



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

**Attachment 6 – Capital
expenditure**

June 2015

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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

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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 (ACN 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

6 Capital expenditure

This attachment outlines our assessment of JGN's proposed conforming capex for 2009–14 and forecast capex for the 2015–20 access arrangement period.

6.1 Final decision

Conforming capex for 2009–14

We approve \$775.8 million (\$2015) total net capex for 2009–14 as conforming capex under r. 79(1) of the NGR. 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).¹

Table 6.1 shows our approved capex for 2009–14 by category.

Table 6.1 AER approved capital expenditure by category over 2009–14 (\$million, 2015)

Category	2009– 10	2010– 11	2011– 12	2012– 13	2013– 14	2014– 15 ^(a)
Connections/Market expansion	46.3	51.3	55.3	62.6	78.6	75.0
Augmentation/Growth capacity	11.6	31.6	28.9	6.0	7.0	6.8
Mains and service renewal	0.8	0.1	5.0	4.2	7.7	7.0
Facilities renewal and upgrade	9.0	7.9	17.9	10.5	10.7	21.2
SCADA	0.4	0.3	0.2	1.2	0.8	1.0
Meter renewal and upgrade	14.3	13.1	15.8	13.3	19.4	25.1
Government authority work	0.0	0.1	0.1	0.4	0.7	0.4
IT	0.0	41.3	28.0	12.7	11.6	38.6
Other - non-distribution	7.7	6.3	4.3	5.3	27.9	46.6
Overheads	15.6	17.6	23.3	24.2	25.7	26.2
GROSS TOTAL CAPITAL EXPENDITURE	107.9	185.5	189.1	143.3	191.0	249.0
Contributions	3.3	8.4	4.0	5.6	6.9	10.0
Asset disposals	0.2	7.2	3.2	1.8	0.2	0.1
NET TOTAL CAPITAL EXPENDITURE	104.4	169.9	181.9	135.8	183.9	238.9

¹ NGR, rr. 64(1) & (5)

Source: AER analysis.

Note: (a) As set out in Attachment 2 the 2014-15 amounts have not been assessed by the AER as approved capex under this decision. This is because these values are estimates. The AER will undertake the assessment of whether the 2014-15 amounts are conforming capex as part of the next access arrangement determination.

(b) Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

Conforming capex for the 2015–20 access arrangement period

We approve total net capex of \$957.2 million (\$2015) for 2015–20 as conforming capex under r. 79(1) of the NGR. This is a 14.5 per cent reduction to JGN's revised proposed expenditure \$1118.3 million (\$2015) total net capex.

Our final decision reflects an increase from our draft decision. JGN had proposed \$1130.4 million in its initial proposal and in our draft decision we had approved \$918.6 million.

The increase from our draft decision largely reflects a decrease in the connections expenditure of \$8.8 million (\$2015, direct, escalated, excluding overheads) which is more than offset by increases in meter renewal and upgrade (up \$23.8 million), overheads (up \$10.5 million) and SCADA (up \$6.4 million).

Table 6.2 shows our approved capex for the 2015–20 access arrangement period by category. 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).²

Table 6.2 AER approved capital expenditure^(a) by category over the 2015–20 access arrangement period (\$million, 2015)

Category	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Connections/Market expansion	63.3	60.7	58.1	55.6	53.0	290.7
Augmentation/Growth capacity	17.2	17.4	21.7	17.2	12.3	85.8
Mains and service renewal	12.3	15.9	12.4	8.6	9.7	58.8
Facilities renewal and upgrade	22.3	18.8	19.9	20.3	16.4	97.7
SCADA	1.3	2.7	2.7	2.2	0.7	9.6
Meter renewal and upgrade	29.7	31.1	31.7	30.3	28.0	150.8
Government authority work	0.5	0.5	0.5	0.5	0.5	2.6
IT	42.5	30.5	32.8	18.3	10.6	134.6

² NGR, rr. 64(1) & (5)

Category	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Other - non-distribution	7.3	3.2	3.9	7.3	4.7	26.4
TPC/FEED	-	-	-	-	-	-
Overheads	24.3	23.9	24.3	23.8	23.2	119.5
GROSS TOTAL CAPITAL EXPENDITURE	222.2	205.0	208.1	184.0	159.1	978.4
Contributions	5.4	4.1	3.7	3.6	3.6	20.4
Asset disposals	0.1	0.1	0.1	0.3	0.2	0.8
NET TOTAL CAPITAL EXPENDITURE	216.6	200.8	204.2	180.1	155.4	957.2

Source: AER analysis.

Notes: (a) Including AER material and labour escalation adjustments.

(b) Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

Table 6.3 shows JGN's proposed capex compared with the AER's approved allowance for each category. All expenditure in this table includes real cost escalation. Table 6.4 shows the same expenditure but excludes real cost escalation. Expenditure referred to in this attachment is unescalated unless otherwise stated.

Table 6.3 Comparison of AER final decision and JGN's revised capital expenditure over the 2015–20 access arrangement period (escalated, \$million, 2015)

Category	Proposed	Approved ^(a)	Difference (\$millions)	Difference (%)
Connections/Market expansion	401.9	290.7	-111.1	-27.7%
Augmentation/Growth capacity	92.0	85.8	-6.2	-6.7%
Mains and service renewal	60.7	58.8	-1.9	-3.2%
Facilities renewal and upgrade	114.1	97.7	-16.4	-14.4%
SCADA	9.6	9.6	0.0	-0.3%
Meter renewal and upgrade	166.6	150.8	-15.8	-9.5%
Government authority work	2.6	2.6	-0.1	-2.6%
IT	135.8	134.6	-1.1	-0.8%
Other - non-distribution	26.4	26.4	0.0	-0.1%
TPC/FEED	5.2	-	-5.2	-100.0%
Overheads	127.7	119.5	-8.2	-6.4%
GROSS TOTAL CAPITAL EXPENDITURE	1,144.5	978.4	-166.2	-14.5%

Category	Proposed	Approved ^(a)	Difference (\$millions)	Difference (%)
Contributions	25.5	20.4	-5.1	-19.9%
Asset disposals	0.8	0.8	0.0	0.0%
NET TOTAL CAPITAL EXPENDITURE ^(b)	1,118.3	957.2	-161.1	-14.4%

Source: AER analysis.

Notes: (a) Including AER material and labour escalation adjustments.

(b) Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

Table 6.4 Comparison of AER final decision and JGN's revised capital expenditure over the 2015–20 access arrangement period (unescalated, \$million, 2015)

Category	Proposed	Approved ^(a)	Difference (\$millions)	Difference (%)
Connections/Market expansion	368.0	285.6	-82.4	-22.4%
Augmentation/Growth capacity	87.0	83.5	-3.6	-4.1%
Mains and service renewal	57.5	57.5	0.0	0.0%
Facilities renewal and upgrade	106.6	95.2	-11.4	-10.7%
SCADA	9.5	9.5	0.0	0.0%
Meter renewal and upgrade	148.4	148.4	0.0	0.0%
Government authority work	2.5	2.5	0.0	0.0%
IT	131.6	131.6	0.0	0.0%
Other - non-distribution	26.4	26.4	0.0	0.0%
TPC/FEED	5.0	-	-5.0	-100.0%
Overheads	125.7	115.2	-10.5	-8.3%
GROSS TOTAL CAPITAL EXPENDITURE	1,070.2	957.3	-112.9	-10.5%
Contributions	25.5	20.4	-5.1	-19.9%
Asset disposals	0.8	0.8	0.0	-0.2%
NET TOTAL CAPITAL EXPENDITURE ^(b)	1,043.9	936.1	-107.8	-10.3%

Source: AER analysis.

Notes: (a) Excluding AER material and labour escalation adjustments.

(b) Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

We tested JGN's proposed forecast capex taking into account the available evidence. The outcomes of our assessment revealed that some aspects of JGN's proposal, such as expenditure for mains subsidence and SCADA, were consistent with the NGR requirements in that the proposed expenditures are justified and would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services. We found that other aspects of JGN's proposal, in particular the level of overheads, connections and some projects and programs associated with facilities renewal and upgrade, respectively, did not meet the NGR requirements given that they were not based on the best estimate in the circumstances and/or revealed inefficiency inconsistent with the NGR requirements.

A summary of our reasons and findings that we present further in this Attachment are set out below.

- Mines subsidence, SCADA, mains and service renewal

We accepted JGN's proposed capex for mine subsidence in this final decision, consistent with our draft decision. We depart from our draft decision by accepting JGN's proposed capex of \$9.5 million (\$2015, unescalated direct costs, excluding overheads) for SCADA in our final decision. This is because in its revised proposal, JGN provided supporting information as to the need for replacement of the GENE system. We have also accepted JGN's proposed expenditure of \$57.5 million (\$2015, unescalated direct costs, excluding overheads) for mains and service renewal.

- Connections/Market expansion

We have included \$285.6 million (\$2015, unescalated direct costs, excluding overheads) in our alternative capex estimate compared to JGN's proposed \$368.0 million. This is a 22.4 per cent reduction in JGN's proposed amount. We based our estimate on a five-year average of historical unit rates and mains/services/meters per connections data. This provides for consistent cost component estimation.

By contrast, JGN based its forecast of connections expenditure on a model which built up the unit rates and Core Energy's forecast of new connections. We assessed that this model did not produce the best estimate, and the proposed capex was not efficient. This is because the model draws off different data sets which are not linked and uses different estimation methods across different cost components (internal labour, contractor labour, restoration costs, materials and other) resulting in potential compositional bias. Further, the model does not use the contract unit rates as proposed by JGN because it substitutes a derived 2013-14 unit rate³ and includes metering contractor costs and material and real labour escalation which are not provided for in the contracted unit rates.

- Overheads

³ Via inclusion of 'quoted works' costs.

We have included \$115.2 million (\$2015, unescalated direct costs, excluding overheads) in our alternative capex estimate for overheads. JGN proposed \$125.7 million. This is an 8.3 per cent reduction. Our estimate uses an average of JGN's historical overheads expenditure as the base, and adjusts for the growth in the variable component of overheads in accordance with JGN's evidence as to the proportion of its overheads which are variable and in line with the gross approved capex. We have also applied our real labour and materials escalation as opposed to those proposed by JGN. This reflects a level of overheads which we consider meets the conforming capex criteria in the NGR.

We consider that JGN's base-step-trend forecast method, using an unadjusted base year of 2013-14 year is not representative of future overheads expenditure. We therefore find that it is not the best estimate in the circumstances and would result in inefficient capex. This is because total overheads in 2013-14 are significantly higher than in other years. This is not consistent with our understanding from the material before us which suggests that under the new management and contractual arrangements between JGN and Jemena Asset Management and Zinfra, overheads would be lower.

- Facilities renewal and upgrade

We have included \$95.2 million (\$2015, unescalated direct costs, excluding overheads) in our alternative capex estimate. JGN proposed \$106.6 million (\$2015, unescalated direct costs, excluding overheads). This is a 10.7 per cent reduction.

We have approved most of the facilities renewal and upgrade expenditure JGN proposed. We have not included JGN's proposed expenditure for the six projects on the Northern Trunk. This is because we consider that the expenditure is not sufficiently justified given the uncertainty that the gas increased pressures will eventuate such that the proposed expenditure will be required.

We have accepted the majority of the expenditure proposed but find that JGN has overstated the replacement requirements for some projects. We have adjusted the expenditure for these in order to reflect efficient costs to achieve the lowest sustainable cost of providing the service.

6.2 JGN's revised proposal

2009–14 period

JGN proposed net total capex of \$775.8 million (\$2015) for 2009–14.

Table 6.4 JGN's revised capital expenditure over 2009-10 to 2013-14 (\$million, 2015)

Category	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Connections/Market expansion	46.3	51.3	55.3	62.6	78.6	75.0
Augmentation/Growth capacity	11.6	31.6	28.9	6.0	7.0	6.8
Mains and service renewal	0.8	0.1	5.0	4.2	7.7	7.0
Facilities renewal and upgrade	9.0	7.9	17.9	10.5	10.7	21.2
SCADA	0.4	0.3	0.2	1.2	0.8	1.0
Meter renewal and upgrade	14.3	13.1	15.8	13.3	19.4	25.1
Government authority work	0.0	0.1	0.1	0.4	0.7	0.4
IT	0.0	41.3	28.0	12.7	11.6	38.6
Other - non-distribution	7.7	6.3	4.3	5.3	27.9	46.6
Overheads	15.6	17.6	23.3	24.2	25.7	26.2
GROSS TOTAL CAPITAL EXPENDITURE	107.9	185.5	189.1	143.3	191.0	249.0
Contributions	3.3	8.4	4.0	5.6	6.9	10.0
Asset disposals	0.2	7.2	3.2	1.8	0.2	0.1
NET TOTAL CAPITAL EXPENDITURE	104.4	169.9	181.9	135.8	183.9	238.9

Source: JGN, 2015-20 Access Arrangement Information, Appendix A to the Access Arrangement RIN response - Regulatory templates (CONFIDENTIAL) [UPDATE].XLSM.

Note: Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

2015–20 access arrangement period

In its revised proposal JGN included net total capex of \$1,118.3 million (\$2015) for the 2015–20 access arrangement period.

Table 6.5 JGN proposed capital expenditure by category over the 2015–20 access arrangement period (\$million, 2015)

Category	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Connections/Market expansion	84.5	83.1	80.4	79.6	74.2	401.9
Augmentation/Growth capacity	17.6	18.0	22.5	18.9	14.9	92.0
Mains and service renewal	12.5	16.3	12.9	9.0	10.0	60.7
Facilities renewal and upgrade	23.1	20.1	24.3	27.0	19.6	114.1

Category	2015-16	2016-17	2017-18	2018-19	2019-20	Total
SCADA	1.3	2.7	2.7	2.2	0.7	9.6
Meter renewal and upgrade	32.6	34.1	35.3	34.2	30.4	166.6
Government authority work	0.5	0.5	0.5	0.5	0.5	2.6
IT	42.6	30.7	33.1	18.5	10.8	135.8
Other - non-distribution	7.3	3.2	3.9	7.3	4.7	26.4
TPC/FEED	1.0	1.0	1.0	1.1	1.1	5.2
Overheads	25.0	25.3	25.6	25.8	26.1	127.7
GROSS TOTAL CAPITAL EXPENDITURE	249.6	235.4	242.4	224.2	192.9	1,144.5
Contributions	5.7	5.2	4.8	4.9	4.8	25.5
Asset disposals	0.1	0.1	0.1	0.3	0.2	0.8
NET TOTAL CAPITAL EXPENDITURE	243.8	230.2	237.5	219.0	187.9	1,118.3

Source: JGN, *2015-20 Access Arrangement Information – Public*, 30 June 2014, p.69; JGN, *2015-20 Access Arrangement Information*, Appendix A to the Access Arrangement RIN response - Regulatory templates (CONFIDENTIAL) [UPDATE].XLSM.

Note: Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

6.3 AER's assessment approach

We must make two decisions regarding JGN's capex. First, we are required to assess past expenditure and determine whether it meets the criteria set out in the NGR to be added to the starting capital base.⁴ Where capex meets these criteria, it is referred to as "conforming" capex.⁵ Secondly, we are required to assess JGN's proposed forecast of required capex for the 2015-20 period to determine whether it is 'conforming.' The following sections set out our approach as well as the tools and techniques we employ in forming a view on these two issues. We also need to take into account timing issues associated with the lag between actual capex data being available and the need to forecast an opening capital base. This is explained further in the next section.

⁴ NGR, r. 77(2)(b).

⁵ NGR, r. 79.

6.3.1 NGR requirements for conforming capital expenditure

Capex will be conforming if it:

- meets the definition of capex in r. 69 of the NGR. Capex is defined as costs and expenditure of a capital nature incurred to provide, or in providing, pipeline services.
- is based on a forecast or estimate which is supported by a statement of the basis of the forecast or estimate required under r. 74(1) of the NGR. In accordance with r. 74(2) of the NGR, any forecast or estimate submitted must:
 - be arrived at on a reasonable basis; and
 - represent the best forecast or estimate possible in the circumstances.⁶
- conforms with the new capex criteria in r. 79 of the NGR. There are two essential criteria that must both be met under this rule:
 - The expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with good industry practice, to achieve the lowest sustainable cost of providing services; and
 - The expenditure must be justifiable on one of four grounds set out in r. 79(2) of the NGR.

The four grounds set out in r. 79(2) of the NGR can be summarised as follows. The capex must either:

- have an overall economic value that is positive
- demonstrate an expected present value of the incremental revenue that exceeds the expenditure
- be necessary to maintain and improve the safety of services, or maintain the integrity of services, or comply with a regulatory obligation or requirement, or maintain capacity to meet levels of demand existing at the time the capex is incurred, or
- be justifiable as a combination of the preceding two dot points.

Rule 79(3) of the NGR provides:

In deciding whether the overall economic value of capital expenditure is positive, consideration is to be given only to economic value directly accruing to the service provider, gas providers, users and end users.

We have limited discretion when making decisions under r. 79 of the NGR.⁷ This means that we must approve a particular element of the access arrangement proposal

⁶ NGR, r. 74(2).

⁷ NGR, r. 79(6).

if we are satisfied that that element complies with the applicable requirements of the NGR and NGL and is consistent with any criteria set out in the NGR or NGL.⁸

6.3.2 Assessment of conforming capital expenditure in the previous period

In assessing JGN's proposed capex in the earlier access arrangement period, we reviewed JGN's supporting material. This included information on JGN's reasoning and, where relevant, business cases, audited regulatory accounts, and other relevant information. This information helped us identify whether capex over the earlier access arrangement period was conforming capex and, in turn, whether that capex should be included in the opening capital base in accordance with r. 77(2)(b) of the NGR.

We do not approve certain information and forecasts provided by JGN if the information does not meet the requirements set out in the NGR.⁹ We must exercise our economic regulatory functions in a manner that will or is likely to contribute to the achievement of the NGO.¹⁰ For instance, having regard to the NGO, we take the view that a prudent service provider will seek cost efficiencies through continuous improvements, and that customers ultimately share in these benefits. This also provides the service provider with a reasonable opportunity to recover at least its efficient costs in accordance with the revenue and pricing principles.

Although the capital base roll forward relates to the 2010–15 access arrangement period, we are also required to adjust for the difference between actual and forecast capex in the capital base.¹¹ Generally, the final year of the previous access arrangement period is based on forecast capex (in this case, 2009–10). Therefore, our assessment of conforming capex includes the regulatory years for 2009–14. This is because:

- 2009–10 capex—when conducting the previous access arrangement review, we did not yet have actual capex for 2009–10. We therefore included in the capital base benchmark JGN's estimate of capex for 2009–10. Since actual capex is now available for 2009–10, we have assessed whether JGN's actual capex for 2009–10 is conforming capex under the NGR.¹² This conforming capex is now included in the capital base roll forward.¹³
- 2010–14 capex—for this access arrangement review, we have the actual capex for 2010–14. We have assessed whether JGN's actual capex for 2010–14 is conforming under the NGR for inclusion in the capital base roll forward.¹⁴

⁸ NGR, r. 40(2).

⁹ For instance, r. 74 of the NGR requires estimates and forecasts to be made on a reasonable basis, amongst other things.

¹⁰ NGL, s. 28(1).

¹¹ NGR, r. 77(2)(a).

¹² NGR, r. 79.

¹³ NGR, r. 77(2)(b).

¹⁴ NGR, r. 79 and r. 77(2)(b).

- 2014–15 capex—for this access arrangement review, we do not yet have actual capex for 2014–15. We have therefore included in the capital base roll forward JGN's estimate of capex for 2014–15. At the next access arrangement review, we will assess whether JGN's actual capex for 2014–15 is conforming capex under the NGR.¹⁵

We assessed the key drivers for the capex to assess whether JGN's proposed capex in the projected capital base complies with the capex criteria in r. 79(1) of the NGR. In doing so, we relied on the following information:

- The access arrangement information (AAI) – this document outlines JGN's program of capital expenditure and describes the main drivers of increased capital expenditure¹⁶
- The Asset Management Plan, IT Strategy and Asset Management Plan, and appendices which provided specific expenditure detail¹⁷
- JGN RIN template and basis of preparation¹⁸
- Opportunity briefs which detail expenditure requirements of specific projects¹⁹
- JGN tender and contract documentation²⁰
- Capex forecast model.²¹

Initially we assessed whether the proposed capex is justified on one of the four grounds under NGR r. 79(2). We then assessed the prudence and efficiency of the proposed capex. For analysis purposes the capex was broken into categories depending on whether the expenditure is driven by:

- Growth in demand – extensions, connections, augmentation
- Replacement on the basis of asset life, obsolescence, safety or regulatory obligations – mains, services, meters, regulators, city gates, IT, SCADA, or
- Other – new regulatory or safety obligations, opex or reliability improvements.

For each category of expenditure the scope, timing and cost of the proposed expenditure were considered in order to form a view on the prudence and efficiency of the expenditure. The assessment also considered whether cost forecasts have been

¹⁵ NGR, r. 79.

¹⁶ JGN, *2015-20 Access Arrangement Information*, 30 June 2014.

¹⁷ JGN, *2015-20 Access Arrangement Information*, 30 June 2014: Appendices 6.1, 6.2, 6.3, 6.5, 6.6, 6.7, 6.8, 6.9.

¹⁸ JGN, *2015-20 Access Arrangement Information*, 30 June 2014: *Appendix A to the Access Arrangement RIN response - Regulatory templates (CONFIDENTIAL) [UPDATE].XLSM, Appendix B to the Access Arrangement RIN response - Basis of preparation - CONFIDENTIAL*.

¹⁹ JGN, *2015-20 Access Arrangement Information*, 30 June 2014.

²⁰ JGN, *2015-20 Access Arrangement Information*, 30 June 2014: Appendix 9 Related party transactions, supporting documentation [CONFIDENTIAL].

²¹ JGN, *2015-20 Access Arrangement Information*, 30 June 2014, Appendix 6.4.

arrived at on a reasonable basis and represent the best forecast possible in the circumstances.

6.3.3 Assessing forecast capex for the 2015-2020 access arrangement period

The following sections set out our approach to assessing JGN's forecast of required capex for the 2015-20 access arrangement period. Our tools and techniques cover:

- assessing whether any outsourcing to third-parties reflect genuine arm's length arrangements
- assessing historical expenditure under the revealed cost approach
- how costs compare against previous decisions we have made (benchmarking)
- consideration of technical engineering advice
- determining the appropriate allowance for equity raising costs.

6.3.3.1 Assessing competitive tender processes for outsourced activities

Outsourcing to specialist providers of a particular service is a common means by which businesses in the economy are able to gain access to economies of scale and scope and other efficiencies.

Where JGN has used tendered rates as the basis of proposed unit costs, we relied on our approach to assessing outsourcing arrangements.²² The first stage of the conceptual framework is a 'presumption threshold' designed to be an initial filter to determine which contracts can be presumed to reflect efficient costs that would be incurred by a prudent operator.²³

In undertaking this 'presumption threshold' assessment, we consider:

- Did the service provider have an incentive to agree to non-arm's length terms at the time the contract was negotiated (or at its most recent re-negotiation)?
- If yes, was a competitive open tender process conducted in a competitive market?

In the absence of an incentive to agree to non-arm's length terms, we consider it reasonable to presume a contract price reflects efficient costs. We also consider this presumption to be reasonable where an incentive to agree to non-arm's length terms exists but the contract was the outcome of a competitive open tender process in a competitive market.²⁴

²² AER, *Better Regulation: Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 9-10.

²³ NGR r. 71(1).

²⁴ NGR r. 71(1).

Where an arrangement 'passes' the presumption threshold, we consider the starting point for setting future expenditure allowances should be the contract price itself, with limited further examination. This further examination involves checking whether the contract wholly relates to the relevant services and whether the contract price already compensates for risks or costs provided for elsewhere in the building blocks.

6.3.3.2 Revealed cost approach

The revealed cost approach considers information revealed by the past performance of a gas business. Under the ex ante regime, gas businesses are rewarded for spending less capex than allowed by the regulator. As a result, this incentive enables us to place some reliance on the historical costs of a gas business when reviewing its forecast capex. We used historical costs and volumes as an indicator of efficient costs and volumes for certain categories of capex. In particular, we used historical total costs, unit costs and volumes in assessing connections, mains and services replacements, meter replacements, SCADA and IT.

The revealed cost approach is an accepted industry practice. Many gas businesses, including JGN, have used this approach as a basis to forecast expenditure proposals. We also used this approach previously in assessing access arrangement proposals from the Victorian gas businesses.

6.3.3.3 Benchmarking against the other businesses' proposed unit costs and volumes

We also conducted comparative analysis of unit costs JGN has used to develop its capex forecast. Comparing the costs incurred by one regulated entity against the costs incurred by other regulated entities in similar circumstances, and using the comparison to assess the efficiency and prudence of those costs, is known as 'benchmarking'. We consider that the use of benchmarking to assess whether capex is conforming is consistent with the requirements of the NGR.

We undertook high level benchmarking of a selection of JGN's unit costs against similar unit costs of the Victorian gas businesses. We made some adjustment for compositional difference where required. We used this comparison for assessing connections, mains and services replacements, meter renewals and upgrade and SCADA.

Where benchmarking indicated that JGN's capex may not be efficient, we undertook a detailed review of JGN's proposal. Our detailed review involved consideration of relevant documentation and the impact of factors expected to differ from the past and/or from the Victorian gas businesses.

We recognise that forecast efficient costs may legitimately depart from those revealed through past performance, and compared with other gas businesses. For example, gas businesses may discover more efficient processes over time. The gas businesses may propose that they can best achieve their safety, reliability or regulatory obligations by incurring expenditure to implement new, more efficient processes, and include such expenditure in their proposed forecast capex. We consider it likely that a prudent

service provider, acting efficiently, would only change operating processes (from revealed, or otherwise efficient processes) if they are likely to result in efficiency gains (in the absence of any information to suggest other reasons for the change). Where we consider that future cost savings should result from capex investments, we have taken this into consideration in determining JGN's opex allowance.

6.3.3.4 Specialist technical advice

We engaged an engineering consultant, Sleeman Consulting, to provide specialist technical advice on the prudence and efficiency of JGN's proposed augmentation, facilities renewal and upgrade, metering renewal and upgrade, mains and services renewal and SCADA capex.²⁵

6.3.3.5 Cash flow analysis for equity raising costs

To determine the amount of equity raising costs, we have undertaken an assessment of benchmark cash flows calculated in the Post Tax Revenue Model (PTRM). Under this method, a prudent service provider, acting efficiently, would first exhaust the cheapest sources of funding, such as internal cash flows, before using more expensive external sources of funding, such as equity financing. The cash flow modelling approach used by the AER incorporates this assumption to determine if any external equity financing would be required based on the AER's capex forecast for JGN. For further discussion see attachment 3 of this final decision (rate of return).

6.3.4 Interrelationships

In assessing JGN's total forecast capex we took into account other components of its regulatory proposal, including:

- the trade-off between potential capex and opex solutions in our assessment of JGN's proposed capex.
- any change in the capitalisation policy applied between the current access arrangement and the 2015–20 access arrangement period. This relates to the change from the expensing of pigging in the current access arrangement period to capitalising in the next period, and the change from the capitalising of access arrangement and consumer engagement costs in the current access arrangement period to expensing in the next period.

²⁵ Sleeman Consulting, *Jemena Gas Networks 2015 Access Arrangement Submission, Review of Capex Forecasts for Capacity Development and Facilities Renewal and Replacement, Report to Australian Energy Regulator*, September 2014.

6.4 Reasons for final decision

6.4.1 Conforming capex for 2009–14

We consider that the \$775.8 million (\$2015) net capex incurred by JGN for 2009–14 is conforming capex that complies with r. 79(1) of the NGR.

As set out in our draft decision, in reaching this view we considered the following factors:

- JGN's network capex was \$0.4 million (0.4 per cent) over the IPART approved amount of \$104.0 million for 2009–10.
- JGN's network capex was \$3.4 million (0.5 per cent) under the AER approved amount of \$674.9 million for 2010–14.
- JGN spent less than our forecast on its network in 7 out of 11 categories for 2010–14. In five categories, the underspend was greater than 20 per cent below forecast.
- The largest underspends for 2010-14²⁶ occurred in the connections/market expansion, meter renewal and upgrade and facilities renewal and upgrade categories:
 - In the connections/market expansion category, JGN spent \$48.0 million less than forecast due to a smaller volume of new connections occurring than was approved and lower industrial and commercial meter average costs.²⁷
 - In the meter renewal and upgrade category, JGN spent \$36.2 million less than forecast due to lower project costs for the 'Replacement of 106 Meter Regulators' and deferral of and lower volumes of tariff meter replacement.²⁸
 - In the facilities and renewal category, JGN spent \$14.0 million less than forecast due to an APA project delay with consequential delay to a country packaged off-take station (POTS) project.²⁹
- The largest overspends for 2010-14 occurred in overheads, other non-distribution, information technology (IT) and related party margin categories:
 - In the overheads category, JGN exceeded the forecast by \$64.0 million due to an IT roll-over that was directly allocated from Jemena Group corporate to JGN.³⁰
 - In the IT category, JGN spent \$23.2 million more than forecast due to changes in project scope and the implementation of transitional National

²⁶ Only the 2010-14 period comparison by category has been presented as the IPART decision was not made on the same category basis and was not in the same level of detail as the AER 2010-15 Access Arrangement Decision.

²⁷ JGN, Revenue proposal, June 2014, p. 29.

²⁸ JGN, Revenue proposal, June 2014, p. 29.

²⁹ JGN, Revenue proposal, June 2014, p. 29.

³⁰ JGN, Revenue proposal, June 2014, p. 29.

Energy Customer Framework (NECF), which was not included in the forecast.³¹

6.4.2 Conforming capex for the 2015–20 access arrangement period

Our forecasts discussed in this section do not include our adjustment to JGN's proposed labour and material cost escalation factors. For our forecasts which include these adjustments see Table 6.2. Our assessment of labour and material cost escalation is set out in section 7.5.3 of attachment 7 (opex) and Appendix A below.

We approve \$936.1 million (\$2015)³² of JGN's proposed \$1,043.9 million total net capex for the 2015–20 access arrangement period (see Table 6.6).

Table 6.6 AER approved capital expenditure over the 2015–20 access arrangement period (\$million, 2015)^(a)

Category	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Connections/Market expansion	62.9	60.0	57.1	54.2	51.4	285.6
Augmentation/Growth capacity	17.0	17.1	21.1	16.5	11.7	83.5
Mains and service renewal	12.1	15.6	12.1	8.3	9.3	57.5
Facilities renewal and upgrade	22.0	18.5	19.4	19.6	15.7	95.2
SCADA	1.3	2.7	2.7	2.1	0.7	9.5
Meter renewal and upgrade	29.5	30.8	31.2	29.7	27.2	148.4
Government authority work	0.5	0.5	0.5	0.5	0.5	2.5
IT	42.0	29.9	31.9	17.7	10.1	131.6
Other - non-distribution	7.3	3.2	3.9	7.3	4.6	26.4
TPC/FEED	-	-	-	-	-	-
Overheads	24.0	23.4	23.5	22.6	21.8	115.2
GROSS TOTAL CAPITAL EXPENDITURE	220.1	202.0	203.5	178.6	153.1	957.3
Contributions	5.4	4.1	3.7	3.6	3.6	20.4
Asset disposals	0.1	0.1	0.1	0.3	0.2	0.8
NET TOTAL CAPITAL EXPENDITURE^(b)	214.5	197.8	199.7	174.7	149.4	936.1

Source: AER analysis, JGN.

Note: (a) Excluding AER adjustment for material and labour escalation.

³¹ JGN, *2015–20 Access arrangement information*, June 2014, p. 29.

³² Excluding AER adjustment for material and labour escalation.

(b) Totals do not add as JGN claimed confidentiality over mines subsidence and related party margin expenditure.

Our analysis of the capex driver categories is presented below.

6.4.2.1 Connections/Market expansion

Distribution businesses have a regulatory obligation to connect residential and commercial/industrial customers to the distribution network upon request. The capex associated with connecting customers to the distribution network generally includes the cost of new mains, gas service pipe from the main to the meter, and the meter. As connecting customers is a regulatory obligation, we consider that connections expenditure is justified under r. 79(2)(c)(iii) of the NGR.

We do not accept JGN's proposed connections capex. This is because we consider its forecast capex is not arrived at on a sufficiently reasonable basis and is not the best estimate in the circumstances. We have included \$285.6 million (\$2015, unescalated direct costs, excluding overheads) of connections capex in our alternative capex estimate. This is lower than JGN's revised forecast expenditure of \$368.0 million (\$2015, unescalated direct costs, excluding overheads).³³

In support of its revised forecast connections expenditure, JGN submitted a model which built up unit rates from a mix of historical and forecast data. Its revised forecast volume is based on its consultant Core Energy's revised forecast of new connections.

The reduction of around 22.4 per cent is driven by:

- our estimate of forecast new connections which is lower than JGN's forecast
- the application of historical unit rates rather than the unit rates built up in JGN's connections model
- not including JGN's proposed additional expenditure for non-routine connections.

The reasons for each of these adjustments are discussed further below.

In its initial proposal JGN proposed \$356.6 million (\$2015, unescalated direct costs, excluding overheads) in connections capex.³⁴ JGN forecast its proposed Tariff V connections expenditure using new connection number forecasts produced by Core Energy for each segment of Tariff V class customers and applying contract rates for mains, services, meters and associated equipment components. The four Tariff V segments include electricity to gas conversions, new estates, medium density/high rise residential developments and industrial and commercial volume connections. It forecast Tariff D expenditure based on its regulatory year 2014 business forecast.

³³ JGN, Response to the draft decision, February 2015, Appendix 4.1 - JGN capex forecast model - updated - CONFIDENTIAL.xlsm

³⁴ JGN, 2015-20 Access Arrangement Information, June 2014, Appendix A to the AA RIN response - Regulatory templates (PUBLIC) [UPDATE].XLSM

In our draft decision we included \$292.1 million (\$2015, unescalated direct costs, excluding overheads) in our alternative capex estimate. The reduction in expenditure in our draft decision mainly reflected a lower number of new connections forecast and a unit rate forecast based on historical unit rates.

Our draft decision set out in detail the reasons for rejecting JGN's initial proposal on connections capex.³⁵ In summary:

- We applied historical unit rates as we had concerns with JGN's unit rate forecast method. These concerns included that the mains/services/meter unit rates were derived from one year of compositional data. The compositional data explains the different unit rate drivers, including connection location, type of main (nylon, PE, steel), size of main (32mm, 50mm, 75mm, 100mm), same side or across the road connection location (short or long service). As unit rates can vary from year to year according to changes in composition, we considered that by relying on one year of data the unit rates produce biased results.
- We were also concerned that JGN had not justified its forecast increases in the metres of mains per connection for medium/high density and tariff V industrial and commercial (I&C) connections.
- We had concerns about JGN's application of inconsistent averaging periods in order to estimate the mains/services/metres per connection.
- JGN did not provide the basis of its proposed I&C contract (Tariff D or demand connections) expenditure in its initial proposal. We considered that its use of forecast regulatory year 2014 data as the basis of its forecast expenditure did not provide the best estimate in the circumstances. We applied a four-year historical average.
- In its proposal JGN did not provide its method for estimating the \$2.1 million of related party margin expenditure or the expenditure it included for Metretek and meter data logger costs. In response to our information requests JGN submitted that Metreteks were forecast on the basis of JGN's business forecast but did not provide the forecast method. JGN did not provide information on how it forecast meter data logger expenditure.
- As historical unit rates include related party margins, Metretek and meter data logger costs we did not adjust the historical costs already included.
- JGN forecast capital contributions on the basis of past contributions. However, it did not consistently apply an eight-year averaging period. We substituted a forecast based on the consistent application of an eight-year average.

The rest of this section sets out our decision for the respective connection types.

³⁵ JGN, Response to the draft decision, February 2015.

6.4.2.1.1 Tariff V or volume connections expenditure

Tariff V class customer connections are residential and commercial/industrial customers who consume less than 10 TJ/year. Residential and commercial/industrial customers are considered separately because there are different input requirements, especially in relation to services and meters.

JGN separately forecast expenditure for the following Tariff V connection types:³⁶

- residential
 - electricity-to-gas (E to G or infill)
 - new estates
 - medium/high density
- industrial and commercial (I&C) volume.

Tariff V connections expenditure is calculated by deriving volume and unit rate forecasts. JGN forecast its proposed Tariff V connections expenditure using new connection number forecasts produced by Core Energy for each segment of Tariff V class customers and applying contract rates for mains, services, meters and associated equipment components.

Tariff V volumes

We do not accept JGN's forecast volume of new connections. Whilst we accept JGN's proposal that that new connections are likely to rise, we consider that JGN's forecasts of Tariff V new connections are marginally overstated. As a result, our forecast volumes (for residential and I&C customers) in this final decision are 0.7 per cent lower than JGN's revised forecast.

JGN's revised forecast volumes were lower by 0.4 per cent compared to its initial proposal. Our forecast volumes in this final decision are higher by 1.0 per cent when compared with our draft decision.

The main types of new connections are:

- Electricity to Gas conversions (E to G) where the connection is to a pre-existing main passing the customer's premises
- New estates
- Medium density residential developments
- Main extensions where the network is extended to connect one or more new customers

³⁶ JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014, Appendix 6.7, Table 4-2, pp.13-14.

JGN's forecast volume of new connections is derived from Core Energy's revised forecast of demand and connections. We do not consider that JGN's forecast volume of new connections is the best estimate in the circumstances. JGN forecast an increase in new connections in the 2015–20 regulatory period compared to the current Access Arrangement period. This is based on its consultant, Core Energy's, advice that new connections will increase due to an increase in the number of new dwellings to be constructed in NSW. Core Energy also forecast the number of small business and industrial and commercial connections to increase by estimating the respective historical growth between 2003 and 2013 and extrapolating that growth.

We agree with our consultant's advice, DAE, that the forecasts of Tariff V new connections are marginally overstated. DAE advised that JGN's forecast of small business new connections is high compared to historical levels. Consistent with DAE's advice, we have also applied a new dwelling connections split between new estates and medium/high density of 45 per cent and 55 per cent respectively (compared to JGN's split of 48.8 per cent and 51.2 per cent). The forecasting method for arriving at these volumes is described in attachment 13 (demand). We have also included additional new E to G connections that arise due to a step change in marketing expenditure that we have approved in opex (see Attachment 7 (opex), section 7.4.3.).

Tariff V unit rates

We do not accept that the JGN's proposed units rates are those incurred by a prudent service provider acting efficiently. Our reasons for this are set out below. We had regard to confidential material in coming to our position. This confidential material is set out in Appendix B.

In its revised proposal, JGN submitted a model which built up unit rates from a mixture of historical and forecast cost information.³⁷ Due to a number of the concerns we have with JGN's unit cost build up, we are not satisfied that these unit rates have been arrived at on a sufficiently reasonable basis and are the best estimate in the circumstances.

Our alternate forecast of Tariff V connections expenditure based on Tariff V connections unit rates uses a five year (2009–10 to 2013–14) historical average. To calculate Tariff V connections expenditure for each connection type we multiplied the number of new connections by the five year actual average unit rates for mains, services and meters and the mains/services/meter per connection volumes. This resulted in forecast expenditure of \$276.2 million (\$2015, unescalated direct costs, excluding overheads).

Table 6.7 summarises the high-level assumptions that JGN applied to estimate mains and services unit rates and Table 6.8 the assumptions JGN applied to estimate meter unit rates for Tariff V connections.

³⁷ JGN, Revised Proposal, February 2015, Appendix 4.2 - JGN market expansion unit rate derivation model - CONFIDENTIAL.xls.

Table 6.7 JGN's revised basis for mains and services unit rates

Component	E to G	New homes	Medium density	I&C volume
Contractor	4 year average of volume mix x current contract rates			
Restorations	4 year average			
Materials	4 year average			
ZNX management fee and margin	RY14 actuals			
Internal labour	RY14 actuals			
Quoted works	RY14 actuals			

Source: JGN, Revised proposal, February 2015, Table 4-5, p.50.

Table 6.8 JGN's revised basis for meter unit rates

Component	E to G	New homes	Medium density	I&C volume
Contractor	4 year average			
Materials - gas meters	4 year average			
Materials - hot water meters	4 year average			
Materials - MDLs	RY14 actuals			
Internal labour	4 year average			
Quoted works	4 year average			
Energisation cost	Nil	Unit rate x 4 year average percentage uncontracted		Nil

Source: JGN, Revised proposal, February 2015, Table 4-7, p.53.

In assessing JGN's unit rate model we identified a number of concerns. In particular:

- JGN's connections model draws off three different data sets with no inter-linkage. This gives rise to concerns about consistency of definitions and, as a result, classification of costs between the data sets. We have found significant differences in the unit rates estimated using the different data sets, which should be the same if consistent definitions and classification of costs were being applied.
- We are concerned that JGN's changes in contract inclusions, levels of insourcing and outsourcing, and accounting policies across time will lead to changes in the category (internal labour, contractor, materials, restoration, other) in which costs are captured across time. Where there are changes over time there is potential to under or over forecast at a disaggregated level, resulting in under or over forecasting at a total level. This is especially the case when different bases are

being applied. That is, some elements are being forecast on the basis of a four-year average while others are being forecast on the basis of RY2014 data.

- We consider that some of JGN's model assumptions result in unit rates that are not efficient. We are concerned that:
 - JGN has not justified the inclusion of some costs (for example, internal labour allocated from opex to capex for mains and metering);
 - The basis for the inclusion of some costs is not reasonable and does not result in the best estimate in the circumstances. The costs we assess to be not reasonable to include are real material and labour escalation, metering labour costs, energisation costs, quoted works costs and non-routine connection costs.

With respect to the inclusion of costs we do not consider are reasonable, after reviewing JGN's contracts we do not consider there is a basis for including real material and labour escalation and metering labour costs. Evidence before us indicates that there is no provision for material and labour escalation and that metering labour costs are already included in the service unit rates. To include these costs would be to include more expenditure than is required under these contracts and so would be inefficient.

JGN proposed the addition of energisation costs to its unit rates for new connections. JGN submitted that these costs will be incurred in undertaking the B2B harmonisation.³⁸ JGN defined the energisation cost as the cost of a technician to attend the relevant site, subsequent to the physical connection being established, to remove the plug from the meter [unwadding], to allow gas to flow through the connection.³⁹ The establishment of the connection (step 1) and the removal of the plug/wad (step 2) is known as a 2 step connection.⁴⁰ The reason for the connection being left wadded after it has been established is to prevent gas being consumed without a retail contract being in place.⁴¹ This situation potentially arises when a real estate developer approaches JGN directly to request new connections and they do not have a nominated retailer.⁴² In such cases, the deemed contract provisions of the NERL do not operate, because there is no financially responsible retailer for the premises. We consider that the NGR and NERL provide for JGN to be able to avoid this situation arising by requiring a retail contract to be in place (and therefore a financially responsible retailer assigned) before establishing a new connection.⁴³ The NGR provides for JGN to not proceed with a connection until a retailer is nominated.⁴⁴

³⁸ JGN, Response to AER information request AER059, question 2, p.2.

³⁹ JGN, Revised proposal, February 2015, p.52.

⁴⁰ JGN, Response to AER information request AER059, question 2, p.2.

⁴¹ JGN, Response to AER information request AER059, question 2, p.2.

⁴² JGN, Revised proposal, February 2015, p.52.

⁴³ NERL s.54.

⁴⁴ NGR r. 119XX. JGN is not required to energise a new connection unless a request to energise a new connection is submitted by a retailer or the distributor is otherwise satisfied that there is a relevant contract with a retailer in relation to the premises.

If a retailer is nominated by the real estate developer, this then becomes consistent with JGN's proposed approach to de-energisation and re-energisation in other circumstances (for example, move-in/move-out customers). To the extent that it departs from this approach, the cost should be borne by the benefitting party, that being the real estate developer.

JGN included 'quoted works' costs. These costs were calculated as the difference between the RY2014 contractor rate and the 4-year mix contractor rate. JGN submitted that quoted works are costs associated with traffic control, night works, works on major roads, etc.⁴⁵ We consider that these costs are not new costs and are embedded in the historical data. This means there is a level of quoted costs already included and captured, most likely, in either 'restoration', 'materials, or 'other' cost categories. The inclusion of an additional amount for quoted costs is equivalent to proposing a step increase in these types of costs. We do not have evidence to support this as justification for a step increase in costs. The costs do not represent a change in regulatory obligation or circumstances more generally that would justify a step increase in 'quoted works'. As including an amount above that which is already embedded would be providing expenditure which is greater than that required, and so is inefficient, we have not included an amount for 'quoted works'.

JGN also proposed non-routine connection costs. Including non-routine connections costs would mean JGN would be recovering costs for non-routine connections through routine, basic or standard connections revenue,⁴⁶ providing JGN with more revenue than required for a prudent service provider acting efficiently.

JGN described non-routine connections as those costing more than \$200,000 or that involve, for example, steel work, connection of a large/contract customer, installation of secondary regulator sets/Cocons, directional drilling or boring.⁴⁷ We consider that the costs of a routine connection should be recovered via the revenue proposed in the Access Arrangement. We consider that non-routine connection costs should be recovered via contribution from the requesting customer, to the extent that the costs are incremental to a routine, basic or standard connection.⁴⁸ We do not consider that non-routine connection costs should be recovered from the customer base which would imply that the customer base is cross-subsidising those customers that request non-routine connections.

We have also not included additional expenditure for Metreteks for I&C connections and meter data loggers for medium density connections. We have also not included expenditure for related party margins. Given that expenditure for Metreteks, MDLs and

⁴⁵ JGN, Revised proposal, February 2015, fn. 172, p.50.

⁴⁶ JGN, Differentiating between Basic, Standard, and Negotiated Services, <<http://jemena.com.au/documents/gas/distinguishing-basic-and-standard.aspx>>, and JGN, Residential Connection Application.pdf, <<http://jemena.com.au/getattachment/1b097646-422c-458a-b0dc-de11c212304a/Residential-Connection-Application.aspx>> accessed 1 June 2015, p.2

⁴⁷ JGN, Response to AER information request 040 - Connections, received 22 October 2014, p.1.

⁴⁸ NGR, r. 119M.

related party margins are included in historical unit rates we have made no additional allowance for these in our alternative capex forecast.

6.4.2.1.2 I&C contract connection expenditure (Tariff D or demand connections)

I&C contract connections are major industrial customer connections. These customers use more than 10 TJ per year.⁴⁹

We do not accept JGN's revised I&C contract connections expenditure. This is because we do not consider it has been arrived at on a sufficiently reasonable basis and is the best estimate in the circumstances.

Consistent with our draft decision,⁵⁰ our alternate forecast of I&C connection expenditure is based on an average of historical I&C expenditure. In this final decision, we have updated our forecast by using 2013-14 actual data which provides for a five year average.⁵¹ By applying this forecasting method we have included \$9.3 million (\$2015, unescalated direct costs, excluding overheads) for I&C demand connections in our alternative capex forecast. This reflects an increase in the amount approved in our draft decision (\$7.9 million (\$2015, unescalated direct costs, excluding overheads)).⁵²

In its revised proposal JGN proposed a forecasting method comprised of a four year average of the separate mains, services and meter components.⁵³ We do not consider that separately forecasting I&C demand connections expenditure produces the best estimate in the circumstances. This is because there is considerable variation in I&C demand type of connections so to separately forecast components is likely to result in over or under estimation errors. This is consistent with the view expressed by JGN. It submitted that 'JGN does not forecast volumes and unit rates for new I&C Contract connections because they are infrequent and generally have unique characteristics'.⁵⁴

In our draft decision, we were not satisfied that JGN has sufficiently justified its forecast of I&C contract connection expenditure.⁵⁵ In its initial proposal JGN forecast I&C contract connections on a total expenditure basis. It proposed \$10.0 million (\$2015, unescalated direct costs, excluding overheads) over the 2015–20 access arrangement

⁴⁹ JGN, *2015-20 Access Arrangement Information*, June 2014, Appendix 6.7 Forecast capital expenditure report, p.14.

⁵⁰ AER, Draft decision, Jemena Gas Networks (NSW) Ltd Access arrangements 2015-20, November 2014, p. 6-25.

⁵¹ See AER, Draft decision, Jemena Gas Networks (NSW) Ltd Access arrangements 2015-20, November 2014, p. 6-25. For our draft decision we forecast I&C demand connections by applying an average of the 2009–13 actual expenditure. This was based on the most recent four years of actual data that JGN provided in the RIN template. We excluded the 2008-09 data point as it appeared to be inconsistent with the trend over the last four years of actual data.

⁵² AER, Draft decision, Jemena Gas Networks (NSW) Ltd Access arrangements 2015-20, November 2014, p. 6-25.

⁵³ JGN, *2015-20 Access Arrangement Response to the AER's draft decision & revised proposal*, February 2015, para 290, p.55.

⁵⁴ JGN, *2015-20 Access Arrangement Information*, June 2014, Appendix B to the Access Arrangement RIN response - Basis of preparation - CONFIDENTIAL, p.5.

⁵⁵ AER, Draft decision, Jemena Gas Networks (NSW) Ltd Access arrangements 2015-20, November 2014, pp.6-25-26.

period.⁵⁶ JGN did not provide the basis for the estimate in its proposal. In response to our request for further information, JGN stated it was JGN's business forecast for the year to March 2014 excluding an unusual one-off connection.⁵⁷ We did not receive information on the method used to forecast the 2014 forecast. We did however observe that the data in the RIN template indicates a 2013-14 estimate of \$0.5 million (\$2015, unescalated direct costs, excluding overheads). This was in contrast to costs in the forecast years which escalated from \$0.8 million to \$1.1 million (\$2015, unescalated direct costs, excluding overheads) between 2016 and 2020.

Customer contributions for connections

Where a connection is not a standard connection, as specified in the NGR and/or JGN's access arrangement, JGN can seek a contribution from the customer.⁵⁸

We do not accept JGN's proposed contributions expenditure \$19.5 million (\$2015) for connections. This is because we do not consider it to be the best estimate in the circumstances. Rather, we have included \$18.5 million (\$2015) in connections contributions.

JGN submitted in its initial proposal that it forecast its capital contributions by applying the eight-year average of the historically observed ratio of contributions to connections capex to forecast connections capex.⁵⁹

In our draft decision we agreed with this approach to calculating customer contributions, as revealed past data is likely to be the best indicator of future contribution rates. However, JGN did not apply an eight-year average consistently across all connection types. In applying an eight-year average across all connection types we calculated customer contributions of \$18.5 million.⁶⁰

In its revised proposal JGN submitted that it accepted that the eight-year average contribution rate should be applied to all categories of market expansion capex.⁶¹ However, it proposed averaging over the period 2005-06 to 2012-13.

In our final decision we have applied an 8-year average but used the averaging period 2006-07 to 2013-14, thereby using the most contemporary data. The amount is less than that proposed by JGN as the contributions scale with the number of connections.

6.4.2.2 Augmentation/Growth capacity

⁵⁶ JGN, *2015-20 Access Arrangement Information*, June 2014, Appendix A to the Access Arrangement RIN response - Regulatory templates (CONFIDENTIAL) [UPDATE].XLSM.

⁵⁷ JGN, Response to information request 40, received 22 October 2014, p.9.

⁵⁸ NGL, Part 12A, Part 21; JGN, *2015-20 Access Arrangement Information*, June 2014: 2015 Access Arrangement, Schedule 4 Reference Service Agreement; JGN, 2015 Reference Service Agreement, cl. 11.3(i) and (j).

⁵⁹ JGN, *2015-20 Access Arrangement Information*, June 2014, Appendix B to the Access Arrangement RIN response - Basis of preparation - CONFIDENTIAL, p. 37.

⁶⁰ AER, Draft decision, *Jemena Gas Networks (NSW) Ltd Access arrangements 2015-20*, November 2014, p.6-26.

⁶¹ JGN, Revised proposal, p.76.

Network augmentation capex is directed at increasing the capacity of the existing network to meet the demand of existing and future customers. Augmentation capex is required to maintain gas pressure and minimise the risk of gas outages.

We do not accept JGN's revised augmentation expenditure. We consider that the proposed augmentation is not justified. We have included \$83.5 million (\$2015, unescalated direct costs, excluding overheads) of augmentation capex in our capex forecast, which reflects an increase from our draft decision of \$80.6 million (\$2015, unescalated direct costs, excluding overheads).⁶²

In its revised proposal, JGN included \$87.0 million (\$2015, unescalated direct costs, excluding overheads) of augmentation expenditure, which reflects a decrease from their initial proposal of \$88.7 million (\$2015, unescalated direct costs, excluding overheads). JGN's revised proposal consists of the \$79.5 million (\$2015, unescalated direct costs, excluding overheads) of expenditure for the 82 projects which we accepted as prudent and efficient in the draft decision. It did not include two projects in its revised proposal (Park St, Sydney and Alexandria-Waterloo interconnection) but maintained that the other nine projects which we rejected as non-conforming in the draft decision were still required.

We considered the advice provided by our engineering consultant, Sleeman Consulting, in relation to JGN's revised augmentation expenditure. We agree with Sleeman Consulting that the \$83.5 million of capex we have included complies with r. 79(1) of the NGR for the following reasons:

- JGN's proposed augmentation solutions are justified in light of forecast connections growth to address a decline in gas pressure along the constrained network areas. We consider that the included project expenditure is justifiable under r. 79(2)(c)(i)-(iii) of the NGR as it is necessary to maintain the safety of services, maintain the integrity of gas services and/or comply with a regulatory obligation or requirement.
- the input costs of JGN's proposed augmentation projects are within a reasonable range and reflect that of a prudent and efficient service provider.

Of the nine re-proposed projects, we have included JGN's proposed expenditure for three of the projects on the basis that they meet the capex criteria.⁶³ These include:⁶⁴

- Woollooware Road Upgrade – consistent with Sleeman Consulting's advice, we are satisfied with JGN's updated forecast network pressures which indicate that the augmentation is required pre-winter of 2017 to maintain the minimum required pressures.
- Hoxton Park CDP (Yarrawa St) – we accept that augmentation is required at Hoxton Park based on new information provided by JGN. This includes load growth

⁶² AER, Draft decision, Jemena Gas Networks (NSW) Ltd Access arrangements 2015-20, November 2014, p.6-26.

⁶³ NGR r. 79(2)(c)(i)-(iii)

⁶⁴ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.3-8.

forecast for the Hoxton Park area and network pressure modelling submitted by JGN which indicated an adjacent market expansion project (Prestons/Edmonston Park CDP) will not provide sufficient capacity to meet the Hoxton Park requirements.

- Bradbury Stage 2 Expansion – we are satisfied based on the network pressure modelling provided by JGN that indicates that both Stage 1 and Stage 2 of the Bradbury Expansion are required to ensure minimum pressure requirements are met.

With respect to Unanderra, we accept JGN's proposal that eventually due to load growth the proposed project may be required. Due to the lead time associated with rail and roadway crossings we consider that it is prudent to commence the approval process. However, we do not consider that the work is required to be completed in the 2015–20 access arrangement period as it is unlikely that the load growth will be of a magnitude such that sub-minimum pressures are experienced. We therefore assessed that the proposed expenditure was not efficient. With a view to the approvals process proceeding we have therefore included \$0.1 million (\$2015, unescalated direct costs, excluding overheads) for regulatory years 2019 and 2020. We assess this to be the efficient amount of expenditure.

Our reasons for not approving capex for the residual five projects which JGN re-proposed are:

- For the Surry Hills Upgrade project, we are not satisfied that augmentation is required and the proposed solution is efficient. Based on the information before us, we do not consider that this project would be a prudent investment. Sleeman Consulting advised that the proposed project could not be reasonably justified based on the 'worst case' interruption scenario where this scenario consists of a supply interruption of 2 business days duration and would result in a gas supply curtailment of less than 10 GJ. The risk of unplanned interruption is also low as the area is already well developed and any subsurface work could reasonably be expected to be planned. We also note that it was not evident from the materials before us that JGN had considered alternative lower-cost solutions. As noted by Sleeman Consulting, this may include interconnection of network sections via Bowden Street.⁶⁵
- For the Haymarket project and the Sydney, Kent-Druitt Streets projects, we do not consider the projects are prudent and efficient. Consistent with the advice from Sleeman Consulting, these projects are not sufficiently justified on the basis of present load forecasts, which show that minimum operating pressures are not expected to be breached within the 2015-20 regulatory period.
- For the Kincumber 210 kPa CDP project, we consider that the project is not sufficiently justified on the basis of present load forecasts, which show that

⁶⁵ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.3-8.

minimum operating pressures are not expected to be breached. Furthermore, we also agree with Sleeman Consulting's advice that there are other security of supply-related initiatives worthy of prior consideration.

- For the Rockdale project, we do not consider it to be a prudent and efficient investment. We consider the project is not justified on the basis of present load forecasts, which show that minimum operating pressures are not expected to be breached. Furthermore, it is also not justified on a security of supply basis. The disruption scenario is based on damage to a pipeline that crosses Princes Highway and which supplies gas to an otherwise isolated section of the 210kPa network. We consider that as the Princes Highway crossing is in a congested area there is a low probability that proper planning would not be undertaken before subsurface work occurred. JGN did not demonstrate that it has considered lower-cost alternative solutions. Therefore, we are not satisfied that the proposed augmentation is efficient.

6.4.2.3 Mains and service renewal

Mains and service renewal expenditure is for replacement of low and medium pressure gas mains as they are reaching the end of their economic life. Replacement may be required to maintain safety, levels of reliability and when the operating and maintenance costs required for the mains or services are greater than the cost of replacement. The majority of renewal activity is planned. However, there is also a small amount of reactive or unplanned work that is required. This is typically for replacement of up to 250 metres of mains or individual services.⁶⁶ We consider that mains and services renewal expenditure is justified under rules 79(2)(c)(i)—(iv), on the basis that the capex is required to maintain safety and reliability, to meet minimum pressure obligations, and to be able to meet existing levels of demand.

We have accepted JGN's revised proposal of \$57.5 million (\$2015, unescalated direct costs, excluding overheads) of mains and service renewal expenditure in our capex forecast for our final decision. We consider that this is conforming capex for the following reasons:

- The amount includes twelve projects that we accepted in our draft decision. This was on the basis that they either have potential public safety implications if not completed in a timely fashion, or were justified as mains condition indicators showed the need for replacement.
- For five Wollongong/Coniston projects, we considered Sleeman Consulting's advice that the proposed costs are inefficient. Sleeman Consulting advised that the expenditure per kilometre should be toward the lower end of the presented range of project per kilometre costs.⁶⁷ This is because the project will be carried out

⁶⁶ JGN, *2015-20 Access Arrangement Information – Public*, 30 June 2014, Appendix 06.07 Forecast capital expenditure report - PUBLIC, p. 20.

⁶⁷ Sleeman Consulting, *Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects*, Report to Australian Energy Regulator, April 2015, pp. 18-9.

almost entirely by mains insertion rather than new mains laying and the customer density is low. Between only 0.5 to 2.2 per cent of total project length is expected to be new mains lay. However, on applying Sleeman Consulting's \$200,000 per kilometre cost we found that the cost differential was \$0.8 million.⁶⁸ Due to the immaterial difference between our forecast and JGN's we have accepted the proposed expenditure.

6.4.2.4 Mines subsidence

Expenditure in this category is required to manage and mitigate the effects on network assets of ground subsidence that can occur when mining takes place beneath or in the vicinity of those assets. It also includes the cost of monitoring the asset's condition where subsidence is anticipated and the monitoring leads to capital works. We are satisfied that mines subsidence expenditures are justified under rules 79(2)(c)(i) and (ii) on the basis that it is necessary to maintain the safety and integrity of gas services.

JGN claimed confidentiality over the amount of mines subsidence expenditure it has proposed.

Our final decision is unchanged from our draft decision, where we included JGN's proposed amount of mines subsidence expenditure in our capex forecast. JGN's proposed mines subsidence capex is for monitoring and rehabilitation of gas pipelines in the vicinity of Mallaty Creek Mines at Mallaty Creek, Appin.

In its revised proposal JGN submitted that it does not accept the contribution rate we applied in our draft decision for mines subsidence expenditure.⁶⁹ In the draft decision we applied the 2005-15 contribution rate to the forecast mines subsidence expenditure.⁷⁰ JGN did not set out its proposed contribution rate in its proposal, but for the contribution rate it included in its capex model.⁷¹ The rate it included was equal to the rate we applied in our draft decision. We have applied this rate in our final decision.

6.4.2.5 Facilities renewal and upgrade

Facilities renewal and upgrade expenditure is required to renew or upgrade facilities that pose integrity, workplace health and safety, capacity, regulatory compliance or similar issues or have reached the end of their economic lives.⁷²

We do not accept JGN's revised facilities renewal and upgrade expenditure. We assess that the proposed expenditure is not justified. We have included \$95.2 million

⁶⁸ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.18-9.

⁶⁹ JGN, revised proposal, February 2015, p.76.

⁷⁰ AER, Draft decision, p.33.

⁷¹ JGN, Submission on JGN 2015-20 access arrangement draft decision, 27 March 2015, Attachment K - updated appendix 4.1 - capex forecast model [CONFIDENTIAL].xls, tab ' Calc[Capex (RY)', cells U587:U590.

⁷² JGN, *2015-20 Access Arrangement Information – Public*, 30 June 2014, Appendix 06.07 Forecast capital expenditure report - PUBLIC, para 240, p. 57.

(\$2015, unescalated direct costs, excluding overheads) of facilities renewal and upgrade expenditure in our capex final decision.⁷³ We had regard to confidential material in coming to our position. This confidential material is set out in Appendix B.

In our draft decision we included \$95.3 million (\$2015, unescalated direct costs, excluding overheads)⁷⁴ We were not satisfied that eight of the 90 projects were justified. The eight projects consisted of expenditure for Zentec designs, in-line inspection costs for the Wilton to Horsley Park trunk pipeline and six projects on the Northern Trunk. The upgrade to the Northern Trunk depends on AGL's Gloucester Gas Project coming online leading to an increase in the operating pressure at the Newcastle end of JGN's Northern Trunk.⁷⁵

In its revised proposal, JGN included \$106.6 million (\$2015, unescalated direct costs, excluding overheads) in facilities renewal and upgrade expenditure. This reflects a decrease from its initial proposal of \$115.0 million (\$2015, unescalated direct costs, excluding overheads). It did not re-propose the Zentec design expenditure, submitting that it had now determined that the works are no longer required. However, JGN maintained that the other seven projects were still required.⁷⁶

Of the projects we have accepted, based on the advice provided by Sleeman Consulting⁷⁷, we are satisfied these projects are justified under rules 79(2)(c)(i)—(iv). This is on the basis that the capex is required to maintain safety, reliability, to meet minimum pressure obligations, and to be able to meet existing levels of demand.

In response to JGN's revised proposal, we assess that the in-line inspection costs for the Wilton to Horsley Park trunk pipeline is justified. On the basis of the advice from Sleeman Consulting we consider that, while unlikely, the possibility of stress corrosion conditions cannot be categorically discounted.⁷⁸ We therefore accept that it is prudent to carry out the in-line inspection work and that the proposed costs are efficient.

We have not included JGN's proposed expenditure for the six projects on the Northern Trunk. This is because we consider that the expenditure is not justified due to the lack

⁷³ The project amounts that we have approved in real \$2013 terms are unchanged from our draft decision. The amount we have approved in the final decision in real \$2015 terms is lower than the amount we approved in the draft decision. This is because we are applying inflation on JGN's regulatory year basis in the final decision rather than inflation on a financial year basis which applied in error in the draft decision.

⁷⁴ The project amounts that we have approved in real \$2013 terms are unchanged from our draft decision. The amount we have approved in the final decision in real \$2015 terms is lower than the amount we approved in the draft decision. This is because we are applying inflation on JGN's regulatory year basis in the final decision rather than inflation on a financial year basis which applied in error in the draft decision.

⁷⁵ AER, Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure, pp. 34-35.

⁷⁶ JGN, JGN response to the draft decision, February 2014, p.61.

⁷⁷ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.9-10.

⁷⁸ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, p.9.

of certainty that the increased pressures will eventuate such that the proposed expenditure will be required.

6.4.2.6 SCADA

This capex category includes SCADA and network control hardware and IT. SCADA systems are used to control and monitor station plant remotely via Remote Telemetry Units (RTUs). The monitoring includes instrumentation, pressure, temperature, flow, environmental monitoring and other event data. Facilities in this category monitor and control network assets, and contribute to the performance of core business functions including billing, gas despatch and distribution, and demand management.⁷⁹

We accept JGN's expenditure of \$9.5 million (\$2015, unescalated direct costs, excluding overheads) for SCADA. We did not accept JGN's proposed total SCADA amount in our draft decision but replaced it with \$3.2 million (\$2015, unescalated direct costs, excluding overheads). At that time, we were not satisfied that the GENE SCADA projects was justified and therefore did not include JGN's proposed expenditure in our capex forecast.

In its revised proposal JGN re-proposed its initial SCADA expenditure, including the GENE projects.⁸⁰ It submitted further information from the GENE system supplier in support of its proposed expenditure.⁸¹

We reviewed Sleeman Consulting's advice and agree with Sleeman Consulting that replacement of the GENE system is prudent.⁸² We assess that the proposed costs are efficient.⁸³ We consider that these SCADA projects are justified under rules 79(2)(c)(i)—(iv), on the basis that the capex is required to maintain safety, reliability, to meet minimum pressure obligations, and to be able to meet existing levels of demand.

6.4.2.7 Meter renewal and upgrade

We have accepted JGN's revised expenditure of \$148.4 million (\$2015, unescalated direct costs, excluding overheads) of meter renewal and upgrade expenditure in our final capex decision. We are satisfied that this meter renewal and upgrade capex complies with r. 79(2)(c)(ii) and (iii) of the NGR as it is required to maintain the integrity of gas services and meet the AS4944 regulatory requirements.

JGN initially proposed \$150.2 million (\$2015, unescalated direct costs, excluding overheads) of meter renewal and upgrade expenditure. In our draft decision we

⁷⁹ JGN, *2015-20 Access Arrangement Information – Public*, 30 June 2014, Appendix 06.07 Forecast capital expenditure report - PUBLIC, p. 64.

⁸⁰ JGN, JGN response to the draft decision, February 2014, p.74.

⁸¹ JGN, JGN response to the draft decision [CONFIDENTIAL], February 2014, pp.74-75.

⁸² Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, p.17.

⁸³ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, p.17.

included \$124.5 million (\$2015, unescalated direct costs, excluding overheads) of meter renewal and upgrade expenditure.⁸⁴ We assessed that four projects were not prudent — planned replacement of the Metretek system, planned replacement of Metretek devices, planned replacement of MDL equipment, and upgrade of MDL modems due to NBN rollout. We also assessed that two projects were not efficient — defective replacement of I&C gas meters and defective replacement of Mercury/Metretek equipment.⁸⁵

In support of the replacement of the Metretek central data collection system, JGN provided further information. We considered advice from Sleeman Consulting and assessed that the proposed replacement is prudent and efficient.⁸⁶ This is because we consider it is prudent to upgrade the "Power Spring" data management software within the 2015-20 access arrangement period due to the DC2009 data management software being unsupported from 2016.

For the planned replacement of Metretek devices, we considered and accepted advice from Sleeman Consulting that while the two versions of Metretek devices are not directly compatible with the NBN, an alternative to the replacement of the existing Metretek with an NBN compatible one, is the installation of an analogue telephone adapter.⁸⁷ Sleeman Consulting advised that this alternative would not unnecessarily compromise JGN's historic 'run to failure' strategy.⁸⁸ However, on applying the adjustment suggested by Sleeman Consulting we found that the cost differential was negligible. Due to the immaterial difference between our forecast and JGN's we have accepted the proposed expenditure.

For the upgrade of MDL modems due to NBN rollout, we considered and accepted Sleeman Consulting's advice that JGN's proposed expenditure for the upgrade of MDL modems to ensure NBN compatibility is prudent and efficient.⁸⁹

In relation to the defective replacement of I&C gas meters project, JGN proposed an increase in the volume of meters to be replaced. This was based on a forecast of 5.5 per cent compounding growth. This is notwithstanding that the rate of replacement dropped off considerably following a large increase between 2010 and 2012.⁹⁰ We

⁸⁴ AER, Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure, pp. 34-39.

⁸⁵ AER, Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure, pp. 34-39.

⁸⁶ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, p.14.

⁸⁷ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.12-13.

⁸⁸ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.13-14.

⁸⁹ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, p.16.

⁹⁰ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, p.11.

considered Sleeman Consulting's advice regarding the prudent and efficient volume of meters. This is based on fitting a logarithmic trend line which is a better fit than the linear trend line applied by JGN.⁹¹ However, on applying the adjustment suggested by Sleeman Consulting we found that the cost differential was \$0.1 million. Due to the immaterial difference between our forecast and JGN's we have accepted the proposed expenditure.

With respect to the defective replacement of Mercury/Metretek devices, JGN provided further information which indicates that full replacement of a Metretek device is required when a component fails. We considered and accepted Sleeman Consulting's advice that this was prudent and efficient expenditure.

6.4.2.8 Government authority work

Government authority work (GAW) is expenditure for relocating gas mains or facilities on government or private property.

We have accepted JGN's revised expenditure of \$2.5 million (\$2015, unescalated direct costs, excluding overheads) of GAW expenditure in our capex forecast. We are satisfied that GAW is justified on the basis of rule 79(2)(c)(iv), that is, to maintain the service provider's capacity to meet levels of demand for services existing at the time the capex is incurred.

In its revised proposal JGN proposed GAW capex of \$0.5 million per year. JGN submitted that 'while not stated explicitly in our initial proposal, JGN's proposed forecast of capex for GAW is in fact net of contributions'.⁹²

JGN's response to an information request indicated that the larger projects involving asset relocation on a third party's property is fully cost recovered. JGN submitted that there are legacy issues, where some assets are located on private property and are required to be moved at JGN's expense at the request of the property owner.⁹³ JGN provided data on these smaller JGN-funded relocations for regulatory years 2010 to 2015. We took an average of the amounts over the six years to arrive at our forecast of \$0.3 million per year. Due to the immaterial difference between our forecast and JGN's we have accepted the proposed expenditure.

In our draft decision we included \$1.8 million (\$2015, unescalated direct costs, excluding overheads), in response to JGN's initial proposal of \$2.5 million (\$2015, unescalated direct costs, excluding overheads) in GAW expenditure. This was because we were not satisfied that JGN's proposed amount of \$2.5 million (\$2015, unescalated direct costs, excluding overheads) was prudent and efficient because we were not satisfied that it is arrived at on a reasonable basis.⁹⁴ This is because JGN

⁹¹ Sleeman Consulting, Jemena Gas Networks, Revised 2015 Access Arrangement Submission, Review of Capex Forecasts for Selected Projects, Report to Australian Energy Regulator, April 2015, pp.11-12.

⁹² JGN, JGN response to the draft decision, February 2014, p.72.

⁹³ JGN, JGN response to AER information request AER JGN 055, received 27 April 2015.

⁹⁴ NGL, r.74(2)(a).

applied an upward trend in GAW costs but had not provided reasons for assuming that GAW would increase over the 2016-20 access arrangement period.

6.4.2.9 IT

IT capex includes projects to maintain and develop IT capacity and deliver improved IT capabilities to support business operations, including to achieve compliance with regulatory obligations. IT capex is required to support the operation of the network and associated business activities, such as billing and accounting.⁹⁵

We accept JGN's revised expenditure of \$131.6 million (\$2015, unescalated direct costs, excluding overheads). We accept that JGN's forecast of this amount has been arrived at on a reasonable basis.

In its revised proposal JGN submitted a further IT project to undertake the systems modifications required to undertake the AEMO approved B2B harmonisation project. As this is a regulatory obligation, we consider that the expenditure is justified.⁹⁶ We assess that it is efficient.

6.4.2.10 Other - non-network

This category includes expenditure for motor vehicles, property and other non-network capital items such as tools, furniture and office equipment. Non-network capex of this nature is required in order for JGN to efficiently manage and operate its network. We are satisfied that non-network capex is justified on the basis of rule 79(2)(c)(iv) of the NGR. It is necessary to maintain the service provider's capacity to meet levels of demand for services existing at the time the capex is incurred.

We have accepted JGN's revised expenditure of \$26.4 million (\$2015, unescalated direct costs, excluding overheads) for other non-network capex in our capex forecast.⁹⁷

In its initial proposal JGN included \$26.7 million (\$2015, unescalated direct costs, excluding overheads) for 'other - non-distribution'. We accepted this amount in our draft decision. We considered that it was prudent and efficient as it represented a 70 per cent decrease in expenditure compared with the current access arrangement period.

⁹⁵ JGN, *2015-20 Access Arrangement Information – Public*, 30 June 2014, pp. 62-63.

⁹⁶ NGR, r.79(2)(c)(iii).

⁹⁷ The project amounts that we have approved in real \$2013 terms are unchanged from our draft decision. The amount we have approved in the final decision in real \$2015 terms is lower than the amount we approved in the draft decision. This is because we are applying inflation on JGN's regulatory year basis in the final decision rather than inflation on a financial year basis which applied in error in the draft decision.

6.4.2.11 Total planning costs (TPC)/Front end engineering design (FEED) and related costs

Based on information provided by JGN, its proposed TPC/ FEED and related costs of \$5.0 million (\$2015, unescalated direct costs, excluding overheads) include the following costs:⁹⁸

- front end engineering and design (FEED) costs, including both internal Jemena and external design engineers and drafting resources
- site investigation costs, including geotechnical costs, pot-holing, survey
- project establishment costs, development of detailed project plans, schedules, risk assessments, etc.
- long lead item specifications, produced by design engineers (internal and/or external)
- tender documentation preparation, for detailed design, fabrication, construction and commissioning (either as separable or combined tenders)
- tender processes, including issuing and reviewing tenders.

We have not included this proposed expenditure for TPC/FEED costs and related costs in our capex forecast. This is because we consider that JGN has not provided evidence that the expenditure meets the capex criteria. In addition, based on the limited information available to us, there is some evidence that the expenditure for TPC/FEED is already included in JGN's proposal in other capex amounts which we have accepted. To include these direct costs therefore would result in double counting. For these reasons we consider that JGN's proposed TPC/FEED capital expenditure is not as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.⁹⁹

In its initial proposal JGN proposed \$5.6 million (\$2015, unescalated direct costs, excluding overheads) in its facilities renewal and upgrade category. JGN did not provide information on these costs in its initial proposal other than to describe them as planning costs. Based on this limited information at that time, we were not satisfied that these were a direct cost incurred in relation to facilities renewal and upgrade expenditure. We took the approach that these costs should be assessed in association with the planning costs proposed in the total overheads build up. This was on the understanding that total overheads were apportioned between capex and opex. Therefore, it followed that a proportion of the planning costs included in total overheads would be included in the capex overheads.

⁹⁸ JGN response to the draft decision, February 2014, p.72.

⁹⁹ NGR r.79(1)(a)

Our approach was premised on our understanding that total overheads were apportioned between capex and opex. This was because:

- In developing the draft RIN templates, including the overheads template, in consultation with JGN, JGN indicated that it would be applying the same method to forecast capex overheads which it had in the 2010-15 access arrangement proposal.
- The overheads template agreed to and issued as the final RIN template reflected the methodology which JGN applied for forecasting capex overheads in its 2005-16 access arrangement proposal.
- In its initial proposal, JGN indicated that its treatment of overhead allocation and capitalisation was detailed in its Access Arrangement RIN response.¹⁰⁰ The Access Arrangement RIN response setting out the flow of the apportionment of total overheads to capex and opex was unchanged from that issued in the final RIN. JGN did not set out any alternative forecast method for its overhead expenditure in its initial proposal.

We assessed the total proposed planning costs, that is, the amounts included in overheads plus the amounts proposed to be included in the facilities renewal and upgrade category. We reviewed the forecast trend in expenditure against the historical trend and observed that planning costs were relatively stable over the 2007-13 period, which was the period of data available.

Our assessment revealed that the \$5.6 million of planning costs proposed under facilities renewal and upgrade expenditure for the 2015-2020 access arrangement period would be a 66 per cent increase in planning costs. We considered that this increase was not consistent with the only incremental changes in the size and complexity of the JGN network and we had no evidence before us to suggest that there were any changes in obligations which would impact planning requirements. As a result, in our draft decision we did not include the increase in forecast planning costs, which JGN proposed to include in the facilities renewal and upgrade category.

On meeting with JGN following our draft decision JGN informed us that it did not forecast overheads by applying a proportional allocation of total overheads to capex. JGN indicated that the network planning and network control and operational switching (system planning) expenditure lines in the total overheads build up were allocated entirely to opex.¹⁰¹ Further assessment by us also revealed that the TPC/ FEED and related costs were project specific costs for front end planning, engineering design and costs associated with tendering projects. JGN indicated that it collects these FEED and related costs together rather than charging the costs directly to individual projects.¹⁰² It

¹⁰⁰ JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014, Appendix 06.07 Forecast capital expenditure report - PUBLIC, p.51.

¹⁰¹ JGN, Email 'JGN AA review: meetings scheduled for Jan/Feb 15', received 16 January 2015, AER meeting 16 Jan 15 - Capex.pdf, p.18.

¹⁰² JGN, Revised proposal, February 2015, p. 63.

submitted that the steel and facilities components relate primarily to moderate and high complexity facilities renewal and refurbishment projects while the plastic component relates primarily to rehabilitation projects in the mains and services renewal category.¹⁰³

This new information required us to reconsider the approach we had taken in our draft decision to assessing these costs. Accordingly, we informed JGN that if these costs are direct costs then they needed to be included in the project cost build ups for assessment, consistent with the RIN template requirements.¹⁰⁴ This is because as a direct cost, these costs would vary with the complexity of the project and in some instances constitute a significant proportion of total direct costs. If they are not presented in the direct costs of the project cost build up, the project costs are necessarily downwardly biased. This has implications for any assessment of the efficiency of a project. A project may appear to be efficient without these costs being included but inefficient if they are included. When assessing efficiency all direct costs associated with the project need to be taken into account.

In its revised proposal JGN included \$5.0 million (\$2015, unescalated direct costs, excluding overheads) for TPC/FEED and related costs.

JGN was required to provide these costs in the RIN in order for these direct costs to be assessed for efficiency. Specifically, it did not submit information on the projects to which the FEED and related costs pertain and the associated quantum of FEED and related costs for that project. As a result, JGN in its revised proposal did not provide evidence to support the efficiency of the total proposed expenditure.

We reviewed the information available to us to assess whether there was any evidence other than that provided in the revised proposal on which we could reach a conclusion that this proposed expenditure, now identified as direct costs, might be efficient and prudent. In its initial proposal, JGN had provided opportunity briefs and feasibility estimates in support of its proposed project costs which variously included engineering assessment, FEED and related costs and detailed design costs.¹⁰⁵ In some instances these costs are clearly included in the amounts entered into the capex model.

Our assessment of this information revealed some evidence that these costs are captured already in other parts of opex and capex:

- in discussions with JGN, it indicated that engineering design costs are one of the costs captured in its 'non-labour recoveries' direct overheads.¹⁰⁶

¹⁰³ JGN, Revised proposal, February 2015, p. 63.

¹⁰⁴ AER, File Note: Jemena Gas 2014 - multiple issues addressed - other - Meeting with AER and JGN - 16 January 2015, January 2015 (AER15/2781).

¹⁰⁵ For example see JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014: C411 - 65 PPM Thin Wall Mitigation OB May 2013.pdf and C424 - 37 Windsor TRS Upgrade OB May 2013.pdf.

¹⁰⁶ AER, File Note 'Meeting with AER and JGN 28 April 2015', 28 April 2015, AER15/2804.

- in some FEED and related costs sections JGN includes a reference to 'AMP Planned Maintenance'.¹⁰⁷ The costs of asset management plans (AMPs) are included in opex.¹⁰⁸
- the management fee paid to Zinfra is for management services including scoping, estimating and scheduling; procurement and logistics; contract management; subcontractor management; quality management; risk management; environmental management; health and safety management; reporting, record keeping and record management; emergency response management and incident investigations; and any other management services required to complete the contract work.¹⁰⁹

Our assessment reveals that it is likely that the FEED and related costs being proposed are being recovered in other parts of its capex and opex proposal. To include these direct costs therefore would result in double counting.

We further note that JGN made clear that FEED and related costs do not apply for some projects. For example, in the section for FEED and related costs JGN included the following:

- FEED N/A for medium pressure main¹¹⁰
- FEED N/A for secondary main¹¹¹.

Accordingly, we are not satisfied that these proposed costs meet the capex criteria and have not included them in our capex forecast.

6.4.2.12 Overheads

Overheads are costs which are not directly attributable to the distribution businesses output but are necessary to support the businesses operations. Examples of overhead costs include network planning, procurement and human resources.

We have not included JGN's proposed overheads expenditure of \$125.7 million (\$2015, unescalated costs) in our alternative forecast of total capex. This is because we consider that it does not represent the efficient costs that a prudent operator would require to achieve the capex criteria.¹¹² Instead we have included \$115.2 million (\$2015, unescalated costs) for overheads in our alternative capex forecast for the

¹⁰⁷ JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014: SCADA - 10 JGN OSI HW Rep OB May 20141.pdf

¹⁰⁸ JGN, Email 'JGN AA review: meetings scheduled for Jan/Feb 15', received 16 January 2015, AER meeting 16 Jan 15 - Capex.pdf, p.18.

¹⁰⁹ JGN, Access arrangement proposal, June 2014, Appendix 04.1 JGN's pipeline service delivery model - CONFIDENTIAL.pdf, para 38. Fn 8, p.9.

¹¹⁰ JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014: C414 - 102 Ourimbah CDP OB Mar 2014.pdf.

¹¹¹ JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014: C414 - 104 Edmonston Park 1B - OB Mar 2014.pdf.

¹¹² NGR. r. 79(1)(a) and r. 74(2).

2015-20 access arrangement period (see Table 6.9). We had regard to confidential material in coming to our position. This confidential material is set out in Appendix B.

Table 6.9 AER capitalised overheads expenditure included in alternative capex estimate (\$000s, real 2014-15)

	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Direct overheads	7.5	7.1	7.1	6.6	6.1	34.4
Network overheads	15.4	15.2	15.3	15.0	14.6	75.5
Corporate overheads	1.1	1.1	1.1	1.1	1.1	5.4
Total overheads	24.0	23.4	23.5	22.6	21.8	115.2

Source: AER analysis.

Network and corporate overheads

We do not accept JGN's revised expenditure of \$89.7 million (\$2015, unescalated costs). We have included \$80.9 million (\$2015, unescalated costs) for network and corporate overheads in our alternate capex forecast.

Our final decision on capitalised network and corporate overheads applies a modified base-step-trend approach, similar to what was applied in the Victorian Gas Access Arrangement Review 2013-17, specifically for Envestra and SP AusNet.¹¹³ In this decision, we have taken an average of the past three years of network and the past four years of corporate overheads data to derive a base year. For each forecast year of the access arrangement period, we have scaled the variable component of these overheads by the size of the capex program and then applied a real cost escalation to the total overhead amount. We consider that the estimate of \$80.9 million (\$2015, unescalated costs) was arrived at on a reasonable basis and represents the best estimate in the circumstances. This reflects a reduction in our draft decision where we included \$90.3 million in network and corporate overheads.¹¹⁴

The reason for our change in position is that our draft decision was based on the understanding that total overheads were apportioned between capex and opex. It was on this basis that we accepted JGN's choice of 2013-14 base year from which to forecast network and corporate overheads. Based on the historical trend for these of total overheads, a 2013-14 base year seemed reflective of the general trend for these overheads overtime.

¹¹³ AER, Access Arrangement Final Decision, SPI Networks (Gas) Pty Ltd 2013-17, Part4: Confidential appendix, March 2013; AER, Access Arrangement Final Decision, Envestra (Gas) Networks 2013-17, Confidential appendix, March 2013.

¹¹⁴ AER, Draft decision, Jemena Gas Networks (NSW) Pty Ltd, Access arrangement 2015-20, Attachment 6: Capital Expenditure, November 2014, p. 6-44-5.

In our draft decision, we also found that network and corporate overheads amount of \$144.4 million allocated across the capex driver categories did not reconcile with the \$93.1 million category build up for capex network and corporate overheads. It was unclear to us what the additional \$51.3 million allocated across capex driver categories represented as the linkage between key spreadsheets was hardcoded.¹¹⁵ JGN submitted that the \$51.3 million was for direct overheads. In our draft decision we included \$18.7 million in direct overheads (based on an average of 2012-13 and 2013-14 years) in recognition that JGN may have incurred these overheads.¹¹⁶

In its revised proposal, JGN repropoed 2013-14 as a base year from which to apply their modified base step and trend method of estimating network and corporate overheads over the regulatory period. Further, after the draft decision, based on correspondence with JGN, we were alerted to the fact that JGN had changed their overhead allocation methodology from the method which we understood was being applied by JGN when we were developing its RINs in consultation with JGN.¹¹⁷ This had not been conveyed in its initial proposal. In particular, JGN did not convey that they now did not apportion network and corporate overheads between capex and opex but instead had specific overhead cost builds up for capex and opex.

This new information necessarily required a reassessment of JGN's revised proposal for network and corporate overheads. To assess the efficiency of JGN's proposed network and corporate overheads amount, we had to come to the amount that is specific to capex. We verified the capex network and corporate overheads for regulatory years 2010-11 to 2013-14, as well as direct costs for regulatory years 2012-13 to 2013-14.¹¹⁸ The historical trend using these verified overhead amounts showed that 2013-14 was not a representative year.¹¹⁹ Overheads were significantly higher in that year compared to all others.¹²⁰ We note a decrease in overheads would be

¹¹⁵ AER, Draft decision, Jemena Gas Networks (NSW) Pty Ltd, Access arrangement 2015-20, Attachment 6: Capital Expenditure, November 2014, p. 6-44-5.

¹¹⁶ AER, Draft decision, Jemena Gas Networks (NSW) Pty Ltd, Access arrangement 2015-20, Attachment 6: Capital Expenditure, November 2014, p. 6-44-5.

¹¹⁷ JGN, Email 'JGN AA review: meetings scheduled for Jan/Feb 15', received 16 January 2015, AER meeting 16 Jan 15 - Capex.pdf, p.12.

¹¹⁸ JGN, Response to AER information request AER JGN 062, received 8 May 2015, 150505 AER information request to JGN AER JGN 062 Network and Corporate - JGN edits.xls; JGN only provided two years of historical data to us.

¹¹⁹ In our expenditure forecasting assessment guideline (AER, Better Regulation, Explanatory Statement, Expenditure Forecast Assessment Guideline, November 2013, p.11) we set out that in applying the base-step-trend approach, we typically use the actual expenditure in a base year (usually the fourth year of the current regulatory period) as the starting point for base expenditure if the NSP was subject to an efficiency benefit sharing scheme (EBSS). However, if there was no efficiency sharing mechanism in place, we assess the components of a NSP's base expenditure in more detail. If necessary, we remove inefficiencies and non-recurrent costs from actual expenditure in the base year. We also use various forms of benchmarking, such as ratio and trend analysis, to inform our assessment of the expenditure forecasts.

¹²⁰ We observe that there has been a stable horizontal trend in total capex overheads until regulatory year 2012. From regulatory years 2012 to 2014 there has been significant growth in total overheads. There is considerable variability in the four years of data available to us for JGN's network overheads. There is a significant step up in

expected over the regulatory period due to Zinfra's management costs benchmarking favourably against those of JAM, and cost shifting from overheads to direct costs (under the management arrangement, Zinfra's costs are defined as direct costs (contractor costs)).

We informed JGN of our position (that is, to not use 2013-14 as the base year), and indicated that we will be applying the approach used in the Victorian Gas Access Arrangements Review.¹²¹ In the Victorian Gas Access Arrangement Review we calculated the base year by applying the average over the previous years.¹²² In response JGN indicated that 2013-14 should be the base year used, rather than averaging using 2011-12 to 2013-14.¹²³ This was on the basis that 2011-12 was under a different organisational structure and that 2012-13 was a transition year to the new organisational structure.¹²⁴ On the basis of the information we have before us we consider that overheads should be lower rather than higher under the new organisational structure. One of the reasons for this is that where JAM was managing the network under the previous organisational structure, under the new organisational structure Zinfra is managing the Southern Region. Zinfra is treated as an independent contractor and so its costs are captured in direct costs.¹²⁵ This represents a shift of costs previously classified as overhead costs to direct costs. JGN also submitted that 2013-14 is likely to be a more representative year as there may have been a misallocation of costs due to 2012-13 being the first year that their accounting systems were in place.¹²⁶ We do not agree with JGN's view as the system of cost allocation was introduced much earlier than 2012-13 (in 2009), and no changes in the system allocation of overheads would be expected based on their outsourcing arrangements.¹²⁷

Therefore, we have forecast capitalised network and corporate overheads over the regulatory period by:

- separately forecasting network and corporate overheads

corporate overheads from 2013. There is a significant increase in direct overheads between the two years of data JGN made available to us for direct overheads.

¹²¹ AER, Email ' RE: Information requests: AER JGN 061 - Connections and AER JGN 062 - Network and corporate overheads', sent 5 May 2015.

¹²² AER, Access Arrangement Final Decision, SPI Networks (Gas) Pty Ltd 2013-17, Part4: Confidential appendix, March 2013; AER, Access Arrangement Final Decision, Envestra (Gas) Networks 2013-17, Confidential appendix, March 2013.

¹²³ JGN, Response to AER information request AER JGN 062, received 8 May 2015, p.2.

¹²⁴ JGN, Response to AER information request AER JGN 062, received 8 May 2015, p.2.

¹²⁵ See unit rate derivation for connections - JGN, Revised proposal, February 2015, Appendix 4.2 - JGN market expansion unit rate derivation model - CONFIDENTIAL, tab 'Output|TCE', which sets out the inclusion of the Zinfra management fee and margin in the unit rates, captured as direct costs in the capex model.

¹²⁶ JGN, Revised proposal, February 2014, Appendix 04.10 Capitalised overheads [CONFIDENTIAL].pdf, para 42, p.9.

¹²⁷ JGN, 2015-20 Access Arrangement Information – Public, 30 June 2014, Appendix I to the AA RIN response - Jemena cost allocation policy and methodology CONFIDENTIAL, p.25.

- averaging overheads over the three years of past overheads data for network overheads and four years of data for corporate overheads to derive the respective network and corporate overheads to derive the respective network and corporate overhead base years;
- identifying the variable and fixed overhead amounts by applying JGN's nominated variable fixed split for network and corporate overheads;
- scaling the variable components by the forecast change in the size of the capex program from year to year;
- applying to the total amount (base and variable component) our forecast of real cost escalation.

Direct overheads

We do not accept JGN's revised expenditure of \$36.0 million (\$2015, unescalated costs). This is because we do not consider that JGN's choice of base year produces the best estimate in the circumstances and is not efficient. We have included \$34.4 million (\$2015, unescalated costs) for network and corporate overheads in our capex forecast.

Our estimate of direct overheads is forecast by applying the same modified base-step-trend approach that we used to forecast network and corporate overheads. It uses 2013 and 2014 direct overheads data provided by JGN. JGN indicated that they were unable to provide any other historical data based on system limitations.¹²⁸ It is relevant to note that JGN did not explicitly propose direct overheads in its initial proposal. As stated above, JGN submitted that the \$51.3 million discrepancy between network and corporate overheads across capex drivers and the category build up for capex network and corporate overheads was due to direct overheads.

In response to AER inquiries, JGN indicated that forecast direct overheads was derived by applying the share of direct overheads in the Singaporean financial year 2013 by the direct capex in financial year 2013.¹²⁹

In its revised proposal JGN applied the same base-step-trend approach used to forecast network and corporate overheads (proposing 2013-14 as a base year and then applying real cost escalation).¹³⁰ We do not consider that applying this method to forecast direct overheads for the regulatory period would result in the best estimate in the circumstances. In particular:

- we do not consider costs (which include depot costs and warehousing costs) scale in proportion with direct capex;

¹²⁸ JGN, Response to information request 43a, received 4 November 2014.

¹²⁹ JGN, Response to AER information request – AER JGN 056 – Overheads, received 8 May 2015, p.5.

¹³⁰ JGN, Response to information request 43a, received 4 November 2014.

- we are not satisfied that using the further data provided by JGN after the draft decision would result in a sufficiently robust estimate. Upon requesting previous years' data to assess the trend in direct overheads, JGN provided budget data for April 2011 to March 2012 and nine months of data for unaudited 2014-15.¹³¹

Based on the information available to us, we consider that our alternate estimate of applying the same modified base step trend approach that we used to forecast network and corporate overheads based on an average of 2013 and 2014 direct overheads, which is based on actual audited expenditure amounts for 2013 and 2014, is the best estimate in the circumstances.

6.4.3 Adjustments to labour and material escalation

We have substituted our estimate of the labour and material escalation in place of that proposed by JGN.

With respect to labour escalation, on review of our draft decision, we have identified that applying the opex rate of change to escalate the labour component of approved capex, is not the best estimate in the circumstances. We consider that an average of Deloitte Access Economics (DAE) and BIS Shrapnel's utilities WPI labour forecasts represents the best forecast of the labour price.¹³² The reasons for this are set out in Attachment 7 of this decision and also in our Draft Decision.¹³³

We conveyed our intention to JGN of escalating the labour component of approved capex by the average of DAE and BIS Shrapnel's labour price rather than the opex rate of change. In response, JGN maintained its initial position that labour escalation should be based on BIS Shrapnel forecast of the labour price. They also queried our discretion under rule 91 and 76 of the NGR.¹³⁴

We do not consider that a labour escalation based on BIS Shrapnel's forecast is the best estimate of the labour price in the circumstances. We consider our alternate estimate of Deloitte Access Economics (DAE) and BIS Shrapnel's utilities sector is the best forecast of the labour price.¹³⁵ We consider it is within our discretion to choose this alternative estimate. This approach is consistent with the labour escalation we applied in our Final Decision on TransGrid's transmission determination for 2015-16 to 2017-

¹³¹ JGN, Response to AER information request – AER JGN 056 – Overheads, received 8 May 2015, p.5.

¹³² BIS Shrapnel, Real labour and material cost escalation forecasts to 2019/20 – Australia and New South Wales, February 2015, p. iii; Deloitte Access Economics, Forecast growth in labour costs in NEM regions of Australia, 23 February 2015, p. 9.

¹³³ AER, JGN Draft Decision, p. 7-54.

¹³⁴ AER JGN 057, Information request, 4 May 2015.

¹³⁵ BIS Shrapnel, Real labour and material cost escalation forecasts to 2019/20 – Australia and New South Wales, February 2015, p. iii; Deloitte Access Economics, Forecast growth in labour costs in NEM regions of Australia, 23 February 2015, p. 9.

18.¹³⁶ We note that adopting the average of DAE and BIS's labour price will provide for a higher escalation compared to applying the opex rate of change.

With respect to materials escalation, we have revised JGN's proposed materials escalation to nil real. This is discussed in the capex attachment at appendix A.6 of the AER's draft decision.

¹³⁶ AER, Final Decision. TransGrid transmission determination 2015-16 and 2017-18, April 2015.

A Appendix: Real material cost escalation

Real material cost escalation is a method for accounting for expected changes in the costs of key material inputs to forecast capex. The materials input cost model submitted by JGN includes forecasts for changes in the prices of commodities such as aluminium, brass, concrete, plastic and steel, rather than the prices of physical inputs themselves (for example, pipes and meters) which are the inputs directly sourced by JGN in the provision of its network services.

A.1 Position

We are not satisfied that JGN's revised proposed real material cost escalators (leading to cost increases above CPI) which form part of its total forecast capex are arrived at on a reasonable basis, and are the best forecast possible in the circumstances. We therefore do not consider that the forecast capex meets the capital expenditure criteria of clause 79(1) of the NGR. We maintain our view, as set out in our draft decision, that zero per cent real cost escalation is more likely to be consistent with the capex criteria, which requires capital expenditure be such as would be incurred by a prudent service provider, acting efficiently, to achieve the lowest sustainable cost of providing services.¹³⁷

Consistent with our position in the draft decision, our approach to real materials cost escalation does not affect the proposed application of labour escalators which apply to JGN's forecast capital expenditure.

A.2 JGN's revised proposal

In its revised proposal, JGN has applied the same material cost escalators to various asset classes proposed in its initial regulatory proposal submitted in June 2014.¹³⁸ Table A-1 shows the revised material cost escalators calculated for JGN by BIS Shrapnel¹³⁹.

Table A-1 JGN's revised real materials cost escalation forecast—inputs (per cent)

	2015–16	2016–17	2017–18	2018–19	2019–20
Aluminium	16.6	1.9	5.1	3.7	-11.0
Brass	12.7	0.5	2.9	2.0	-12.0
Steel	9.2	-1.3	3.7	3.7	-11.1

¹³⁷ NGR, clause 79.

¹³⁸ JGN, *Revised Access Arrangement Proposal, Appendix 5.1 BIS Shrapnel Updated cost escalators for JGN (Public)*, February 2015.

¹³⁹ BIS Shrapnel, *Updated cost escalators for JGN (Public)*, February 2015, p. iv.

	2015–16	2016–17	2017–18	2018–19	2019–20
Plastic	0.2	1.4	4.2	3.1	-7.6
Concrete	1.9	2.6	-0.7	-2.0	-1.3

Source: JGN, *Revised Access Arrangement Proposal, Appendix 5.1 BIS Shrapnel Updated cost escalators for JGN (Public)*, February 2015.

BIS Shrapnel commodity forecasts are converted into Australian dollars using its own in-house methodology based on three key drivers; commodity price forecasts, interest rate differentials between Australia and the United States and the VIX volatility index.¹⁴⁰

Details of JGN's approach to forecasting escalation are set out in our draft decision.¹⁴¹ The weight applied to each escalator in each distribution capex category was derived from an analysis of the actual split for JGN's financial year ending 31 March 2013 in consultation with project managers and key personnel.¹⁴²

In its revised proposal, JGN rejected the AER's findings on material cost escalation because:¹⁴³

- it considers its consultant BIS Shrapnel to be a respected economic forecaster and that their updated forecasts are best estimates in the circumstances in accordance with NGR 74(2)
- quantifying the relationship between final prices and the underlying inputs is not practical. JGN stated that putting together a long enough time series of prices of physical assets to make it amenable to econometric modelling, in order to numerically estimate the relationship, is almost impossible, and
- the methodology based on weighted average of input costs has previously been accepted by the AER¹⁴⁴. JGN stated that it believes that the AER should be consistent in applying its approach and approve its input cost methodology for deriving material cost escalation forecasts.

In its report to JGN, BIS Shrapnel stated that its forecasts of the relevant inputs (commodities) are based on Consensus Economics forecasts and therefore it considers them to be robust. BIS Shrapnel also stated that Consensus Economics

¹⁴⁰ JGN, *Revised Access Arrangement Proposal, Appendix 5.1 BIS Shrapnel Updated cost escalators for JGN (Public)*, February 2015, pp. A5-7.

¹⁴¹ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, p. 6-49.

¹⁴² JGN, *2015-20 Access Arrangement Information (Public)*, 30 June 2014, p. 68.

¹⁴³ JGN, *2015-20 Access Arrangement, Response to the AER's draft decision and revised proposal*, February 2015, p. 85.

¹⁴⁴ AER, *Draft Decision, SP AusNet Transmission Determination 2014/15 to 2016/17*, August 2013, p.67.

forecasts are effectively an average of a number of independent forecasts and consequently represent the most reliable forecasts.¹⁴⁵

BIS Shrapnel's report also stated that quantifying the relationship between final prices and the underlying inputs is not practical. BIS Shrapnel considered that constructing a long enough time series of prices of physical assets to make it amenable to econometric modelling, in order to numerically estimate the relationship, is almost impossible. BIS Shrapnel stated that to the best of its knowledge, there are no published data on polyethylene pipe prices. BIS Shrapnel submits that the lack of readily available historical data combined with an absence of a futures market for equipment typically installed on a gas distribution network compelled it to use an input cost model to generate forecasts of polyethylene pipe prices.¹⁴⁶

A.3 Reasons

We must be satisfied that a forecast is based on a sound and robust methodology in order to accept that JGN's proposed total capex conforms with the capex criteria¹⁴⁷ and are arrived at on a reasonable basis, and are the best forecast possible in the circumstances.¹⁴⁸ Further details about our assessment approach were set out in the draft decision.¹⁴⁹ In making our assessment, we do recognise that predicting future materials costs for gas service providers involves a degree of uncertainty. However, for the reasons set out below, we are not satisfied that the materials forecasts provided by JGN satisfy the requirements of the NGR. Accordingly, we have not accepted it as part of our substitute estimate in our final decision on total forecast capex. We are satisfied that zero per cent real cost escalation is consistent with the capex criteria and this has been taken into account into our substitute estimate.

This conclusion is based on the following:

- the degree of potential inaccuracy of commodities forecasts
- there is little evidence to support how accurately JGN's materials escalation model forecasts reasonably reflect changes in prices paid by JGN for physical assets in the past and by which we can assess the reliability and accuracy of its materials model forecasts; and
- there is insufficient supporting evidence to show that JGN has considered whether there may be some material exogenous factors that impact on the cost of physical inputs.

¹⁴⁵ JGN, *Revised Access Arrangement Proposal, Appendix 5.1 BIS Shrapnel Updated cost escalators for JGN (Public)*, February 2015, p. ii.

¹⁴⁶ JGN, *Revised Access Arrangement Proposal, Appendix 5.1 BIS Shrapnel Updated cost escalators for JGN (Public)*, February 2015, p. ii.

¹⁴⁷ NGR, clause 79(1).

¹⁴⁸ NGR, clause 74(2).

¹⁴⁹ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, pp. 6-49-50.

The weight of the information clearly evidences that there is a real potential for inaccuracy in commodity forecasts. This possibility in conjunction with the lack of evidence in support of JGN's forecasts is such that we cannot conclude with a sufficient degree of certainty that commodity forecasts are either accurate or likely to be accurate. We associate this possibility with a real risk that consumers would pay more than JGN's costs for its physical assets if we were to accept its material cost escalation.

Our decision not to accept JGN's material cost escalation means that JGN's real costs will be escalated annually by no more than CPI under its tariff variation mechanism. As part of its tariff variation mechanism, by default CPI ensures that JGN's increased costs generally will be taken into account. This is not to suggest that CPI measures are a proxy for the movement in the prices of JGN's physical assets. We acknowledge that CPI is directed at measuring changes in the price of a basket of goods and services which account for a high proportion of expenditure by the CPI population group (that is, metropolitan households); it does not measure the movement in the prices paid for the physical assets purchased by network service providers. However, the CPI provides for a necessary degree of certainty for JGN and consumers that a measured and well understood basis for increasing JGN's costs is reflected in its revenue and prices. By contrast, the degree of possible inaccuracy of commodities' forecasts is such that it is not reasonable to use commodities' forecasts, in addition to CPI, to reflect changes in the prices paid by JGN for assets. Commodities' forecasts do not display the same level of rigour as CPI to satisfy us that consumers should incur additional costs above CPI. In reaching this conclusion, we have had regard to the capital expenditure criteria of the NGR that JGN's capital expenditure must be such as would be incurred by a prudent service provider acting efficiently to achieve the lowest sustainable cost of providing services.¹⁵⁰ We consider that if we were to apply JGN's material costs escalation, there is a possibility that it will recover in excess of its efficient costs. This, combined with an absence of evidence to support a conclusion that it would be in the long term interests of consumers to incur prices that reflected more than the CPI, were fundamental to our conclusion.

We received a submission from the Energy Markets Reform Forum (EMRF) which stated that it does not support JGN's forecast of real increases in costs for materials and considers the AER's assumption of a CPI increase in the cost of materials is reasonable.¹⁵¹ In its submission, the EMRF also rejected JGN's comments about currency movements and the effect this has on commodity costs for the network. The EMRF submitted that a prudent network would be expected to hedge its exposures to currency movements, and given that the movements in commodity prices are very

¹⁵⁰ NGR, clause 79(1)(a).

¹⁵¹ The Energy Markets Reform Forum, *NSW Gas Distribution Revenue Reset Draft Decision by the Australian Energy Regulator on Jemena's Gas Networks Access Arrangement - A response by The Energy Markets Reform Forum*, March 2015, p. 51.

substantial, an assumption of no real price increases is not only more preferable but also a more realistic forecast.¹⁵²

In the following discussion, we have addressed the points raised by JGN in its revised regulatory proposal.¹⁵³

Robust real materials cost escalation

We acknowledge that businesses use forecasts for planning and budgeting purposes. However, we are not satisfied that JGN's proposed materials forecasts are based on a sound and robust methodology, and accordingly, consider that it does not conform to the capex criteria.¹⁵⁴ Our conclusion is based on the degree of potential inaccuracy of commodities forecasts and the paucity of evidence to support how accurately JGN's materials escalation model forecasts reasonably reflect changes in prices paid by JGN for physical assets in the past.

As we stated in our draft decision, our view on the potential inaccuracy of commodities forecasts is informed by:¹⁵⁵

- recent studies which show that forecasts of crude oil spot prices based on futures prices do not provide a significant improvement compared to a 'no-change' forecast for most forecast horizons, and sometimes perform worse¹⁵⁶
- evidence in the economic literature on the usefulness of commodities futures prices in forecasting spot prices is somewhat mixed. Only for some commodities and for some forecast horizons do futures prices perform better than 'no change' forecasts;¹⁵⁷ and
- the difficulty in forecasting nominal exchange rates (used to convert most materials which are priced in \$US to \$AUS). A review of the economic literature of exchange

¹⁵² The Energy Markets Reform Forum, *NSW Gas Distribution Revenue Reset Draft Decision by the Australian Energy Regulator on Jemena's Gas Networks Access Arrangement - A response by The Energy Markets Reform Forum*, March 2015, p. 51.

¹⁵³ JGN, *2015-20 Access Arrangement, Response to the AER's draft decision and revised proposal*, February 2015, p. 85.

¹⁵⁴ NGR, clause 79(1).

¹⁵⁵ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, pp. 6-50-58.

¹⁵⁶ R. Alquist, L. Kilian, R. Vigfusson, *Forecasting the Price of Oil*, Board of Governors of the Federal Reserve System, International Finance Discussion Papers, Number 1022, July 2011 (also published as Alquist, Ron, Lutz Kilian, and Robert J. Vigfusson, 2013, *Forecasting the Price of Oil*, in *Handbook of Economic Forecasting*, Vol. 2, ed. by Graham Elliott and Allan Timmermann (Amsterdam: North Holland), pp. 68-69 and pp. 427-508) and International Monetary Fund, *World Economic Outlook — Recovery Strengthens, Remains Uneven*, Washington, April 2014, pp. 25-31.

¹⁵⁷ International Monetary Fund, *World Economic Outlook — Recovery Strengthens, Remains Uneven*, Washington, April 2014, p. 27, Chinn, Menzie D., and Olivier Coibion, *The Predictive Content of Commodity Futures*, *Journal of Futures Markets*, 2014, Volume 34, Issue 7, p. 19 and pp. 607-636 and T. Reeve, R. Vigfusson, *Evaluating the Forecasting Performance of Commodity Futures Prices*, Board of Governors of the Federal Reserve System, International Finance Discussion Papers, Number 1025, August 2011, pp. 1 and 10.

rate forecast models suggests a “no change” forecasting approach may be preferable to the forward exchange rate produced by these forecasting models.¹⁵⁸

In our draft decision we reviewed the material cost escalation report submitted by BIS Shrapnel as well as the Competition Economics Group (CEG) report commissioned by a number of energy service providers and the Sinclair Knight Mertz (SKM) report submitted by TransGrid as part of their revenue proposals.¹⁵⁹ These reports included a number of statements and information which support our view on the potential inaccuracy of commodities forecasts, including:

- futures prices will be very unlikely to exactly predict future spot prices given that all manner of unexpected events can occur¹⁶⁰
- the view expressed by the International Monetary Fund:¹⁶¹

While futures prices are not accurate predictors of future spot prices, they nevertheless reflect current beliefs of market participants about forthcoming price developments.
- analysis of London Metals Exchange (LME) three-month, 15-month and 27-month aluminium and copper futures data shows that the longer the futures projection period, the less accurate are LME futures in predicting actual commodity prices. Futures forecasts also have a greater tendency towards over-estimating of actual aluminium and copper prices over the 20-year period (particularly for aluminium)
- there is always a high degree of uncertainty associated with predicting the future. Although CEG consider that it obtained the best possible estimates of the NSPs’ future costs at the present time, the actual magnitude of these costs at the time that they are incurred may well be considerably higher or lower than we have estimated in this report. This is a reflection of the fact that while futures prices and forecasts today may well be a very precise estimate of current expectations of the future, they are at best an imprecise estimate of future values
- CEG acknowledged that its escalation of aluminium prices are not necessarily the prices paid for aluminium equipment by manufacturers.¹⁶² CEG provided the example of producers of electrical cable who purchase fabricated aluminium which has gone through further stages of production than the refined aluminium that is traded on the LME

¹⁵⁸ R. Meese, K. Rogoff, (1983), *Empirical exchange rate models of the seventies: do they fit out of sample?*, Journal of International Economics, 14, B. Rossi, (2013), *Exchange rate predictability*, Journal of Economic Literature, 51(4), E. Fama, (1984), *Forward and spot exchange rates*, Journal of Monetary Economics, 14, K. Froot and R. Thaler, (1990), *Anomalies: Foreign exchange*, the Journal of Economic Perspectives, Vol. 4, No. 3, CEG, *Escalation factors affecting expenditure forecasts*, December 2013, and BIS Shrapnel, *Real labour and material cost escalation forecasts to 2019/20, Australia and New South Wales*, Final report, April 2014.

¹⁵⁹ BIS Shrapnel, *Real Labour and Material Cost Escalation Forecasts to 2019/20 - Australia and New South Wales*, April 2014, SKM, *TransGrid Commodity Price Escalation Forecast 2013/14 - 2018/19*, 9 December 2013 and CEG, *Escalation factors affecting expenditure forecasts*, December 2013.

¹⁶⁰ CEG, *Escalation factors affecting expenditure forecasts*, December 2013, pp. 4-5.

¹⁶¹ CEG, *Escalation factors affecting expenditure forecasts*, December 2013, p. 5.

¹⁶² CEG, *Escalation factors affecting expenditure forecasts*, December 2013, p. 19.

- CEG forecast indexed real aluminium, copper, steel and crude oil real prices which showed a trend of higher prices compared to the historical trend
- SKM caution that there are a variety of factors that could cause business conditions and results to differ materially from what is contained in its forward-looking statements
- in modelling the exchange rate, SKM in part adopted the longer term historical average of \$0.80 USD/AUD as the long term forecast going forward consistent with our view that longer term historical commodity prices should be considered when reviewing and forecasting future prices¹⁶³
- SKM stated that LME futures contracts for copper and aluminium are only available for three years out to December 2016 and that in order to estimate prices beyond this data point, it is necessary to revert to economic forecasts as the most robust source of future price expectations¹⁶⁴
- SKM also stated that LME steel futures are still not yet sufficiently liquid to provide a robust price outlook¹⁶⁵
- SKM commented that in respect to the reliability of oil future contracts as a predictor of actual oil prices, futures markets solely are not a reliable predictor or robust foundation for future price forecasts;¹⁶⁶ and
- BIS Shrapnel forecasted the Australian dollar to fall to US\$0.77 from mid-2016 to mid-2018 which is significantly lower than the exchange rate forecasts by SKM of between US\$0.91 to US\$0.85 from 2014-15 to 2018-19.¹⁶⁷ BIS Shrapnel stated that exchange rate forecasts are not authoritative over the long term.¹⁶⁸

In our draft decision we also compared the material cost escalation forecasts derived by the three consultants.¹⁶⁹ Our review showed that there is considerable variation between the consultants' commodities escalation forecasts. We concluded in our draft decision that these forecast divergences between consultants further demonstrate the significant uncertainty in the modelling of material input cost escalators to reliably and accurately estimate the prices of intermediate outputs used by service providers to provide network services.¹⁷⁰ This conclusion is further supported by our comparison of

¹⁶³ SKM, *TransGrid Commodity Price Escalation Forecast 2013/14 - 2018/19*, 9 December 2013, p. 9.

¹⁶⁴ SKM, *TransGrid Commodity Price Escalation Forecast 2013/14 - 2018/19*, 9 December 2013, p. 12.

¹⁶⁵ SKM, *TransGrid Commodity Price Escalation Forecast 2013/14 - 2018/19*, 9 December 2013, p. 16.

¹⁶⁶ SKM, *TransGrid Commodity Price Escalation Forecast 2013/14 - 2018/19*, 9 December 2013, p. 18.

¹⁶⁷ BIS Shrapnel, *Real Labour and Material Cost Escalation Forecasts to 2019/20 - Australia and New South Wales*, April 2014, p. 6.

¹⁶⁸ BIS Shrapnel, *Real Labour and Material Cost Escalation Forecasts to 2019/20 - Australia and New South Wales*, April 2014, p. A-7.

¹⁶⁹ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, pp. 6-56-58.

¹⁷⁰ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, p. 6-58.

updated commodity forecasts provided by BIS Shrapnel between April 2014 and February 2015, a relatively short period of 10 months.

Table A-2 BIS Shrapnel real materials cost escalation forecast April 2014 and February 2015—inputs (per cent)

	2015–16	2016–17	2017–18	2018–19	2019–20
Aluminium					
April 2014	5.56	3.86	11.00	-6.53	-2.44
February 2015	16.6	1.9	5.1	3.7	-11.0
Difference (actual)	11.04	-1.96	-5.9	10.23	-8.56
Difference (%)	198.6%	-50.8%	-53.6%	-156.7%	350.8%
Brass					
April 2014	1.94	2.13	9.53	-8.84	-5.31
February 2015	12.7	0.5	2.9	2.0	-12.0
Difference (actual)	10.76	-1.63	-6.63	10.84	-6.69
Difference (%)	554.6%	-76.5%	-69.6%	-122.6%	126.0%
Steel					
April 2014	0.98	-0.20	7.96	-8.87	-5.11
February 2015	9.2	-1.3	3.7	3.7	-11.1
Difference (actual)	8.22	-1.1	-4.26	12.57	-5.99
Difference (%)	838.8%	550.0%	-53.5%	-141.7%	117.2%
Plastic					
April 2014	-1.08	-0.22	6.49	-6.21	-3.56
February 2015	0.2	1.4	4.2	3.1	-7.6
Difference (actual)	1.28	1.62	-2.29	9.31	-4.04
Difference (%)	-118.5%	-736.4%	-35.3%	-149.9%	113.5%
Concrete					
April 2014	4.5	-0.5	-2.0	-1.1	0.5
February 2015	1.9	2.6	-0.7	-2.0	-1.3
Difference (actual)	-2.6	3.1	1.3	-0.9	-1.8
Difference (%)	-57.8%	-620.0%	-65.0%	81.8%	-360.0%

Source: JGN, *2015-20 Access Arrangement Information (Public)*, 30 June 2014, p. 68 and JGN, *Revised Access Arrangement Proposal, Appendix 5.1 BIS Shrapnel Updated cost escalators for JGN (Public)*, February 2015, p. iv.

As table A-2 shows, there is considerable variation between BIS Shrapnel's commodity cost escalation forecasts between its April 2014 and February 2015 reports. All materials showed very significant forecast variation between the two periods.

The variation in BIS Shrapnel's commodity cost escalation forecasts between April 2014 and February 2015 demonstrates the significant uncertainty in the modelling of

material input cost escalators to reliably and accurately estimate the prices of intermediate outputs used by service providers to provide network services. This supports our view that JGN's forecast real material cost escalators are not arrived at on a reasonable basis, and are not the best forecast possible in the circumstances¹⁷¹ and do not meet the capital expenditure criteria.¹⁷² Also, the commodity cost escalation forecasts would apply for the duration of the regulatory period, further amplifying the risk of commodity forecast error and subsequent impact on the accuracy of estimating the prices of network assets.

Link between forecast prices of commodities and asset prices

We consider that JGN has not provided sufficient evidence to support how accurately its materials escalation model forecasts reflect changes in prices paid by JGN for its physical assets.

As we stated in our draft decision, we consider that JGN's material input escalation model may not be representative of the full set of inputs or input choices impacting on changes in the prices of assets purchased by JGN and may also be biased to the extent that it may include a selective subset of commodities that are forecast to increase in price during the 2015-2020 period.¹⁷³ Therefore there may be some inputs which impact on the price of assets purchased by JGN for its network business that are not included in its escalation model. One example of such an input may be the impact of design changes or components that are superseded and perform better or cost less through technological advances.

We also consider that the escalation of commodities such as aluminium are not necessarily the prices paid for aluminium equipment by manufacturers where the fabricated aluminium has gone through further stages of production than the refined aluminium that is traded on the LME. The value of the input escalation model is diminished by the extent that these value adding processes for each commodity are not captured by the model.

Past practice

We recognise that our approach differs in some respects to our past practice. This is as a result of the development of our Expenditure Forecast Assessment Guideline (Expenditure Guideline). As stated in our draft decision, we assessed JGN's proposed real material cost escalation based on our approach as set out in our Expenditure Guideline to assessing the input price modelling approach to forecast materials cost.¹⁷⁴ The Guideline was a result of changes made by the AEMC in 2012 as to how we are to determine the total amount of revenue each electricity and gas network business can

¹⁷¹ NGR, clause 74(2).

¹⁷² NGR, clause 79(1).

¹⁷³ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, p. 6-53.

¹⁷⁴ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, pp. 6-49-50.

earn. After extensive consultation with stakeholders in the development of the Expenditure Guideline, we consider that it marks a significant improvement in our approach to expenditure assessment. It reflects both a review of assessment techniques employed throughout our first round of network determinations and how these can be improved (for example, materials cost escalation). Most importantly, it also sets out a number of new assessment techniques.

As we concluded in our draft decision, we considered that we had seen limited evidence to demonstrate that the commodity input weightings used by service providers to generate a forecast of the cost of material inputs have produced unbiased forecasts of the costs the service providers paid for manufactured materials.¹⁷⁵ We considered it important that such evidence be provided because the changes in the prices of manufactured materials are not solely influenced by the changes in the raw materials that are used.

We acknowledge JGN's concerns with respect to the difficulty in quantifying the relationship between final prices and the underlying inputs. However, the NGR require us to be satisfied that JGN's total forecast capex is arrived at on a reasonable basis and is the best possible forecast in the circumstances and that JGN's capital expenditure must be such as would be incurred by a prudent service provider acting efficiently to achieve the lowest sustainable cost of providing services.¹⁷⁶ We consider that JGN's revised regulatory proposal does not include supporting data or information which demonstrates movements or inter-linkages between changes in the input prices of commodities and the prices JGN paid for physical inputs. JGN's capex input escalation model assumes a weighting of commodity inputs for each asset class but does not provide information which explains the basis for the weightings or that the weightings applied have produced unbiased forecasts of the costs of JGN's assets. We consider it important that such evidence be provided because the changes in the prices of manufactured materials are not solely influenced by the changes in the raw materials that are used. For these reasons, there is no basis on which we can conclude that the forecasts are reliable and consistent with the requirements of the NGR.

Other factors affecting input cost prices

Consistent with our draft decision, we consider a number of factors impact on JGN's input costs, namely:¹⁷⁷

1. exogenous factors which may impact on the accuracy and reliability of using commodity forecasts to predict input costs. Such factors include changes in technology which affect the weighting of commodity inputs, suppliers of the physical

¹⁷⁵ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, p. 6-51.

¹⁷⁶ NGR, clauses 74(2) and 79(1).

¹⁷⁷ AER, *Draft decision, Jemena Gas Networks 2015-20, November 2014, Attachment 6 Capital expenditure*, November 2014, pp. 6-50-53.

assets changing their sourcing for the commodity inputs and the general volatility of exchange rates

2. input cost mitigation, including:
 - potential commodity input substitution as the price of a commodity increases relative to other commodities
 - the substitution potential between opex and capex when the relative prices of operating and capital inputs change
 - the scale of any operation change to the energy service provider's business that may impact on its capex requirements, including an increase in capex efficiency, and
 - increases in productivity that have not been taken into account by JGN in forecasting its capex requirements
3. strategic contracts with suppliers to mitigate the risks associated with changes in material input costs
4. the impact that material input cost escalation has on reducing the incentives for energy service providers to manage their capex efficiently, and
5. the relevance of material input cost escalation post the 2009 commodities boom experienced in Australia.

We consider that these factors lend further support to our conclusion that JGN's revised regulatory proposal real material cost escalators are not arrived at on a reasonable basis, and are the best forecast possible in the circumstances. We therefore do not consider that the forecast capex meets the capital expenditure criteria of clause 79(1) of the NGR. JGN did not address any of the other factors listed above in its revised regulatory proposal.

A.4 Labour escalators

Our approach to real materials cost escalation does not affect the application of labour cost escalators, which will continue to apply to reference services capital and operating expenditure.

We consider that labour cost escalation more reasonably reflects the capex criteria, which requires capital expenditure be such as would be incurred by a prudent service provider, acting efficiently, to achieve the lowest sustainable cost of providing services.¹⁷⁸ We consider that real labour cost escalators can be more reliably and robustly forecast than material input cost escalators, in part because these are not intermediate inputs.

¹⁷⁸ NGR, clause 79(1)(a).