW) Ltd
Access Arrangement 2015-20

Attachment 7 − Operating expenditure

June 2015

AUSTRALIAN ENERGY REGULATOR

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Note

This attachment forms part of the AER's final decision on Jemena Gas Networks' 2015–20 access arrangement. It should be read with other parts of the final decision.

The final decision includes the following documents:

Overview

Attachment 1 – services covered by the access arrangement

Attachment 2 – capital base

Attachment 3 – rate of return

Attachment 4 – value of imputation credits

Attachment 5 – regulatory depreciation

Attachment 6 – capital expenditure

Attachment 7 – operating expenditure

Attachment 8 – corporate income tax

Attachment 9 – efficiency carryover mechanism

Attachment 10 – reference tariff setting

Attachment 11 – reference tariff variation mechanism

Attachment 12 – non-tariff components

Attachment 13 – demand

Contents

Shortened forms

Shortened form	Extended form
AER	Australian Energy Regulator
capex	capital expenditure
CAPM	capital asset pricing model
CCP	Consumer Challenge Panel
Code	National Third Party Access Code for Natural Gas Pipeline Systems
CPI	consumer price index
DRP	debt risk premium
ERP	equity risk premium
JGN	Jemena Gas Networks (NSW) Ltd (CAN 003 004 322)
MRP	market risk premium
NGL	national gas law
NGO	national gas objective
NGR	national gas rules
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia
RFM	roll forward model
RIN	regulatory information notice
RPP	revenue and pricing principles
SLCAPM	Sharpe-Lintner capital asset pricing model
WACC	weighted average cost of capital

7 Operating expenditure

Forecast operating expenditure (opex) is the forecast operating, maintenance and other non-capital costs incurred in the provision of distribution pipeline services. It includes labour costs and other non-capital costs that a prudent service provider is likely to require during the 2015–20 access arrangement period for the efficient operation of its network.

7.1 Final decision

We are not satisfied that the forecast of total opex JGN proposed complies with the applicable requirements, and is consistent with the applicable criteria, in the NGL.[1] We therefore do not approve the forecast opex JGN included in its building block proposal.

We approve the opex set out in Table 7.1. This Table also compares our approved opex for the 2015–20 access arrangement period with JGN's initial proposal, our draft decision and its revised proposal.

Table 7.1 Our final decision on total opex—JGN ($ million, 2014–15)

	2015–16	2016–17	2017–18	2018–19	2019–20	Total
JGN's initial proposal	156.7	156.8	158.2	163.0	162.7	797.5
AER draft decision	154.4	153.8	154.6	159.0	157.8	779.7
Update to JGN's revised proposal[2]	158.0	159.9	160.4	165.3	164.8	808.2
AER final decision	157.0	158.0	158.9	163.5	162.7	800.0

Source: AER analysis.

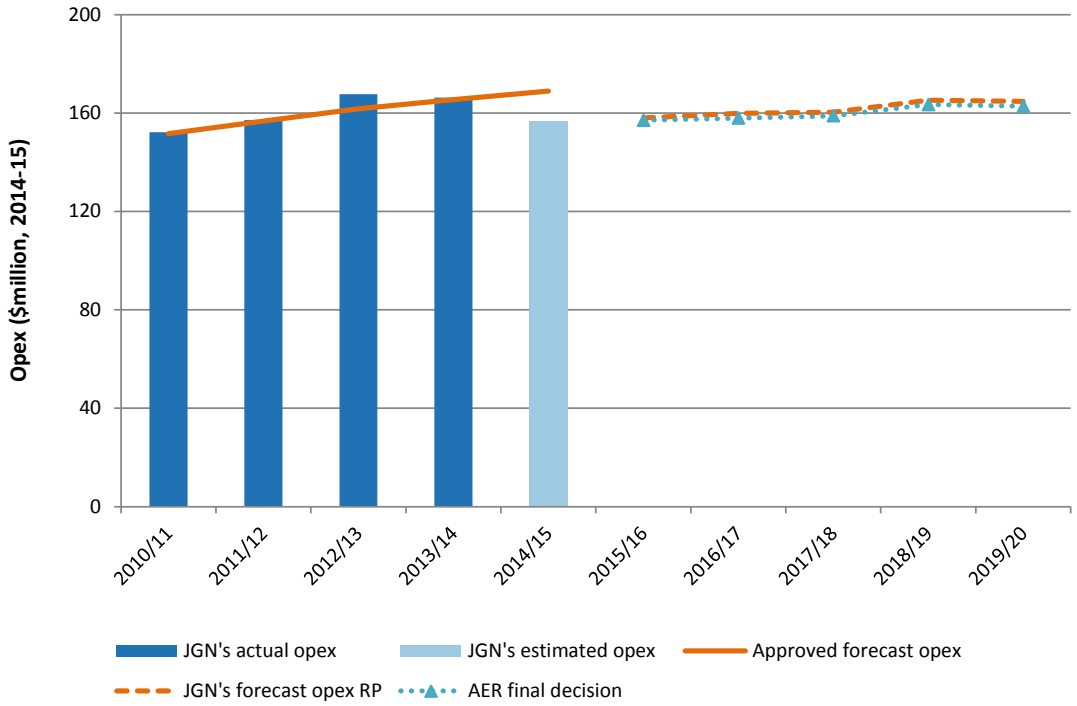
Note: Excludes debt raising costs.

Figure 7.1 shows our final decision compared to JGN's proposal, its past allowances and past actual expenditure.

1 NGR, rr. 40, 91.

2 In its revised proposal, JGN proposed total opex of $805.0 million ($2014-15). After submitting its revised proposal it updated its estimate to $808.2 million.

Figure 7.1 Our final decision compared to Jemena Gas Networks' past and proposed opex ($ million, 2014–15)



Source: AER analysis.

For the most part, we are satisfied with JGN's opex forecast. Our alternative estimate of opex (excluding debt raising costs) is $8.2 million lower than JGN's forecast over the 2015–20 access arrangement period. This is due the following factors:

- We have forecast lower input price growth than JGN over the 2015–20 access arrangement period
- We have not included a step change in opex for JGN's proposed asbestos meter cover removal program. We consider that this program should be funded from base opex.

We note our decision on JGN's opex also includes an allowance for forecast debt raising costs, which we consider separately in Attachment 3.

We have made all revisions necessary to give effect to this final decision in the *Approved Access Arrangement, JGN's NSW distribution networks 1 July 2015 – 30 June 2020* (June 2015).[3]

[3] NGR, rr. 64(1) & (5)

7.2 JGN's revised proposal

In its initial access arrangement proposal, JGN proposed total forecast opex of $797.5 million ($ 2014–15) for the 2015–20 access arrangement period (excluding debt raising costs). This total opex forecast was comprised of:

- Base opex for the 2015–20 access arrangement period of $665.8 million ($2014–15) based on an estimate of its opex in 2013–14
- Rate of change in opex of $6.0 million ($2014–15) based on forecast real input price escalation, productivity growth in opex and network growth
- Category specific forecasts for unaccounted for gas (UAG), government levies, and carbon costs of $101.7 million ($2014–15)
- Step changes, which resulted in a further increase of $23.9 million ($2014–15).

In its revised proposal, JGN adopted the same methodology for its forecast. Changes from its initial forecast included:

- An updated estimate of base opex to reflect its actual opex in 2013–14
- An updated estimate of its forecast rate of change in opex based on the latest data
- Updated forecasts for customer numbers, throughput and productivity
- An updated estimate of its forecast for UAG to reflect its latest competitive tender for UAG and demand forecasts
- Updated forecast for carbon costs to remove the effect of the carbon tax
- New step changes for B2B harmonisation, a gas quantity audit, and inspection of asbestos meter covers
- Removal of a step change for regulatory reporting consistent with our draft decision

In total, JGN's revised forecast was $808.2 million ($2014–15) over the access arrangement period - an increase of 1.3 per cent from its initial proposal.

7.3 AER's assessment approach

We decide whether or not to accept a service provider's forecast opex proposal. We approve the service provider's forecast opex if we are satisfied that it is consistent with the criteria governing operating expenditure (the opex criteria).[4]

> 91. Criteria governing operating expenditure
>
> (1) Operating expenditure must be as 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.

[4] See also NGR, r. 40(2).

In determining whether forecast opex is consistent with the opex criteria we have regard to the criteria for forecasts and estimates.

> 74. Forecasts and estimates
>
> (1) Information in the nature of a forecast or estimate must be supported by a statement on 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.

Our approach is to compare the service provider's total forecast opex with our alternative estimate of total opex. By doing this, we form a view on the reasonableness of the service provider's proposal. If we are not satisfied that the proposal complies with the opex criteria we approve the amount we consider does comply with the applicable requirements and criteria.[5]

Our estimate is unlikely to exactly match the service provider's forecast because the service provider may adopt a different forecasting method to us. However, if the service provider's inputs and assumptions are reasonable, its method should produce a forecast consistent with our estimate. Accordingly, part of our approach is to assess the service provider's forecasting method as well as the inputs and assumptions it used to form its opex forecast.

7.3.1 Building an alternative estimate of total forecast opex

Our approach to forming an alternative estimate of opex involves five key steps which we outline below in Figure 7.2.

[5] NGR r.40(2)

Figure 7.2 Our assessment approach

Step 1 – Starting point - base year expenditure

When we choose the base year, we aim to use a year that is most representative of efficient, recurrent expenditure. Typically, we start with the service provider's revealed expenditure in the second last year of the current access arrangement period. This is because the second last year is usually the most recent year for which data is available at the time we conduct our assessment. Accordingly, other than the extent expenditure drivers change over time, it is likely to best reflect circumstances in the forecast period.[6] However, if this year does not represent efficient, recurrent costs, we may consider another year.

In choosing a base year, we need to make a decision as to whether any categories of opex incurred in the base year should be removed. For instance:

- If a material cost was incurred in the base year that is unrepresentative of a service provider's future opex we may remove it from the base year in undertaking our assessment. For this decision we removed some costs which will be reclassified as capex in the 2015–20 period.
- Rather than use all opex in the base year, service providers also often forecast specific categories of opex using different methods. We must also assess these methods in deciding what the starting point should be. If we agree that these categories of opex should be assessed differently, we will also remove them from the base year.

Step 2 - Assessing base year expenditure

Regardless of the base year we choose, we test whether the 'revealed expenditure' is the appropriate starting point. This is because the service provider's actual expenditure may not reflect the criteria in rule 91 of the NGR. We will use all techniques available to us to do this. For instance, if we determine that a service provider's revealed expenditure is not efficient, we will not use it as our starting point for our estimate of total forecast opex.

Step 3 - Rate of change

Once we have chosen an appropriate starting point, we apply an annual escalator to take account of the likely ongoing changes to opex over the access arrangement period. Opex in the access arrangement period could reasonably differ due to changes in:

- prices

[6] The second last year is sometimes an estimate rather than audited actual expenditure. Given this, we typically use the estimate as a placeholder and update it when the service provider submits its audited accounts. If expenditure in the penultimate year is not audited at the time the service provider submits its regulatory proposal, we sometimes use the third last year because it is the most recent year of audited actual expenditure at the time.

- outputs
- productivity.

We estimate the change by adding expected changes in prices (such as the cost of labour and materials) and outputs (such as changes in customer numbers and demand for gas). We then incorporate reasonable estimates of changes in productivity.

Step 4 - Step changes

We then consider if there is other opex needed in the forecast period. We refer to these as 'step changes'. We typically allow step changes for changes in spending that are driven by external factors (rather than discretionary spending) or which result from efficient capex/opex trade-offs. This would generally include changes in spending resulting from new, changed or removed obligations.

We will typically compensate a service provider for step changes only if base year opex and the rate of change in opex do not already compensate the provider for the proposed costs.

Step 5 - Other costs that are not included in the base year

In our final step, we make any further adjustments we need for our opex forecast to meet the requirements of rule 91 of the NGR. For instance, our approach is to forecast debt raising costs based on a benchmarking approach rather than a service provider's actual costs. This is to be consistent with the forecast cost of debt in the rate of return building block. JGN also has several categories of opex which are subject to annual tariff variations. We therefore forecast opex for each of these categories of opex to ensure compatibility with the annual tariff variation mechanism.

After applying these five steps, we arrive at our total opex forecast.

Comparing our opex forecast to the service provider's opex forecast

If a service provider's forecast opex is sufficiently different to our estimate, we will examine the reasons for the difference. If there is no satisfactory explanation for this difference, we may form the view that the service provider's forecast does not comply with the opex criteria. Conversely, if our estimate demonstrates that the service provider's forecast is consistent with the opex criteria, we will accept the forecast. Whether or not we accept a service provider's forecast, we will provide the reasons for our decision.

7.4 Reasons for final decision

We are not satisfied JGN's forecast opex complies with the applicable requirements and is consistent with the applicable criteria in the NGL and NGR.[7] We compared JGN's opex forecast to an opex forecast we constructed using the method outlined above. JGN's proposal is higher than ours. We are not satisfied that it complies with all applicable requirements (in particular the requirement that a forecast or estimate represent the best possible in the circumstances), and we are not satisfied that it is consistent with the opex criteria in rule 91 of the NGR. For this reason, we have approved a lower amount of opex.

Table 7.2 illustrates our forecast in each year of the 2015–20 period.

Table 7.2 Our final decision opex forecast ($ million, 2014–15)

	2015–16	2016–17	2017–18	2018–19	2019–20	Total
Base opex	135.1	135.1	135.1	135.1	135.1	675.6
Rate of change	-2.4	-1.9	-1.2	-0.9	-0.5	-6.9
Step changes	4.4	4.7	4.9	9.2	8.0	31.3
Category-specific forecasts	20.0	20.0	20.0	20.0	20.1	100.1
Final decision	157.0	158.0	158.9	163.5	162.7	800.0

Source: AER analysis.

Note: Excludes debt raising costs; Numbers may not add due to rounding.

The main elements of our assessment are outlined below.

7.4.1 Base opex

In formulating our alternative forecast of opex we determined a base opex amount. This is based on JGN's opex in 2013–14.

Position

We are satisfied JGN's proposed 2013–14 base year expenditure of $135.1 million ($2014–15) is a reasonable estimate for the purpose of forecasting opex for the 2015–20 access arrangement period.

Draft position

In its initial proposal, JGN used a mixture of actual and estimated costs in this year as its base. It adjusted the amount to:

[7] NGR r. 40(2), r. 91.

- remove the cost of unaccounted for gas and government levies which are subject to category based forecasts
- remove non-recurrent costs in 2013–14 associated with the Winmalee bushfires
- remove expenses that will be capitalised in the 2015–20 access arrangement period.

As many opex items are of a recurrent nature, we considered that JGN's actual costs incurred in 2013–14 were likely be a good indicator for the efficient costs to be incurred in the 2015–20 access arrangement period.

Because JGN was not subject to an incentive mechanism in this year, it may have faced an incentive to increase its opex in 2013–14. Based on the available evidence, we were satisfied that JGN's proposed base year (2013–14) was not biased upwards and there was no evidence to suggest that expenditure in the proposed base year is materially inefficient. In particular, we noted that JGN's opex was relatively stable across the 2010–15 access arrangement period.

Revised proposal and submissions

In response to our draft decision, JGN updated its base opex forecast for the actual audited opex it incurred in the 2013–14. This increased its proposed base opex forecast from $133.2 million ($2014–15) to $135.1 million ($2014-15).

Despite a $2 million increase in its proposed base, we still consider JGN's revised estimate to be a reasonable estimate of the lowest sustainable cost in that year of a prudent provider operating and maintaining JGN's network and acting efficiently in accordance with accepted good industry practice. As outlined in Figure 7.3, it still suggests JGN's actual opex was relatively stable in the 2010–15 access arrangement period. On this basis, we consider JGN's actual opex in 2013–14 is likely to be a good indicator of its future opex needs.

Figure 7.3 JGN's actual opex less UAG and carbon costs, 2010–11 to 2013–14

Source: JGN, Appendix 5.5, Opex forecast model, February 2015.

7.4.2 Rate of change

We apply the rate of change to our base opex to derive an opex forecast that includes forecast changes in input prices, output and productivity for the 2015–20 access arrangement period.

This is consistent with the rate of change approach outlined in the *Expenditure forecast assessment guideline* for electricity.[8]

Position

We have applied the same rate of change methodology to derive our alternative estimate of opex as we used for our draft decision. We have updated our price growth forecasts to reflect the latest forecasts from Deloitte Access Economics (DAE) and BIS Shrapnel.

Table 7.3 shows our final position on each rate of change component and the overall rate of change in annual percentage terms. We consider JGN has not adequately addressed our concerns over its approach as set out in our draft decision. We are satisfied that applying our rate of change method to derive an alternative estimate of opex will represent the best forecast or estimate possible in the circumstances.[9] This is further explained below.

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8 AER, *Better Regulation – Explanatory statement expenditure forecast assessment guideline*, November 2013, pp. 65–66.

9 NGR r. 74.

Table 7.3 Rate of change (per cent)

	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20
JGN[10]						
Price growth	0.95	0.70	0.95	1.23	1.28	1.34
Output growth	–4.29	0.03	0.30	0.18	0.09	0.10
Productivity growth	–1.73	0.14	0.62	0.52	0.83	0.92
Overall	**–1.71**	**0.59**	**0.63**	**0.89**	**0.52**	**0.51**
AER						
Price growth	0.43	0.39	0.57	0.78	0.92	0.96
Output growth	–4.20	0.11	0.39	0.27	0.20	0.23
Productivity growth	–1.73	0.14	0.62	0.52	0.83	0.92
Overall	**–2.12**	**0.36**	**0.22**	**0.54**	**0.28**	**0.27**
Difference	**–0.41**	**–0.23**	**–0.29**	**–0.35**	**–0.24**	**–0.24**

Source: JGN opex model and AER analysis.

Draft position

In our draft decision, we considered JGN's use of economic benchmarking techniques to forecast the rate of change was reasonable. We therefore assessed the inputs that JGN applied in forecasting its rate of change.

We considered JGN's proposed productivity change estimate was reasonable.

However, we were not satisfied with the following aspects of JGN's forecast price changes:

- the higher percentage of labour as a proportion of opex in the forecast period was inconsistent with the benchmark labour and non-labour proportions used to forecast productivity growth. Since labour price is increasing at a greater rate than CPI, a higher proportion of labour will result in a rate of change that is higher than using benchmark weightings.
- analysis we previously undertook[11] suggested that BIS Shrapnel's labour forecast is less accurate than a forecast based on an average of BIS Shrapnel and DAE's

[10] These figures represent JGN's updated opex model provided to us on 27 March 2015 in response to our draft decision.

[11] AER, *Access arrangement final decision SPI Networks (Gas) Pty Ltd 2013–17 – Part 3: appendices*, March 2013, p. 7.

labour forecasts for the electricity, gas, water and waste services (EGWWS) industry.

- JGN did not demonstrate a relationship between the change in the price of materials and the change in its total opex.

For these reasons we were not satisfied that JGN's forecast of price changes was the best estimate possible in the circumstances and that it was arrived at on a reasonable basis. Therefore, we were not satisfied that including JGN's forecast price change in our alternative forecast of opex would comply with the applicable requirements for forecasts and estimates. This also meant that using JGN's proposed rate of change would not satisfy the opex criteria.[12]

We also considered JGN's output growth forecasts were not appropriate as they did not reflect what we considered to be the best possible demand forecasts.

Revised proposal and submissions

We consider our methodology for forecasting price growth and output growth to represent the best forecast of the rate of change components that reflects the opex criteria and the requirements for forecasts and estimates.[13]

In its revised proposal JGN did not adopt the following components of our draft decision:

- Opex price weightings: JGN maintained its firm specific weightings to forecast the opex price and benchmark weightings to forecast opex productivity, consistent with its initial proposal.[14]
- Opex price growth: JGN considered BIS Shrapnel's forecasts of labour and materials was the best forecast available rather than our forecast using an average of BIS Shrapnel and DAE's labour forecasts and CPI for non-labour.[15]
- Demand forecasts: JGN did not accept our revised demand forecasts. JGN used updated Core Energy demand forecasts and updated Economic Insights' benchmarking analysis to reflect actual output growth. [16]

JGN did not address the substance of our concerns about inconsistency in its application of opex price weightings and the potential upward bias in its estimate of opex price growth. In the sections below we discuss each of these issues raised in JGN's revised proposal.

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12 NGR r. 91.

13 NGR, r. 91, r. 74.

14 JGN, *Response to the draft decision and revised proposal,* February 2015, pp. 84–85.

15 JGN, *Response to the draft decision and revised proposal,* February 2015, p. 85.

16 JGN, *Response to the draft decision and revised proposal,* February 2015, p. 85.

Opex price weightings

We have maintained our draft decision opex price weightings of 62 per cent labour and 38 per cent non-labour to forecast price growth (this is consistent with the weightings used to forecast productivity growth). We are not satisfied that JGN's use of firm specific weightings[17] to forecast price growth will result in a forecast of total opex that represents the best forecast or estimate possible in the circumstances.

JGN did not accept our draft decision to apply benchmark opex price weights. It stated that opex price weights should reflect its firm specific opex split which represents the base year split used to roll-forward the opex forecast.[18]

JGN also considered that firm specific weights should be used to forecast productivity. However it noted that its consultant, Economic Insights, could not substitute benchmark weights with firm specific weights because the historical data was not available to forecast productivity using firm specific weights.[19] Therefore JGN proposed using benchmark weights for the purpose of forecasting opex productivity. JGN did not otherwise respond to our draft decision that the use of inconsistent opex weights was not reasonable and did not represent the best forecast or estimate possible in the circumstances.

We do not consider JGN's use of different weightings for opex price and opex productivity is reasonable. We noted in our draft decision that we considered modelling techniques which use the same weightings, for both historical and forecast data, are more robust than those which adopt inconsistent weightings.[20] In absence of responding arguments we maintain the findings from our draft decision.

Consistency is important because price growth and productivity growth are linked. JGN's firm specific weights results in higher forecast opex price growth than using the benchmark weights. We would expect that using a higher firm specific price growth measure would also result in a higher firm specific weighting productivity measure than the benchmark weighting productivity measure. This is because productivity is a measure of the quantity of inputs required to produce outputs.[21] To calculate the quantity of inputs we divide total opex by the opex price. Dividing total opex by a higher opex price will lead to a lower quantity of inputs and higher measured productivity. For example, Economic Insights found that opex productivity was higher when the average

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17 JGN's firm specific weightings are the forecast weightings of inputs used to provide gas distribution services (as reflected in JGN's opex model) which are based on their actual historical weightings. These inputs include labour, materials and other.

18 JGN, *Response to the draft decision and revised proposal,* February 2015, pp. 84–85.

19 JGN, *Response to the draft decision and revised proposal,* February 2015, pp. 85–86.

20 AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20 , Attachment 7, November 2014,* p. 52.

21 Productivity is calculated as a ratio of outputs produced for a given quantity of inputs, where outputs is the numerator and inputs is the denominator. The quantity of inputs is affected by the price measure. A higher price measure will result in a lower quantity measure which will decrease the denominator in the productivity ratio calculation. This will result in a higher productivity measure.

weekly ordinary time earnings (AWOTE) was used as the opex price measure, compared to the use of the wage price index (WPI) as the opex price measure. The AWOTE is a typically higher opex price measure than the WPI.[22]

Using weights that result in a higher price without adjusting for a higher productivity would mean that the service provider would receive higher price forecasts and lower productivity forecasts. So this inconsistency in the use of weightings would be likely to lead to an under-forecast of productivity or an over-forecast of labour price.

As stated above, JGN's considers firm specific weights should be used to forecast the opex price because they have used the base year split to roll forward its opex. However, we do not consider this is a sufficient reason for JGN to apply inconsistent weightings between its opex price and opex productivity measures.

For the reasons above we are not satisfied that using firm specific weightings to forecast price growth is consistent with the legal requirements for forecasts and estimates.[23] In addition, we do not consider that using this approach will result in a forecast of opex that satisfies the opex criteria.[24] We therefore do not approve this element of JGN's proposed opex.[25]

Forecast opex price

We have maintained our draft decision approach for forecasting opex price growth. We use a forecast based on an average of DAE and BIS Shrapnel's utilities sector forecasts for labour price growth and CPI for non-labour price growth. We have updated our draft decision forecasts to reflect the latest forecasts provided by DAE and BIS Shrapnel.

JGN maintained its initial proposal methodology of using BIS Shrapnel's labour and materials forecasts in its revised proposal. We discuss our reasons for maintaining our forecasting method for labour and non-labour prices below.

Labour

We consider an average of DAE and BIS Shrapnel's utilities WPI labour forecasts represents the best forecast of the labour price possible in the circumstances. We based this on our analysis of DAE and BIS Shrapnel's forecasting history.

JGN maintained BIS Shrapnel's utilities sector labour and construction labour forecasts to forecast the labour price growth in its opex model. JGN considered BIS Shrapnel to

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22 Economic Insights, *Economic Benchmarking assessment of operating expenditure of NSW and ACT electricity DNSPs*, 17 November 2014, p. 23.

23 NGR r.74.

24 NGR r.91.

25 NGR r.40(2).

be a respected forecaster and submitted that its updated forecasts are the best estimates in the circumstances in accordance with NGR rule 74(2).[26]

As discussed in our draft decision we consider only the utilities sector, which is comprised of the Australian Bureau of Statistics (ABS) classification of the electricity, gas, water and waste services (EGWWS) sector, should be used to forecast labour prices in order to arrive at the best forecast.

JGN did not respond to our concerns of the use of the construction industry to forecast some of its labour price.

JGN also did not provide a reason for why it considered BIS Shrapnel's labour forecasts are better than using an average of DAE and BIS Shrapnel's forecasts, based on the historical analysis we set out in our draft decision. In the absence of arguments addressing the concerns outlined in our draft decision we have no reason to depart from those findings. As a result we maintain the use of the average of DAE and BIS Shrapnel's labour forecasts in this final decision.

We consider both BIS Shrapnel and our consultant DAE are respected labour forecasters. In our draft decision we noted, however, the deficiencies of both forecasters as revealed by their historical forecasting records. Specifically we noted that DAE has previously tended to under forecast the EGWWS WPI and BIS Shrapnel has tended to over forecast the EGWWS WPI at the national level. Analysis from DAE showed that DAE's forecasts were more accurate than BIS Shrapnel's.

Further, our previous analysis[27] and analysis from Professor Borland[28] showed that an average of DAE and BIS Shrapnel's forecasts typically produced more accurate forecasts.[29]

Non-labour

We have maintained our draft decision position of forecasting non-labour by the consumer price index (CPI). In our draft decision we considered JGN's forecast of concrete and steel did not have a material impact on the opex forecast. Further JGN did not demonstrate a relationship between the price of materials and the change in its total opex.[30]

We consider that the CPI represents the best estimate of non-labour price growth. The reasons for this are set out in Attachment 6 of this decision.

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[26] JGN, *Response to the draft decision and revised proposal,* February 2015 p. 85.

[27] AER, *Access arrangement final decision SPI Networks (Gas) Pty Ltd 2013–17 – Part 3: appendices*, March 2013, p. 7.

[28] Professor Borland, *Recommendations for methodology for forecasting WPI*, October 2012, p. 3.

[29] AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20 , Attachment 7, November 2014,* p. 55.

[30] AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20 , Attachment 7, November 2014* p. 54.

In response to our draft decision, JGN considered it was not practical to quantify the relationship between final prices and the underlying inputs.

We note that JGN's revised proposal opex model attributes a 0.73 per cent and 0.18 per cent weighting to concrete and steel respectively.[31] We do not consider these price categories would have a material impact on opex. We consider only price growth categories which have a significant impact on opex should be included in the rate of change. For example, Economic Insights attributes a 62 per cent weighting for labour and changes in the labour price has a material effect on the overall opex price.

JGN also noted that we have accepted BIS Shrapnel's materials forecasts in the past and that we should be consistent with our past decisions.[32] The past decision JGN referred to was for electricity transmission. We note that we have not accepted materials price growth in our previous gas distribution decisions.[33] We have also not applied material price changes in our recent NSW electricity decisions.[34]

We see no reason to depart from our draft decision method of applying the CPI for all non-labour price growth for the following reasons:

- JGN did not demonstrate the relationship between changes in materials prices and overall opex.
- Materials price change does not have a material impact on opex because the opex weight attributed to materials is not significant.
- We consider our forecast of non-labour price escalation is the best forecast possible in the circumstances for the reasons set out here and in the draft decision.

Demand forecasts

For the reasons set out in attachment 13, we do not accept JGN's revised demand forecasts for the purpose of forecasting output growth.

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31 JGN, *JGN opex forecast model – updated – Public, Input escalators worksheet*.

32 JGN, *Response to the draft decision and revised proposal,* February 2015, p. 85.

33 AER, *Access arrangement draft decision for Envestra Ltd 2013–17, Part 3 appendices*, September 2012, p. 122.

34 AER, *Draft decision - Ausgrid distribution determination 2015–16 to 2018–19, Attachment 7*, November 2014; AER, *Draft decision - Endeavour Energy distribution determination, Attachment 7*, November 2014; and AER, *Draft decision - Essential Energy distribution determination, Attachment 7*, November 2014.

Table 7.4 shows JGN's revised proposal output growth, and our final position on forecast output growth.

Table 7.4 Output growth (per cent)

	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20
JGN						
Demand (TJ)	–8.36	–1.53	–0.97	–1.02	–1.03	–0.89
Customers	2.99	2.83	2.57	2.32	2.08	1.87
Overall	**–4.29**	**0.03**	**0.30**	**0.18**	**0.09**	**0.10**
AER						
Demand (TJ)	–8.22	–1.40	–0.83	–0.86	–0.84	–0.67
Customers	2.99	2.83	2.56	2.31	2.07	1.85
Overall	**–4.2**	**0.11**	**0.39**	**0.27**	**0.20**	**0.23**

Source: JGN opex model, DAE, Gas demand forecast for Jemena Gas Network NSW, 28 April 2015 and AER analysis.

As shown in Table 7.2 (above) overall our forecast output growth is higher than JGN's revised proposal output growth. This change is driven primarily by our demand forecast which is forecast to decline at a slower rate than JGN's forecast.

Other submissions

The Energy Markets Reform Forum (EMRF) considered increases in capex should lead to lower opex as older assets are replaced. The EMRF noted the decline in opex productivity despite the increase in capex allowances over the same period.[35]

It seems reasonable to consider that newer assets might require less maintenance than older assets. We also note that older assets usually require more maintenance. While we have not explicitly modelled this relationship, JGN's productivity measure has taken this into account at an overall level for the gas industry by using capital quantity and asset age as variables in its model.[36]

The EMRF also disagreed with our draft decision to not use IPART's findings that the Australian gas industry as a whole was less efficient than its overseas counterparts.[37]

We noted in our draft decision that IPART conducted its study in 1999 and since then the average opex partial factor productivity was 4.36 per cent.[38] We also noted that

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35 Energy Markets Reform Forum, *Draft decision by the Australian Energy Regulatory on Jemena's Gas Networks Access Arrangement, A response by the Energy Markets Reform Forum, March 2015*, pp. 47–48.

36 Economic Insights, Relative opex efficiency and forecast opex productivity growth of Jemena Gas Networks, September 2014, p. 41.

37 Energy Markets Reform Forum, *Draft decision by the Australian Energy Regulatory on Jemena's Gas Networks Access Arrangement, A response by the Energy Markets Reform Forum, March 2015*, pp. 47–48.

38 AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20 , Attachment 7, November 2014*, p. 61.

based on the limited data available there was no evidence to suggest that JGN's revealed costs in its proposed base year are materially inefficient.[39]

7.4.3 Step changes

In some instances, a service provider may face a step change in efficient costs that is not reflected in the base year or rate of change for the access arrangement period. When assessing a service provider's proposed step changes, we consider whether without those changes, total opex would comply with the opex criteria.

As a starting point, we consider whether the proposed step changes in opex are already compensated through other elements of our opex forecast, such as the base opex or the 'rate of change' component. Step changes should not double count costs included in other elements of the opex forecast. Further, in assessing whether step changes are captured in other elements of the opex forecast, we assess the reasons for, and the level of, the incremental costs the service provider has proposed.

Position

We have included seven step changes totalling $31.3 million ($2014–15) in the approved opex forecast for our final decision.

We assessed the three additional step changes JGN proposed in its revised proposal to determine whether we should include them in our total opex forecast. Our final position is to include two of those proposed step changes, in addition to the step changes we approved in our draft decision. Table 7.5 sets out our final position on each of JGN's proposed step changes.

Table 7.5 JGN proposed step changes and our final position ($ million, 2014–15)

		JGN proposal	AER decision	Reason for position
Original proposal:				
NECF	To comply with the National Energy Customer Framework (NECF) from 1 July 2015.	6.4	6.4	New regulatory obligation.
Customer engagement	These costs were previously treated as capex rather than opex.	0.5	0.5	Capitalisation policy change.
Reset costs	These costs were previously treated as capex rather than opex.	7.8	7.8	Capitalisation policy change.
Annual	For the costs of anticipated	1.9	–	Not a new regulatory obligation.

[39] AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20 , Attachment 7, November 2014*, p. 24.

		JGN proposal	AER decision	Reason for position
regulatory reporting	increased regulatory reporting obligations.			
Marketing	To increase JGN's marketing program and to promote the sale of gas appliances via incentive payments.	6.5	6.5	Efficient response to change in market conditions.
Insurance premiums	For an insurance solution not available in the base year.	0.6	0.6	Prudent change in risk management.
Additional step changes in revised proposal:				
Gas quantity audit	To provide an audited statement of gas quantity inputs used in the reference tariff mechanism.	0.1	0.1	New regulatory obligation.
Asbestos meter cover removal	For a program to remove asbestos meter covers.	1.0	–	Not a new regulatory obligation.
B2B harmonisation	To comply with AEMO decision to change the NSW/ACT retail market procedures and gas interface protocol.	9.4[a]	9.4	New regulatory obligation.
Total step changes		**32.2**[b]	**31.3**	

Source: JGN, *Access Arrangement Information, Revised proposal, Revised Opex model,* 27 March 2015; JGN, *Revised proposal, Addendum - B2B harmonisation capex and opex proposal,* 17 March 2015, p. 7.

Note: The total does not add due to rounding.

[a] JGN revised its forecast for the B2B harmonisation on 17 March 2015 from $11.0 million to $9.4 million.

[b] The total does not include the 'Annual regulatory reporting' step change ($1.9 million) because JGN did not include it in its revised proposal.

Draft position

JGN proposed six step changes totalling $23.9 million ($2014–15) in its initial proposal. Our draft decision was to include five of the proposed step changes (refer to Table 7.5). We did not include a step change for anticipated increases in regulatory reporting obligations. JGN accepted this position in its revised proposal.

Revised proposal and submissions

In its revised proposal, JGN proposed three new step changes. The proposed step changes reflect:[40]

[40] JGN, *Response to the draft decision and revised proposal,* February 2015, p. 87 and *Appendix 5.4 - Operating expenditure step changes report*.

- a new regulatory obligation for JGN to obtain an independently audited or verified statement to support gas quantity inputs used in the reference tariff variation formula
- a new employee and public safety initiative to remove customer-owned asbestos meter covers
- new regulatory obligations regarding business to business (B2B) service levels and market requirements.

The EMRF considered the removal of meter asbestos and the B2B harmonisation projects may be prudent but suggested we examine whether the proposed costs represent efficient costs.[41]

The EMRF had concerns with the additional marketing costs we approved and considered that JGN needs to first establish that its existing programs are cost effective. In addition, it was concerned with a program that might encourage gas connections when it is uneconomic to do so.[42] As outlined in our draft decision, JGN submitted a benefit cost analysis to demonstrate that its marketing program was cost effective. We were satisfied from the analysis that JGN provided that the estimated benefits of its proposed program exceed the costs. As such we included the cost of the program in our forecast of total opex.

Our assessment of each of the new step changes is outlined below.

Gas quantity audit

We have included a gas quantity audit step change of $0.14 million ($2014–15) in our alternative opex forecast. We have included it because the requirement to provide an audited statement of gas quantity inputs is a new obligation which is not accounted for in our estimate of base opex or in our forecast rate of change.

In its revised proposal, JGN included a step change of $0.14 million in its opex forecast for the annual costs of auditing gas quantities.[43] JGN included the step change because we amended the clause of its access arrangement containing the reference tariff variation mechanism in our draft decision. The amendment requires JGN to provide an independent audit of the gas quantity inputs used in the reference tariff formula.[44] We have not required an audit of this information previously. Therefore, JGN considered it represents a new regulatory obligation.[45] JGN's forecast is based on a

41 ERMF, *Response to AER DD and JGN revised proposal*, March 2015, pp. 11, 41.
42 ERMF, *Response to AER DD and JGN revised proposal*, March 2015, pp. 11, 52.
43 JGN, *Response to the draft decision and revised proposal, Appendix 5.4 - Operating expenditure step changes report*, February 2015, p. 1.
44 AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20, Attachment 11 – Reference tariff variation mechanism, revisions 11.2 and 11.3*, pp. 11-24 to 11-25.
45 JGN, *Response to the draft decision and revised proposal,* February 2015, p. 119.

quote by KPMG to undertake the audit. We are satisfied that this is a reasonable estimate of the costs of complying with the new obligation.

AEMO B2B harmonisation initiative

We have included a business to business (B2B) harmonisation step change of $9.4 million ($2014–15) in our alternative opex forecast. We have included it because JGN will incur costs to comply with new obligations which are not accounted for in our estimate of base opex or the forecast rate of change.

In its revised proposal, JGN included an opex step change in anticipation of an Australian Energy Market Operator (AEMO) decision to change the NSW/ACT retail market procedures (RMP) and gas interface protocol (GIP).[46] The changes are to harmonise NSW/ACT retail market procedures with those in other jurisdictions.

Currently, the retail gas market interactions between the network service providers, retailers and the market operator in NSW/ACT are different to those operating in Victoria, Queensland and South Australia. A technology platform known as the Retail Gas Hub (the Hub) is in place in Victoria, Queensland and South Australia to facilitate the transactions for most of these interactions, whereas NSW/ACT uses file transfer protocol to facilitate transactions that are directed to and from the market operator.

In February 2014 JGN announced it was replacing its retail gas systems. This provided AEMO the opportunity to introduce the same set of B2B standards that are used in Victoria, Queensland and South Australia into the NSW/ACT retail gas market.

In its revised proposal, JGN included a placeholder estimate of $11 million ($2014–15) based on its assessment of AEMO's likely position on B2B harmonisation but noted it would update its cost estimates after the AEMO final decision was released.

As a result of the B2B harmonisation decision, JGN stated it would be required to:[47]

- implement new IT hardware and software to give effect to the new B2B and B2M procedures, service standards and other regulatory obligations
- comply with a number of new service levels for the provision of metering data, special meter reads and service order data
- comply with new energisation requirements in NSW/ACT for customer initiated connections
- comply with other new regulatory obligations in the NSW/ACT RMP.

The changed service levels relate to:

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[46] JGN, *Response to the draft decision and revised proposal, Appendix 5.4 - Operating expenditure step changes report*, February 2015, p. 8.

[47] JGN, *Response to the draft decision and revised proposal, Appendix 5.4 - Operating expenditure step changes report*, February 2015, pp. 10-11.

- the timing of providing AEMO with meter read data, for example, JGN will be required to provide meter read data within 1 to 2 days after the meter read (previously 5 days). JGN provides AEMO with around 6 million meter reads per year.
- the timing of providing AEMO with special meter reads, for example, JGN will be required to provide special meter read data within 1 day after the special meter read (previously 5 days). JGN provides AEMO with over 250,000 special meter reads per year.
- the timing of notifying AEMO of service order completion. JGN will be required to notify AEMO no later than 5 days after the service order was completed (previously there was no timing requirement). JGN notifies AEMO of around 150,000 service order completions each year.
- other miscellaneous changes, for example other changes to the RMP that require data cleansing, process design and ongoing support.

AEMO released its final decision for NSW/ACT B2B process harmonisation on 27 February 2015.[48] Subsequently, in March 2015, JGN reviewed the cost estimates in its revised proposal of complying with the new obligations. It reduced its opex step change proposal from $11.0 million to $9.4 million over the 5 years ($2014–15).[49]

We agree that AEMO's decision changes the manner in which JGN must provide B2B and B2M services to network users from April 2016. AEMO noted:[50]

> The proposed changes are material. They involve significant changes to the current NSW/ACT B2M transactions and the introduction of standardised B2B transactions. Most of the existing B2B transactions are being retired and replaced with a suite of transactions used in the other gas retail markets.

We are satisfied that JGN will incur incremental opex that is not accounted for in our estimate of opex, to meet the new requirements associated with the AEMO B2B harmonisation decision.

Origin Energy submitted that we should examine the independent cost-benefit analysis prepared by the Nous Group for AEMO's B2B harmonisation project working group.[51] Origin Energy questioned why JGN proposed capex and opex in excess of the costs submitted to the cost-benefit analysis by the NSW and ACT gas distributors. Origin

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48 http://www.aemo.com.au/Consultations/Gas-Consultations/General/IIR-IN006_14-Harmonisation-of-NSW_ACT-business-to-business-processes.

49 JGN, *Access Arrangement Information - Revised proposal, Addendum - B2B harmonisation capex and opex proposal*, 17 March 2015.

50 JGN, *Access Arrangement Information - Revised proposal, Addendum - B2B harmonisation capex and opex proposal*, 17 March 2015, cited AEMO, *Impact and implementation report issue no IN006/14*, 9 January 2015.

51 Nous Group, *NSW/ACT Gas Market Reform – Cost Benefit Analysis*, 3 July 2014, pp. 14-15.

Energy was also concerned that some additional efficiencies in distributor systems and processes were not reflected in JGN's revised proposal.[52]

We note that the changes to B2B and B2M obligations were agreed in February 2015, after the Nous Group report was finalised in July 2014. The Nous Group report reflected initial submissions before the actual scope of the final market obligations were determined by AEMO.

We are satisfied that the updated costs JGN proposed are made on a reasonable basis and represent the best forecast possible in the circumstances of the opex it will incur.

JGN's proposed meter data provision costs and special reads data delivery cost estimates are:[53]

- Management services: additional FTEs to oversee the scheduling and delivery of meter reads and special meter reads.
- Meter reading services: market tenders to renew JGN's meter reading and special meter reading contracts including the cost to comply with the new service levels.
- Back office services and support: additional FTE's to provide additional back office support.

JGN's meter reading services cost estimates are based on a market tender response for the renewal of JGN's meter reading services contract and includes the cost to hire additional meter readers and schedulers to comply with the new service levels. We consider this is a reasonable estimation method. The forecast additional staffing requirements, for both management services and back office support, that JGN proposed in order to meet the new service standards do not appear excessive. We also consider the estimated cost of $100,000 per FTE is reasonable based on current labour rates.

The opex step change JGN proposed for B2B harmonisation is outlined in

[52] Origin Energy, *Submission on JGN's draft decision*, 27 March 2015, p. 7.

[53] JGN, *Access Arrangement Information - Revised proposal, Addendum - B2B harmonisation capex and opex proposal*, 17 March 2015, pp. 8-9.

Table 7.6.

Table 7.6 B2B harmonisation step change forecast ($ million, 2014–15)

	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Meter data provision	0.23	1.08	0.97	0.97	0.97	**4.21**
Special reads data delivery	0.13	0.41	0.45	0.45	0.45	**1.90**
Service order completion	0.09	0.28	0.28	0.28	0.28	**1.19**
Miscellaneous service level changes	0.33	0.45	0.45	0.45	0.45	**2.11**
Total	**0.77**	**2.21**	**2.14**	**2.14**	**2.14**	**9.42**

Source: JGN, *Access Arrangement Information - Revised proposal, Addendum - B2B harmonisation capex and opex proposal*, 17 March 2015, pp. 6-7.

Asbestos meter cover removal program

We have not included an asbestos meter cover removal program step change in our alternative opex forecast. We consider our estimate of opex already reflects the opex a prudent service provider acting efficiently, in accordance with accepted good industry practice, would incur to achieve the lowest sustainable cost of delivering pipeline services.

In its revised proposal, JGN included a step change for a new program to remove asbestos meter covers for $0.97 million ($2014–15).[54] JGN stated that up until the early 1970s, property owners and tenants were able to install a cover for their gas meter made from moulded fibre cement containing asbestos. In 2014 Jemena's health, safety and environment council recommended that the meter covers be removed to protect the safety of its employees who may be required to lift these covers to perform meter maintenance or meter readings.

JGN noted that the asbestos cover removal program is not driven by a new regulatory obligation and it goes beyond its obligations under the Workplace Health and Safety Act 2011 because the asbestos material is not yet in a friable state. However, JGN stated that eliminating the risk to employees, contractors and customers would be good industry practice and therefore the proposed expenditure would be consistent with the opex criteria.[55] JGN assessed several options to remove and dispose of the asbestos meter covers. It chose the option to remove and dispose of the covers under a large-scale program for free, recovering the costs through network tariffs.

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[54] JGN, *Response to the draft decision and revised proposal, Appendix 5.4 - Operating expenditure step changes report*, February 2015, p. 3.

[55] NGR, cl. 91(1) states that 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.

We acknowledge JGN's proposal to remove asbestos meter covers may be prudent, however we consider our total opex forecast would already provide sufficient funding for JGN to meet the opex criteria.

In arriving at our opex forecast, we assess the total costs that would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

Actual past opex, if efficient, should provide a good indicator of required funding in the future. Opex tends to be stable or recurrent both on a year by year basis and when comparing opex across access arrangement periods (see Figure 7.3 above). The efficient amount of opex a prudent business needs in a year is generally a good indicator of the forecast efficient amount of opex it will need in the next year. If a service provider is operating efficiently, there should be few reasons why its forecast opex in an access arrangement period should be much different to its past spending in the previous access arrangement period. We have determined the base amount of opex we consider would reasonably reflect the opex criteria in section 7.4.1.

We consider managing asbestos risk is a business-as-usual cost for JGN. It is not driven by new external obligations but rather it involves a decision about how best to allocate spending from year to year to achieve existing obligations.

Some types of projects and programs of expenditure a service provider undertakes will differ between years and between access arrangement periods. However, we do not consider an increase in one program is a reason to increase the revenue JGN can recover from gas pipeline consumers. What matters is whether the cost of this program is likely to affect our views on the total forecast opex we consider a prudent service provider would require acting efficiently, in accordance with accepted good industry practice to achieve the lowest sustainable cost of delivering pipeline services.

JGN may need to change the programs it undertakes from year to year to respond to emerging risks. As discussed above a new program or project may, in isolation, be prudent. However, at the same time as some priorities emerge, others will fall away. New programs and projects can often be funded as the cost of other programs and projects in the base year decline. As the proposed cost of the asbestos meter cover removal program is relatively immaterial compared to JGN's total opex forecast, (0.1 per cent of total opex), we expect the expenditure would be met through adjustments in other programs. We are not satisfied that JGN would need an increase in the total amount of funding that it can recover from its consumers in the 2015–20 access arrangement period because one program it may undertake is different to the projects it undertook in the base year.

7.4.4 Category-specific forecasts

JGN proposed category-specific forecasts for four opex cost categories:

- government levies
- unaccounted for gas (UAG)
- carbon costs

- debt raising costs.

In our draft decision, we included JGN's forecast for government levies and UAG in our forecast. We adjusted JGN's carbon cost forecast following the removal of the carbon tax. The residual amount reflected the auditing costs JGN incurs in reporting its assumed fugitive emissions under the *National Greenhouse and Energy Reporting Act 2007*. We noted in our draft decision that our forecast of UAG reflected JGN's demand forecasts. We stated we would update our UAG forecast to reflect our final decision on demand.

While we typically do not use a category-specific forecasting approach, government levies, UAG and carbon costs are all subject to a true-up through the tariff variation mechanism. Therefore, to be consistent with this mechanism, it is most appropriate to adopt a category-specific approach.

In its revised proposal, JGN updated its forecast of carbon costs and government levies to reflect the actual opex it incurred on these costs in 2013–14. We consider this to be a reasonable forecasting approach so we have included JGN's updated forecasts in our revised forecast.

UAG refers to any gas lost or unaccounted for while it is in JGN's custody. It is calculated as the difference between the measured quantity of gas entering the network system (receipts) and metered gas deliveries (withdrawals). JGN is required to replace any unaccounted for gas, which it buys through a competitive tender process.[56] JGN forecast UAG based on the product of:

- the approved target rate (loss rate) of UAG
- total gas receipts (or demand)
- the cost of replacement gas.

JGN updated its UAG forecast in its revised proposal to reflect:

- its updated forecast of wholesale gas prices based on its recent competitive tender for UAG
- its most recent demand forecast.[57]

In our draft decision we considered JGN's forecast was based on reasonable assumptions regarding the approved target rate of UAG and the cost of replacement gas.[58] However, we considered JGN's assumption regarding total gas receipts, or demand, was too low.[59]

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[56] JGN, *Reference Service Agreement - JGN's NSW gas distribution network*, 30 June 2014, p. 31.

[57] JGN, *Response to the draft decision and revised proposal,* February 2015, p. 87.

[58] AER, *Draft decision for Jemena Gas Networks (NSW) Ltd Access Arrangement 2015–20 , Attachment 7, November 2014,* pp. 7-38 to 7-43.

[59] See clauses 9.4, 9.5(d) and 9.5(e) of the Reference Agreement.

The final UAG forecast we have included in our opex forecast reflects our approved demand forecast. We discuss our decision on JGN's demand forecast in attachment 13.

We note that JGN's access arrangement includes an incentive to minimise the rate of UAG. If the actual UAG rate is below (above) JGN's target UAG rate, JGN over (under) recovers its actual UAG costs.[60]

For the other elements of the UAG forecast, an automatic adjustment applies in the tariff variation mechanism to true-up actual and forecast gas prices and demand assumed in UAG costs. Therefore if actual wholesale prices are different during the access arrangement period to what JGN has forecast, then the difference will be passed through to consumers.

The difference between JGN's revised proposal and our final decision for all category specific forecasts (except debt raising costs) is outlined in Table 7.

Table 7.7 Category specific forecasts for JGN ($million, 2014–15)

Category	Revised proposal	Final decision
Unaccounted for gas	78.9	80.0
Government levies	19.9	19.9
Carbon costs	0.2	0.2

Source: AER analysis; JGN, *Access Arrangement Information, Revised proposal, Revised Opex model,* 27 March 2015.

7.4.5 Interrelationships

We note there are interrelationships between our opex forecast and other elements of JGN's access arrangement proposal. In assessing JGN's total forecast opex we took into account these components, including:

- the impact of forecast capex on forecast output growth in the rate of change
- the impact of JGN's capitalisation policy on capex and opex
- the impact of the form of control on the forecasting methodology for licence fees, UAG and carbon costs
- the impact of forecast demand on forecast output growth in the rate of change and forecast unaccounted for gas costs.

[60] JGN is compensated for changes in total market volumes and costs of purchasing UAG through the tariff variation mechanism.