DRAFT DECISION
Australian Gas Networks Victoria and Albury gas access arrangement 2018 to 2022

Attachment 6 – Capital expenditure

July 2017

AUSTRALIAN ENERGY REGULATOR

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Note

This attachment forms part of the AER's draft decision on the access arrangement for AGN's Victoria and Albury gas distribution networks for 2018-22. It should be read with all other parts of the draft decision.

The draft decision includes the following documents:

Overview

Attachment 1 - Services covered by the access arrangement

Attachment 2 - Capital base

Attachment 3 - Rate of return

Attachment 4 - Value of imputation credits

Attachment 5 - Regulatory depreciation

Attachment 6 - Capital expenditure

Attachment 7 - Operating expenditure

Attachment 8 - Corporate income tax

Attachment 9 - Efficiency carryover mechanism

Attachment 10 - Reference tariff setting

Attachment 11 - Reference tariff variation mechanism

Attachment 12 - Non-tariff components

Attachment 13 - Demand

Attachment 14 - Other incentive schemes

Contents

Shortened forms

Shortened form	Extended form
AER	Australian Energy Regulator
ATO	Australian Tax Office
capex	capital expenditure
CAPM	capital asset pricing model
CESS	Capital Expenditure Sharing Scheme
CPI	consumer price index
DRP	debt risk premium
ECM	(Opex) Efficiency Carryover Mechanism
ERP	equity risk premium
Expenditure Guideline	Expenditure Forecast Assessment Guideline
gamma	Value of Imputation Credits
MRP	market risk premium
NGL	National Gas Law
NGO	national gas objective
NGR	National Gas Rules
NPV	net present value
opex	operating expenditure
PTRM	post-tax revenue model
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
STTM	Short Term Trading Market
TAB	Tax asset base
UAFG	Unaccounted for gas
WACC	weighted average cost of capital
WPI	Wage Price Index

6 Capital expenditure

Capital expenditure (capex) refers to the capital costs and expenditure incurred in the provision of pipeline services.[1] This investment mostly relates to assets with long lives and these costs are recovered over several access arrangement periods.

This attachment outlines our assessment of AGN's proposed conforming capex for 2012–16, which forms part of its opening capital base.[2] It also outlines our assessment of forecast capex for the 2018–22 access arrangement period, which forms part of its projected capital base.[3]

6.1 Draft decision

6.1.1 Conforming capital expenditure for 2012–16

We approve $587.1 million ($2017) of total net capex for AGN during the 2012–16 period as conforming capex under the NGR.[4]

Table 6.1 shows our approved capex for 2012–16 by category.

1 NGR, r. 69.
2 NGR, r. 77.
3 NGR, r. 78(b).
4 NGR, r. 79(1).

Table 6.1 AER approved capital expenditure by category over 2012–17 ($million, 2017)

Category	2012	2013	2014	2015	2016	2017(a)
Growth assets	30.9	30.1	39.2	48.7	42.9	42.8
Mains replacement	39.9	63.8	63.2	54.8	37.1	37.0
Meter replacement	3.4	3.9	4.2	4.2	7.9	8.5
Augmentation	15.8	2.9	1.0	3.3	5.3	8.0
Telemetry	0.0	0.2	0.4	0.4	0.4	0.5
Other assets	3.8	3.8	4.2	1.5	3.0	4.1
IT	1.2	0.9	0.4	11.9	1.2	8.5
Overheads	18.3	8.3	8.8	8.1	7.8	8.0
GROSS TOTAL CAPITAL EXPENDITURE	**114.0**	**119.1**	**126.9**	**137.4**	**105.7**	**117.5**
Contributions	0.8	5.3	5.6	4.5	0.0	0.0
NET TOTAL CAPITAL EXPENDITURE	**113.3**	**113.8**	**121.3**	**132.9**	**105.7**	**117.5**

Source: AER analysis. Totals may not sum due to rounding.

Note: (a) As set out in attachment 2, we have not assessed the 2017 amounts as approved capex under this decision. This is because these values are estimates. We will undertake the assessment of whether the 2017 amounts are conforming capex as part of the access arrangement determination.

6.1.2 Conforming capital expenditure for the 2018–22 access arrangement period

We approve AGN's proposed forecast $554.1 million ($2017) of total net capex for the 2018–22 access arrangement period as conforming capex under the NGR.[5]

Table 6.2 shows our approved capex for the 2018–22 access arrangement period by category.

[5] NGR, r. 79(1).

Table 6.2 AER approved capital expenditure by category over the 2018–22 access arrangement period ($million, 2017)

Category	2018	2019	2020	2021	2022	Total
Growth assets	35.0	34.2	34.5	35.1	35.6	174.3
Mains replacement	33.8	35.8	35.8	33.4	8.6	147.3
Meter replacement	7.5	7.5	7.5	5.0	5.0	32.6
Augmentation	9.3	12.0	7.4	3.5	2.1	34.2
Telemetry	0.3	0.3	0.3	0.3	0.1	1.2
Other capex	4.7	6.5	11.5	8.1	4.0	34.8
IT	11.5	24.2	16.5	5.2	6.1	63.5
Escalation	0.6	1.3	2.0	2.6	2.4	8.9
Overheads	11.5	11.9	11.8	11.3	10.8	57.3
GROSS TOTAL CAPITAL EXPENDITURE	**115.6**	**134.9**	**128.5**	**105.9**	**76.1**	**561.0**
Contributions	1.37	1.37	1.37	1.37	1.37	6.8
NET TOTAL CAPITAL EXPENDITURE	**114.2**	**133.5**	**127.1**	**104.5**	**74.7**	**554.1**

Source: AER analysis. Totals may not sum due to rounding.

Having regard to our alternative estimate of total capex, we are satisfied that AGN's proposed total capex is 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.

6.2 AGN's proposal

2012–17 period

AGN proposed net capex of $704.6 million for the 2012–17 period, where capex in 2017 is an estimate. Without the estimate of capex for 2017, AGN has proposed $587.1 million as conforming capex. We accept $587.1 million as conforming capex for 2012–16, and will assess whether capex incurred in 2017 is conforming in the next review.

For 2012–17 AGN underspent net capex by 0.3 per cent ($2.4 million). This includes the 2017 estimate. Without the 2017 estimate, AGN underspent net capex by 4.8 per cent ($28.4 million).

Table 6.3 AGN's proposed capital expenditure by category over 2012–17 ($million, 2017)

Category	2012	2013	2014	2015	2016	2017(a)
Growth assets	30.9	30.1	39.2	48.7	42.9	42.8
Mains replacement	39.9	63.8	63.2	54.8	37.1	37.0
Meter replacement	3.4	3.9	4.2	4.2	7.9	8.5
Augmentation	15.8	2.9	1.0	3.3	5.3	8.0
Telemetry	0.0	0.2	0.4	0.4	0.4	0.5
Other capex	3.8	3.8	4.2	1.5	3.0	4.1
IT	1.2	0.9	0.4	11.9	1.2	8.5
Overheads	18.3	8.3	8.8	8.1	7.8	8.0
GROSS TOTAL CAPITAL EXPENDITURE	**114.0**	**119.1**	**126.9**	**137.4**	**105.7**	**117.5**
Contributions	0.8	5.3	5.6	4.5	0.0	0.0
NET TOTAL CAPITAL EXPENDITURE	**113.3**	**113.8**	**121.3**	**132.9**	**105.7**	**117.5**

Source: AGN reset RIN, response to information request 11(D), 29 March 2017. Totals may not sum due to rounding.

2018–22 period

AGN proposed net total capex of $554.1 million ($2017) for the 2018–22 access arrangement period. This represents a real decrease of 8 per cent compared with the amount approved by the AER for the 2013–17 access arrangement period.

Table 6.4 AGN proposed capital expenditure by category over the 2018–22 access arrangement period ($million, 2017)

Category	2018	2019	2020	2021	2022	Total
Growth assets	35.0	34.2	34.5	35.1	35.6	174.3
Mains replacement	33.8	35.8	35.8	33.4	8.6	147.3
Meter replacement	7.5	7.5	7.5	5.0	5.0	32.6
Augmentation	9.3	12.0	7.4	3.5	2.1	34.2
Telemetry	0.3	0.3	0.3	0.3	0.1	1.2
Other assets	4.7	6.5	11.5	8.1	4.0	34.8
IT	11.5	24.2	16.5	5.2	6.1	63.5
Escalation	0.6	1.3	2.0	2.6	2.4	8.9
Overheads	11.5	11.9	11.8	11.3	10.8	57.3
GROSS TOTAL CAPITAL EXPENDITURE	**115.6**	**134.9**	**128.5**	**105.9**	**76.1**	**561.0**
Contributions	1.37	1.37	1.37	1.37	1.37	6.8
NET TOTAL CAPITAL EXPENDITURE	**114.2**	**133.5**	**127.1**	**104.5**	**74.7**	**554.1**

Source: AGN - *Attachment 8.8 - Capital Expenditure Forecasting Model* - December 2016 – Public; AGN, *Response to information request #11 – Attachment A Capex Model (Confidential)*, received 21 March 2017.
Totals may not sum due to rounding.

The major components of forecast gross total capex over the 2018–22 access arrangement period are growth assets (31 per cent) and mains replacement (21 per cent).

6.3 Assessment approach

We must make two decisions regarding AGN's capex. First, we are required to assess past capex and determine whether it is conforming capex that we should add to the opening capital base.[6] Second, we are required to assess AGN's forecast of required capex for the 2018–22 access arrangement period to determine whether it is

[6] NGR, r. 77(2)(b).

conforming capex. Capex will be 'conforming' if it meets the NGR's new capex criteria.[7] We have limited discretion when deciding whether capex conforms with the new capex criteria.[8] This means that we must approve the capex if we are satisfied it complies with the applicable requirements of the NGR and NGL and is consistent with the criteria set out in the NGR or NGL.[9]

The following sections set out our approach and 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 in the last year of the 2013–17 access arrangement period and the need to forecast the opening capital base for the 2017–22 access arrangement period. We explain this in the next section.

6.3.1 Capex in the 2013–17 access arrangement period

We reviewed AGN's submission and supporting material to assess its proposed capex for the 2013–17 access arrangement period. This included information on AGN's reasoning and, where relevant, business cases, responses to information requests and other relevant information. We used this information to identify whether capex over the 2013–17 access arrangement period was conforming capex and, in turn, whether that capex should be included in the opening capital base.[10] Generally, we use the same approach to assess whether both historical and forecast or estimated capex conforms with the new capex criteria. We have set out this approach in more detail in section 6.3.2 below.

We consider the following when determining the opening capital base for 2018–22:

- 2012 capex—when we conducted the previous access arrangement review, we did not yet have actual capex for 2012. Consequently, we need to adjust for the difference between actual and estimated 2012 capex in the capital base.[11] Since actual capex for 2012 is now available, we have assessed whether this capex is conforming capex.
- 2013–16 capex— since we have actual capex for these years, we have assessed whether this is conforming capex.[12] We have included conforming capex in the opening capital base for 2018–22.[13]
- 2017 capex—we do not yet have actual capex for 2017 and so must include an estimate in the opening capital base. We have not assessed AGN's estimate of capex for 2017. At the next access arrangement review, we will assess whether

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7 NGR, r. 79.
8 NGR, r. 79(6).
9 NGR, r. 40(2).
10 NGR, r. 77(2)(b).
11 NGR, r. 77(2)(a).
12 NGR, rr. 77(2)(b), 79.
13 NGR, r. 77(2)(b).

AGN's actual capex for 2017 is conforming capex under the NGR, and adjust for any differences between actual and estimated capex.[14]

6.3.2 Conforming capital expenditure for 2018–22

We have assessed the key drivers of forecast capex to consider whether AGN's proposed capex complies with the new capex criteria.[15] In doing so, we relied on the following information:

- the access arrangement submission and access arrangement information, which outline AGN's capex program and the main drivers of those programs
- AGN's Asset Management Plan, Distribution Mains and Services Integrity Plan and associated appendices and reports which provide specific expenditure or technical detail for each capex driver
- business cases that detail the expenditure requirements for specific projects
- AGN's RIN template response
- AGN's capex forecast model
- responses to information requests
- engineering advice we commissioned from Zincara to help us assess the prudency and efficiency of selected projects
- submissions from interested parties.

For each category of capex we considered the scope, timing and cost of the proposed capex in order to form a view on whether it complies with the new capex criteria. We also considered whether cost forecasts were arrived at on a reasonable basis and represent the best forecast possible in the circumstances.[16]

Our assessment results in an alternative estimate of the business's total capex requirements in the forecast period. If we are satisfied the business's total forecast meets the NGR requirements, we accept the forecast. If we are not satisfied, we substitute the business's forecast with our alternative estimate. In making this decision, we take into account the reasons for the difference between our alternative estimate and the business's forecast, and the materiality of that difference. We also take into consideration the interrelationships between the capex forecast and other constituent components of our decision such that our decision is likely to contribute to the achievement of the NGO.[17]

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14 NGR, rr. 77(2)(b), 79.
15 NGR, r. 79(1).
16 NGR, r. 74(2).
17 NGL, s. 28(1).

6.3.3 Interrelationships

In assessing AGN's total forecast capex we took into account other components of its access arrangement proposal, including:

- possible trade-offs between capex and opex
- any differences between the capitalisation policies applied in the 2013–17 and 2018–22 access arrangement periods
- the growth in the price of labour forecast for opex and capex.

6.4 Reasons for draft decision

6.4.1 Conforming capital expenditure for 2012–16

AGN has proposed $704.6 million for the 2012–17 period, where capex in 2017 is an estimate. Without the estimate of capex for 2017, AGN has proposed $587.1 million as conforming capex. We accept $587.1 million as conforming capex for 2012–16, and will assess whether capex in 2017 is conforming in the next review.

In reaching this view we have considered the following factors:

- AGN's capex was $6.8 million (6.4 per cent) over the Essential Services Commission approved amount of $106.5 million ($2017) for 2012.
- AGN's capex was $35.2 million (6.9 per cent) under the AER approved amount of $509.0 million for 2013–16.

6.4.2 Conforming capital expenditure for the 2018–22 access arrangement period

The following sets out our analysis of the capex drivers of AGN's proposed $554.1 million ($2017) total net capex for the 2018–22 access arrangement period. In developing our alternative estimate of total capex, we included the expenditure proposed by AGN excepting forecast connection volumes relating to the proposed marketing step change. The difference between our alternative estimate and AGN's proposed total capex forecast is $0.6 million. At the overall level of total capex, we consider this difference is immaterial and on this basis and for the reasons below, accept AGN's proposed capex.

Mains replacement

Distribution mains are the pipes which convey gas to service pipes at each end user point. AGN's distribution mains replacement program consists of proactive and reactive replacement programs. It involves the replacement of low pressure and medium pressure mains.

Our draft decision is to accept AGN's forecast capex for mains replacement of $147.3 million ($2017, unescalated direct costs) over the 2018–22 access arrangement period as conforming capex. We have included this in our alternative estimate of total capex.[18] This is based on our view that mains replacement is justified on the grounds of maintaining and improving the safety of services and for maintaining the integrity of services.[19] We also consider that AGN's proposed volumes and unit rates are arrived at on a reasonable basis and represent the best forecasts possible in the circumstances.[20]

AGN's proposal

AGN proposed forecast mains replacement capex of $147.3 million ($2017, unescalated direct costs)[21], with an estimated 297 km of mains to be replaced.[22] This is less than the $248.2 million ($2017, unescalated direct costs) AGN spent in the 2013–17 access arrangement period.[23] Similarly, the volume proposed to be replaced is less than the 696 km replaced in the 2013–17 access arrangement period.[24]

AGN submitted that the main driver of mains replacement was the provision of a safe and reliable supply of natural gas. AGN used a risk assessment and derived risk ratings to guide its actions and activities to ensure that safety and compliance in the network is maintained. AGN's risk management framework is based on:

- AS/NZS ISO 31000 Risk Management - Principles and Guidelines
- AS 2885 Pipelines-Gas and Liquid Petroleum; and
- AS/NZS 4645 Gas Distribution Network Management.

In accordance with AS/NZS 4645, AGN identified for each risk the consequence and likelihood of that risk occurring. Once the level of risk is identified, AGN considers the risk treatment options. AGN considered that any risks rated 'extreme', 'high' or 'intermediate' must be reduced to 'low' or 'negligible' (or as low as reasonably practicable) as soon as possible.[25]

Figure 6.1 shows AGN's risk assessment and the proposed replacement volumes for each type of mains asset.

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18 NGR, r. 79.

19 NGR, rr. 79(1)(a) and 79(2)(c)(i) and (ii) .

20 NGR, r. 74(2).

21 AGN, *Response to information request 14*, 6 April 2017, p. 3.

22 AGN, *Attachment 8.2 – Distribution Mains & Services Integrity Plan*, December 2016, p. 7.

23 AGN, *Response to information request 4(A) – Supplementary spread sheet*, 1 March 2017.

24 AGN, *Attachment 8.2 – Distribution Mains & Services Integrity Plan*, December 2016, p. 18.

25 AGN - *Final Plan - Access Arrangement Information for our Victorian and Albury natural gas distribution networks 2018-2022* – 22 December 2016 (AGN, *Final Plan*, December 2016), p. 84.

Figure 6.1 Mains risk treatment approach and resultant risk rating

Asset Category	As at End of Current AA Period:		Risk Treatment Approach	To Be Replaced Next AA Period:	
	Kilometres	Risk Rating		Kilometres	Risk Rating
Low Pressure CI/UPS in the CBD	25	High	Replace as soon as possible	25	Not applicable
Low Pressure PVC in the CBD	12	Intermediate	No additional risk treatment proposed (six month leak surveys in place)	0	Intermediate
Low Pressure steel in the CBD	7	Low		0	Low
Medium Pressure CI/UPS Trunk Mains	32	High	Replace or decommission as soon as possible	32	Not applicable
Low Pressure CI/UPS in HDICS	96	High	Replace as soon as possible	96	Not applicable
Low Pressure PVC in HDCIS	85	High	Replace as soon as possible as part of CI/UPS replacement program	85	Not applicable
Low Pressure CI/UPS in LDS	11	High	Replace as soon as possible	11	Not applicable
Low Pressure PVC in LDS	25	Intermediate	Replace as soon as possible as part of CI/UPS replacement program	25	Not applicable
High Pressure HDPE over 35 years old	597	Intermediate	3km sampling program and 7km end of life	7	Intermediate
High Pressure HDPE less than 35 years old	2,480	Low	No additional risk treatment proposed	3	Low
High Pressure Polyethylene	4,330	Low	No additional risk treatment proposed	0	Low
Total as per Risk Assessment				**285**	
Medium Pressure Trunk Mains	Not applicable	Not applicable	Construction of new trunk mains to support new mains	12	Not applicable
Total as per Mains Replacement Program				**297**	

Source: AGN, *Final Plan*, December 2016, p. 86.

In support of its proposed mains replacement program, AGN provided:

- its distribution mains and services integrity plan,
- its unit rate forecast attachment model, and

- a letter from Energy Safe Victoria supporting AGN's plan.[26]

Our assessment

We consider AGN's proposed mains replacement capex is justified on the grounds that it is necessary to maintain and improve the safety of services and for maintaining the integrity of services.[27] Also, AGN's proposed forecast mains replacement of $147.3 million ($2017, unescalated direct costs) is that which would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services, and is therefore conforming capex.[28] In arriving at this position we used both internal and external engineering and technical expertise to determine whether AGN's proposed replacement volumes and unit rates were arrived at on a reasonable basis and represent the best forecasts possible in the circumstances.[29]

Volumes

We assessed each material type to determine whether AGN's priorities reflect the risk level of its network. Table 6.5 below shows the leak rate and break rate per kilometre by mains type.

Table 6.5 Leak rate by material

Material	Km as at 31 Dec 2015	Mains leaks FY 15	Leaks per km	Mains crack FY15	Crack per km
Cast Iron	226	516	2.28	55	0.24
PVC	228	58	0.25	29	0.13
Unprotected steel	21	139	6.7	0	0
Steel	2,860	131	0.05	0	0
Polyethylene	6,995	188	0.03	86	0.013

Source: AGN, *Attachment 8.2 – Distribution Mains & Services Integrity Plan*, December 2016, p. 28.

AGN's risk analysis demonstrates that it has appropriately identified the mains that present the highest risk to the network. This is consistent with Zincara's risk analysis that notes that AGN's methodology appropriately identified mains requiring replacement.[30]

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[26] AER website, https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/australian-gas-networks-victoria-and-albury-access-arrangement-2018-22

[27] NGR, rr. 79(1)(a) and 79(2)(c)(i) and (ii) .

[28] NGR, r. 79(1)(a).

[29] NGR, rr. 74(2) and 79.

[30] Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 48.

To determine the volume of mains replacement, AGN considered various mains replacement scenarios. The scenarios ranged from replacing all 'high' risk cast iron and unprotected steel mains to replacing all 'high' risk and 'intermediate' risk mains.

AGN's preference is to replace all 'high' risk mains and achieve 'as low as reasonably practicable' or 'low' risk for all other mains.[31] AGN submitted that:

- this is a prudent and efficient level of replacement, with the estimated cost of the program reflecting the lowest cost of achieving the risk reduction required by AS/NZS 4645,
- that it could mitigate the risk of the remaining 599km of 'high' and 'intermediate' risk mains by continuing regular leak surveys, monitoring odorant levels and responding to and repairing leaks when they occur,[32] and
- this program is consistent with its safety case currently being reviewed by Energy Safe Victoria. Energy Safe Victoria has informed AGN that it supports AGN's proposed program notwithstanding it is not in a position to assess the financial merits of the program.[33]

Zincara advised that AGN's proposed approach and its scenarios are reasonable.[34]

However, Zincara expressed concern regarding AGN's proposal to replace 10 km of HDPE 575 mains so AGN can investigate the condition and material properties of these mains to better understand the likelihood of failure.[35] While Zincara noted that it does not believe this replacement is efficient at this time, it does acknowledge the uncertainty of failure and the level of research already undertaken. Given this, Zincara advised that the sampling program is reasonable and prudent.[36]

Red Energy and Lumo Energy submitted that they support the continuation of AGN's mains replacement program on the basis that it is primarily driven by safety considerations and reliability of the network. They also noted that the mains replacement program should be reflected in lower unaccounted for gas.[37] Uniting Communities also noted that it expects customers will receive the benefit from mains replacement with greater efficiency of service and less gas loss leading to lower real costs for customers.[38]

Taking this information into account, we consider AGN's proposed approach to replacement achieves an appropriate balance between replacing 'at risk' assets and

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31 AGN, *Attachment 8.2 – Distribution Mains & Services Integrity Plan*, December 2016, p. 12.

32 AGN, *Attachment 8.2 – Distribution Mains & Services Integrity Plan*, December 2016, pp. 12-13.

33 AGN, *Attachment 8.9 – Energy Safe Victoria - Letter to AGN - Australian Gas Networks distribution mains and services integrity plan,* September 2016, p. 2.

34 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 53.

35 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, pp. 58-59.

36 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 59.

37 Red Energy and Lumo Energy, *Australian Gas Networks Access Arrangement*, 6 March 2017, p. 2.

38 Uniting Communities, *No Shocks AA Proposal – Submission to the AER regarding the AGN access arrangement proposal for Victoria Albury*, 19 April 2017, p. 7.

relying on operations and maintenance to manage network safety. We also consider that AGN can deliver its proposed program in the 2018-22 access arrangement period, which is noticeably less than the volume replaced in the 2013–17 access arrangement period. AGN has also recognised the challenges for the Melbourne CBD replacement program and has provided a satisfactory explanation of how it will meet these challenges.[39]

For these reasons, we are satisfied that AGN's forecast mains replacement volume is arrived at on a reasonable basis and represents the best forecast possible in the circumstances.[40]

Unit rates

AGN's proposed unit rates are the result of a unit rate methodology that is consistent with that which was applied for its South Australian network. We assessed and approved this unit rate methodology in our South Australian review.[41] To forecast unit rates this methodology involves:

- where available, adopted tendered rates,
- if work packages are similar, adopted comparable tenders,
- where tendered rates are not available, historical actual unit rates for comparable work has been adopted,
- where work is not comparable to available tendered rates or historical actual unit rates, AGN applied assumptions to estimate a unit rate.

Zincara undertook an in depth engineering analysis of AGN's proposed unit rates and considers the unit rates are reasonable.[42] Finally, in response to an information request, AGN provided updated unit rates that reflected recent tendering outcomes.[43] We expect outcomes of any new tendered unit rates to be reflected in AGN's revised access arrangement proposal.

For these reasons, we are satisfied that AGN's proposed unit rates are arrived at on a reasonable basis and represent the best forecasts possible in the circumstances.[44]

Growth assets

Distribution businesses have a regulatory obligation to make a connection offer to residential and commercial/industrial customers making application to connect to its distribution network.[45]

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39 AGN, *Attachment 8.2 – Distribution Mains & Services Integrity Plan*, December 2016, pp. 73-74.

40 NGR, r. 74(2).

41 AER, *Final decision Australian gas networks access arrangement 2016 to 2021 attachment 6 – capital expenditure*, May 2016, p. 23.

42 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 59.

43 AGN, *Response to information request 14*, 6 April 2017.

44 NGR, r. 74(2).

Connections capex is usually forecast by categorising connections into Tariff V (residential customers, and small commercial and industrial (I&C) customers[46]) and Tariff D (large I&C customers[47]). AGN refers to its residential customers as Tariff R and small I&C customers as Tariff C. Tariff R customers are disaggregated further into existing homes[48], new estates, and medium/high density (or multi-user) dwellings.

For each connection type (overall residential, new home, I&C etc.), connections capex is derived by multiplying the forecast unit rate for that connection type by the forecast volume of new connections.

We are satisfied that AGN's capex forecast for growth assets is conforming capex subject to an adjustment for forecast connection volumes relating to the proposed marketing step change.[49] We have included $173.8m ($2017, unescalated direct costs) of growth capex in our alternative capex estimate.

Volumes

AGN engaged Core Energy Group Pty Ltd (CE) to forecast connection volumes on the Victorian and Albury networks. Attachment 13 sets out CE's forecasting methodology for Tariff R and C connection volumes and our reasons for accepting these volumes.

CE forecast an increase in total net residential and I&C connections of 1.97 and 0.65 per cent per annum respectively on the Victorian network.[50] The forecast residential growth rate is lower than the 2.04 per cent growth, and the forecast I&C connections is higher than the -0.15 per cent growth, experienced during the 2013–17 access arrangement period.[51]

While forecast net connections are relevant for demand forecasting purposes, forecast gross connections (that is, net connections plus disconnections) are used to determine connections capex.[52] We are satisfied that AGN's methodology of using an average of

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45 NGR, r. 119S, for basic and standard connections and NGR, r. 119V, for negotiated connections.

46 I&C customers are generally classified under Tariff V if they consume less than 10 TJ of gas per year.

47 I&C customers are generally classified under Tariff D if they consume more than 10 TJ of gas per year.

48 Connections to existing homes are sometimes referred to as an 'electricity-to-gas' connections, whereby households replacing electric appliances with gas equivalents and require connection to the gas distribution network.

49 Specifically, NGR, r. 79(2)(c)(iii).

50 AGN, *Attachment 13.1 - Core Energy Group, Gas demand forecast - AGN Victoria and Albury gas access arrangement 2018-22*, December 2016, pp. 47-48, 61-62. Similarly, CE forecast connection growth on the Albury network of residential (1.9 per cent per annum) and I&C (0.64 per cent per annum) respectively.

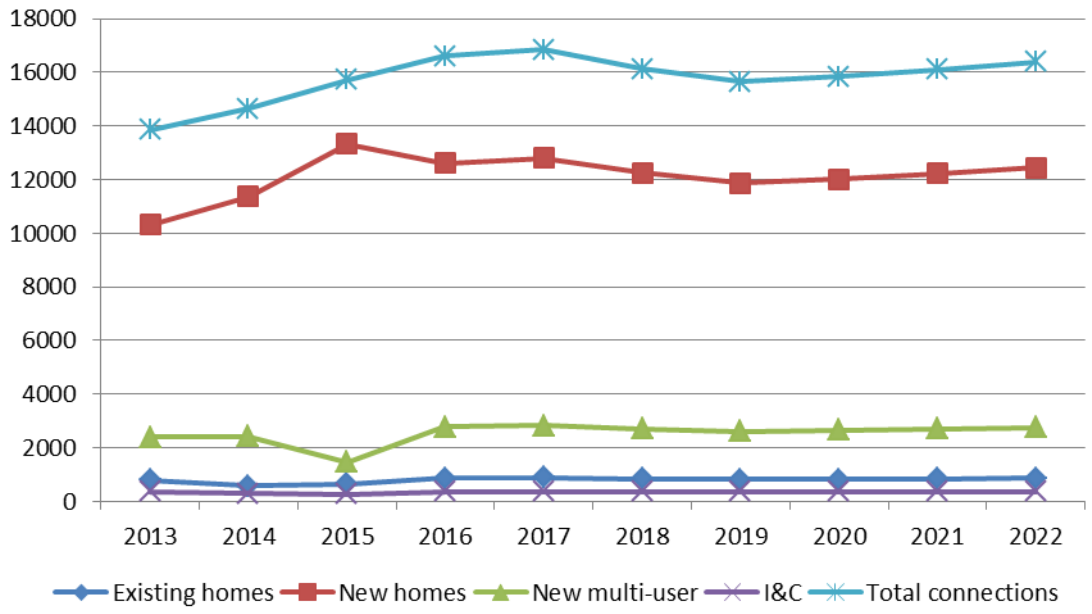
51 AGN has planned removal of zero-consuming meters in 2017 and 2018, with I&C connections dropping by approximately four per cent in each year. The removal of these meters will leave fewer connections in 2017 (22,620) relative to 2013 (22,780). AGN, *Attachment 13.1 - Core Energy Group, Gas demand forecast - AGN Victoria and Albury gas access arrangement 2018-22*, December 2016, p. 34.

52 AGN makes a post-model adjustment to its net customer growth forecast to calculate gross connections. It calculates this by adding the number of disconnections to net customer growth. AGN forecast the disconnection rate as the three-year average of historical (2013-15) disconnection rates.

the historical disconnection rate to forecast gross connections is a reasonable basis for its forecast.

Figure 6.2 shows the historical trend and forecasts of AGN's new Tariff R and C connections at each connection category. Connections to new detached homes make up most new Tariff R connections and are forecast to recover following a decline in 2018 and 2019. Forecast volumes for medium density dwellings (apartments), existing homes, and Tariff C connections are also expected to remain stable.

Figure 6.2 AGN's historical and forecast Tariff R and C connection volumes (Victoria and Albury)



Source: AGN - *Attachment 1.5 - Victoria RIN* – 20170104; AGN - *Attachment 1.6 - Albury RIN* - 20170104 - Public, AER analysis.

AGN's proposal incorporates capex for its proposed joint marketing campaign for an additional 303 connections above CE's forecast.

As set out in Attachment 7, in this draft decision we do not accept AGN's forecast opex step change for this proposed marketing campaign. For capex, the impact of the proposed marketing campaign on AGN's proposed connections capex is 0.3 per cent.[53] Although this is immaterial in terms of the connections capex, we have adjusted for this in our alternative estimate for consistency with our decision on opex. However, as set out above, we consider this difference is immaterial at the overall level of proposed capex.

[53] We consider that 303 connections (and the associated capex) are immaterial to the overall forecast of approximately 76,000 new residential connections (based on forecast meter connections) and $174.3m capex forecast, over the 2018-22 access arrangement period.

Subject to this adjustment, we are satisfied that AGN's forecast connection volumes are otherwise arrived at on a reasonable basis and the best forecast possible in the circumstances.[54]

Unit rates

AGN forecasts connection unit rates for mains, services and meters for each connection category. As Table 6.6 shows, AGN used a three-year historical average to forecast the unit rates for existing homes, multi–user and I&C connections for both its Victorian and Albury networks.

Table 6.6 AGN forecasting method for each Tariff V connection component

Connection type		Forecasting approach
New Mains	New Estate	3-year weighted average (2014-2016), competitively tendered
	Existing Home	3-year weighted average (2014-2016), competitively tendered
	I&C	3-year weighted average (2014-2016), competitively tendered
New Service	New Estate	3-year weighted average (2014-2016), competitively tendered
	Multi-user	3-year weighted average (2014-2016), competitively tendered
	Existing Home	3-year weighted average (2014-2016), competitively tendered
	I&C	3-year weighted average (2014-2016), competitively tendered
New Meter	Domestic	Actual rates for the 9 months to September 2016 to reflect impact of new contracts entered into in 2016
	I&C	3-year weighted average (2014-2016), performed by a mix of internal and APA staff.

Source: AGN, *Attachment 8.4 – Unit rates forecast*, 4 January 2017, p. 3.

New mains and services unit rates

We are satisfied that AGN's proposed forecast unit rates are reasonable and represent the best forecasts possible in the circumstances. We took account of the following material in coming to our position:

- the forecast unit rates are the outcome of a competitively tendered process
- the three-year weighted average of actual unit rates in 2014 to 2016 reflect the most recent updated unit rates for the laying of mains and for service installation[55]

[54] NGR, r. 74(2).

[55] AGN, *Attachment 8.4 – Unit Rates Forecast*, 4 January 2017, p. 4.

- sensitivity analysis undertaken by Zincara using historical averages longer than three years, which we consider do not result in materially different unit rates than that determined with AGN's three-year averages[56]
- Zincara advised that AGN's residential connection unit rates are within a reasonable range when benchmarked against that of AusNet Services and Multinet.

New meter unit rates

AGN's proposed forecast unit rates for domestic and I&C meter connections are materially higher than that which we approved in the 2013-17 access arrangement.

AGN used the actual unit rates for the nine months to September 2016 as the basis for its forecast for future domestic meter installations. AGN used this approach because it entered into contracts commencing in 2016 to provide gas fitting services (including meter installation), which was the most recent information available that it submitted best reflects the forecast cost of performing this work.[57] As these 2016 rates were competitively tendered, we are satisfied AGN's forecast unit rates for future domestic meter installations are arrived at on a reasonable basis and represent the best forecasts possible in the circumstances.

To forecast new I&C meter connection unit rates, AGN applied a three-year average unit rate similar to the approach it took to forecasting the new mains and services unit rates. However, notwithstanding I&C meter connections are not competitively tendered and undertaken by both AGN and APA staff, AGN submitted that the 2014–16 unit rates are efficient because:[58]

- as AGN's asset management service provider, there are incentives upon APA to minimise connections costs; and
- the relevant materials were the subject of a competitive procurement process.

Given the low volume and varying scopes of work, we consider delivering new I&C meters through a combination of AGN and APA staff is reasonable. Further, a three-year weighted average of historical unit rates averages out the fluctuation of costs associated with the varying scopes of work.

For these reasons, we are satisfied that these forecasts meet the NGR requirements.[59]

Customer contributions

AGN proposed forecast customer contributions of $6.8 million ($2017), which includes "growth capex-related contributions".[60] AGN applied a three-year average (2013–2015)

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56 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 38.
57 AGN, *Attachment 8.4 – Unit Rates Forecast*, 4 January 2017, pp. 21-22.
58 AGN, *Attachment 8.4 – Unit Rates Forecast*, 4 January 2017, p. 24.
59 NGR, r. 74(2).

of actual contributions as the basis for its forecast in the 2018–22 access arrangement period. We are satisfied that a three-year average of actual contributions to estimate forecast customer contributions a reasonable basis for forecasting customer contributions and results in the best forecast possible in the circumstances.

Information technology

AGN proposed $63.5 million ($2017, unescalated direct costs) for IT capex.[61] This is $41.2 million or 185 per cent more than the allowance we approved in the 2013–17 access arrangement. AGN's proposal is conforming capex and we have included this amount in our alternative capex estimate of total capex.

AGN submitted that its current IT expenditure and proposed forecast follows a period of lower than sustainable investment.[62] Its proposal constituted the following projects that are part of its national program to mitigate the risks associated with its core operating systems and ensure compliance with regulatory obligations:

- $22.5 million to update applications to ensure their ongoing reliability
- $16.5 million to upgrade geographical information systems to ensure the ongoing safe operation of the network so that its employees and the public can access reliable information regarding the location of its assets
- $11.3 million to improve reporting across AGN to allow for greater access to information for decision making
- $10.6 million to provide for mobile integration of resources across its network and automate the current paper–based manual processes
- $1.3 million to upgrade desktop and telephony infrastructure
- $1.4 million to develop a range of digital capabilities aimed at delivering a customer experience consistent with the delivery of services by other distributors.[63]

As AGN submitted, we approved these same projects in our decision on AGN's South Australian network.[64] We have also assessed the allocation of AGN's proposal between its Victoria and Albury networks. After reviewing information provided by AGN in response to our information request[65], we are satisfied that AGN's allocation accurately reflects the customer numbers at 31 December 2015.

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60 AGN defines growth capex-related contributions as those contributions received for standard customer connections to the network. It does not include large customer connections, which are classified as "other contributions" AGN has not included any "other contributions" in its forecast as it was unaware of any projects that may be undertaken during the 2018–22 access arrangement period. AGN, *response to information request 1 (A)*, 25 January 2017, p. 5.

61 AGN, *Final Plan*, December 2016, p. 92.

62 AGN, *Final Plan*, December 2016, p. 89.

63 AGN, *Final Plan*, December 2016, p. 91.

64 AGN, *Final Plan*, December 2016, p. 89.

65 AGN, Response to information request 7, 17 March 2017.

On the basis of this information, including our past consideration of these projects[66], we are satisfied that AGN's proposed forecast IT capex is conforming capex.[67]

Augmentation

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. AGN submitted that its augmentation capex is necessary under the NGR.[68]

We are satisfied that AGN's proposed capex forecast for augmentation is conforming capex.[69] We have included $34.2 million ($2017, unescalated direct costs) of augmentation expenditure in our alternative capex forecast.[70] As we discuss further below, we consider that the following is justified as conforming capex ($2017, unescalated direct costs):

- $14.0 million for the Dandenong to Crib Point Pipeline augmentation
- $9.1 million for the Cranbourne high pressure augmentation
- $5.9 million for the Sale transmission pipeline duplication
- $2.4 million for the city gate and customer transfer meter upgrades
- $2.8 million for other smaller augmentation projects.

We assessed AGN's augmentation projects by considering the timing of the proposed works, the resulting capacity benefits and whether the input costs of each project is that which a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services would incur.[71] We also sought advice from Zincara. Specifically, we considered:

- the capacity shortfall and/or projected growth demonstrating the requirement for the augmentation
- whether AGN considered alternative options to address the issue
- the prudency of the timing of the proposed augmentation
- the prudency and efficiency of the scale of the proposed augmentation
- the efficiency of the proposed project costs.

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66 AER, *Draft decision Australian Gas Networks Access Arrangement 2016 to 2021 attachment 6 – capital expenditure*, November 2015, pp. 41–45, and AER, *Final decision Australian Gas Networks Access Arrangement 2016 to 2021 attachment 6 – capital expenditure*, May 2016, pp. 33–34.

67 NGR, rr. 79(1)(a), 79(2)(ii).

68 NGR, r. 79(2)(c).

69 NGR, r. 79(2)(c).

70 AGN initially proposed $28.0 million ($2017) in augmentation capex in its Final Plan, and then later proposed $5.9 million ($2017) for the Sale transmission pipeline duplication and a further $0.3 million ($2017) for the Cranbourne high pressure augmentation.

71 NGR, r. 79(1)(a).

Our assessment focuses on the four projects that constitute $31.8 million (or 93 per cent) of AGN's proposal.

Dandenong-Crib Point Pipeline augmentation

We are satisfied that AGN's proposed $14.0 million ($2017) for the Dandenong to Crib Point Pipeline augmentation is conforming capex.

The Dandenong to Crib Point Pipeline is the primary supply to several high pressure networks in the Mornington Peninsula that supply gas to over 100 000 customers. Duplicating this pipeline has been undertaken in stages over the last ten years.

AGN submitted a detailed business case for this project which considered options including doing nothing in the 2018–22 access arrangement period, implementing demand management and three design and construction scenarios.[72] AGN's proposal is to complete this duplication by constructing a 4km steel transmission pressure pipeline from Abbotts Road to the Dandenong City Gate. AGN submitted that this is required to:

- maintain minimum gas pressures
- avoid guaranteed service level payments and relight costs associated with gas outages
- meet its obligation to supply 'infill' growth across the Mornington Peninsula.[73]

In response to an information request, AGN provided network planning reports, winter test results, evidence of pipeline coating defects and detailed cost estimates for the options it considered.[74]

Zincara also advised that AGN's proposal is prudent and, based on the approach used in developing the cost estimates, that the project costs are efficient.[75]

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[76]

Cranbourne High Pressure augmentation

We are satisfied that AGN's proposed $9.1 million ($2017) for the Cranbourne High Pressure augmentation is conforming capex.[77]

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72 AGN, *Attachment 8.6 – Business Cases*, December 2016.

73 AGN, *Attachment 8.6 – Business Cases*, December 2016, p. 177.

74 AGN, *Response to information request 2*, 9 February 2017.

75 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 20.

76 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).

77 AGN initially submitted that the proposed augmentation would cost $8.8 million ($2017), then later resubmitted that the total cost would be $9.1 million ($2017) based on updated project planning estimates. (Information request 3).

The Cranbourne high pressure network supplies gas to the broader Cranbourne areas located on the south-eastern fringe of Melbourne. AGN submitted that ongoing connections in and around Cranbourne will require network reinforcement to support customer growth while maintaining network reliability to existing customers.[78]

AGN submitted a detailed business case which considered options including doing nothing in the 2018–22 access arrangement period, implementing demand management, staging the augmentation and deferring the augmentation into the following access arrangement period. AGN proposed staging the augmentation given its regulatory obligations to maintain a safe and reliable supply of gas to customers.[79] The proposed works include small and relatively large new mains and new gate stations aligned with expected future residential developments. AGN submitted that this is required to:

- maintain minimum gas pressures;
- maintain and improve the safety of services;
- avoid guaranteed service level payments; and
- meet its obligation to supply 'infill' growth areas.[80]

In response to an information request, AGN provided network planning reports, winter test results and detailed cost estimates. AGN's modelling demonstrated the interaction between local network pressures and each proposed augmentation project within the Cranbourne network.[81]

Zincara also advised that AGN's proposal is prudent and, based on the approach used in developing the cost estimates, that the project costs are efficient.[82]

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[83]

Sale Transmission Pipeline duplication

We are satisfied that AGN's proposed $5.9 million ($2017) for Sale Transmission Pipeline duplication is conforming capex.

The Sale City Gate serves the communities of Sale and Maffra. AGN submitted that the Australian Energy Market Operator (AEMO) advised that due to changing hourly demand profiles in Victoria and an anticipated increase in gas powered generation, the 5 000 kPa inlet pressure at the Sale city gate can no longer be maintained with the

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78 AGN, *Final Plan*, December 2016, p. 94.
79 AGN, *Attachment 8.6 – Business Cases*, December 2016, p. 210.
80 AGN, *Attachment 8.6 – Business Cases*, December 2016, p. 198.
81 AGN, *Response to information request 3*, 13 February 2017.
82 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 23.
83 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).

Victorian Longford to Melbourne Pipeline in its current configuration.[84] AGN provided a letter from AEMO advising that the minimum connection pressure for Sale needs to be reduced to 4 500 kPa.[85]

AGN submitted a detailed business case which considered options including doing nothing in the 2018–22 access arrangement period, implementing demand management, duplicating the pipeline and deferral of augmentation into the following access arrangement period.[86] AGN's proposal is to duplicate the existing transmission pressure main from the outlet of the Sale city gate for 4 700 metres downstream, as the other options would not maintain minimum network pressures or may limit consumption during peak periods. AGN submitted that this will ensure regulatory compliance by maintaining minimum network pressures, and is the lowest cost solution that reinstates the existing level of service following AEMO's direction.[87] AGN provided a detailed cost estimate in its business case based on comparable works completed elsewhere in the network.

Zincara also advised that AGN's proposal is prudent and, based on the approach used in developing the cost estimates, that the project costs are efficient.[88]

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[89]

City Gate and Customer Transfer Meter Upgrades

We are satisfied that AGN's proposed $2.4 million ($2017) for the City Gate and Customer Transfer Meter Upgrades is conforming capex.

AGN submitted that major works at three entry points (Berwick, Lindrum Road and Sale) are required in the 2018–22 access arrangement period to ensure appropriate gate station capacity. AGN submitted that this augmentation is required in order to meet regulatory obligations under the Victorian Distribution System Code[90] and to maintain and improve the safety of services and maintain the integrity of services.

AGN considered options including doing nothing in the 2018–22 access arrangement period, maintaining the current network configuration and upgrading the three gate stations.[91] In response to an information request, AGN provided a detailed cost

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84 AGN, *Response to information request 11(B)*, 23 March 2017.

85 AGN, *Attachment 8.10 – Australian Energy Market Operator - Letter to AGN - Sale minimum connection pressure*, 21 November 2016.

86 AGN, *Response to information request 11(B)*, 23 March 2017.

87 AGN, *Response to information request 11(B)*, 23 March 2017.

88 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 33.

89 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).

90 AGN has a regulatory obligation to use all reasonable endeavours to ensure the minimum pressure is maintained at supply points and connect customers that are within the minor or infill extension area.

91 AGN, *Attachment 8.6 – Business Cases*, December 2016.

breakdown based on the actual incurred costs of recently completed comparable projects, including the Cobram City Gate and Melrose Drive Field Regulator upgrades and installing a City Gate at Thewlis Road, Pakenham. These projects were competitively tendered and are similar in scope.[92]

Zincara also advised that AGN's proposal is prudent and, based on the approach used in developing the cost estimates, that the project costs are efficient.[93]

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[94]

Other augmentation projects

We are satisfied that AGN's proposed $2.8 million ($2017) for various other augmentation projects is conforming capex.

AGN submitted that the following smaller projects were necessary to maintain minimum network pressures and to maintain and improve the safety and reliability of services:[95]

- $1.7 million to refurbish the Dandenong to Crib Point Pipeline
- $0.5 million to augment the Echuca network
- $0.2 million to augment the Moe network
- $0.4 million to augment the Wallan network.

AGN also provided business cases for each of these augmentation projects.

Zincara advised that the business cases are comprehensive and that AGN's proposal is prudent and, based on the approach used in developing the cost estimates, that the project costs are efficient.[96]

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[97]

Meter replacement

Meter replacement is an ongoing activity which is necessary to ensure that gas meters in the field are replaced when they fail to accurately read data. AGN has regulatory

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92 AGN, *Attachment 8.6 – Business Cases*, December 2016, p. 139.
93 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 26.
94 NGR, rr.79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).
95 AGN, *Attachment 8.6 – Business Cases*, December 2016.
96 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017.
97 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).

obligations to manage the integrity of meters and ensure they operate within the prescribed tolerance band for metering accuracy.[98]

We are satisfied AGN's proposed $32.6 million ($2017, unescalated direct costs) for meter replacement is conforming capex and have included it in our alternative capex estimate.[99]

AGN submitted that its proposal took into account:[100]

- the number of domestic and commercial periodic meter changes that are expected to be required each year of the access arrangement period, which is a function of a range of factors, including the age of meters, the condition of meters and the types of meters in service; and
- the cost of carrying out periodic meter changes (e.g. the costs of procuring new and refurbished meters, installing the meters, carrying out the testing and associated activities), which AGN has established through competitive tender processes and are reflected in AGN's proposed domestic and commercial periodic meter change unit rates.

Using information on the age of its meter fleet, the types of meters and the most recent test results, AGN estimated that 152,621 domestic meter replacements and 7,055 commercial meter replacements will be required in the 2018–22 access arrangement period. AGN proposed to undertake these meter replacements at a total cost of $33.2 million ($2017) which was later revised to $32.6 million ($2017) to correct the contractor component of its proposed unit rates.[101] This is 20 per cent greater than the actual/estimated meter replacement capex in the 2013–17 access arrangement period. AGN submitted that there was a significant increase in the number of meters installed between 2003 and 2007, which will require replacing in the 2018–22 access arrangement period.[102]

AGN proposed to replace meters with a combination of new and refurbished meters. AGN submitted that there is a saving of 35 per cent per meter when refurbished meters are used. The reduction in anticipated service life between a new and refurbished meter is 21 per cent (24 years versus 19 years), which means that the overall cost saving of using a refurbished meter is around 19 per cent.[103] AGN proposed to minimise inter-year variations in its meter replacement program by smoothing the number of replacements each year. This brings forward the replacement of some meters before the end of their deemed useful life, but also allows AGN to maximise the use of refurbished meters. There is a limit on the availability of refurbished meters of

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98 Under the National Measurement Act 1960 (Commonwealth), the Victorian Gas Distribution System Code and the New South Wales Gas Supply (Safety and Network Management) Regulation 2013.

99 NGR, r. 79(2)(c)(iii).

100 AGN, *Final Plan*, December 2016, p. 92.

101 AGN, *Response to information request 11*, 21 March 2017.

102 AGN, *Attachment 8.3 – Meter Replacement Plan*, December 2016, p. 14.

103 AGN, *Attachment 8.3 – Meter Replacement Plan*, December 2016, p. 21.

around 25 000 meters per annum, and so new meters are required if the annual program exceeds this amount.[104] We agree with AGN's proposal to smooth the replacement program where possible to ensure it meets its regulatory obligations. We also note that the use of refurbished meters is industry practice and is efficient because it reduces total capex.

AGN's proposed unit rates for meter replacements include materials and contractor rates. The forecast contractor rate for domestic meter replacements was notably greater than that during the 2013-17 access arrangement period. AGN submitted that it commenced a new Gas Fitting Services contract in February 2016 following a competitive tender process, and has used this as the basis for its contractor rate forecast.

Zincara advised that AGN's proposed meter replacement methodology is based on good industry practice and its forecast estimates are well developed. Zincara also advised that given that AGN's contracts have been competitively tendered, its proposal is prudent and efficient.

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[105]

Telemetry (SCADA)

AGN proposed $1.2 million ($2017, unescalated direct costs) to more effectively manage monthly meter reading or large customer sites and to extend the Supervisory Control and Data Acquisition (SCADA) network to regional towns and certain fringe points of the network.[106] We are satisfied that AGN's proposal is conforming capex and have included it in our alternative capex estimate.

AGN submitted that it relies on telemetry or SCADA for the real-time monitoring of network conditions and, in some cases, the remote control of gas flows and pressures to optimise system performance and maximise safety.

We assessed both of AGN's end of life replacement and field regulators and fringe points projects. Zincara also advised that the telemetry capex is required to meet electrical safety standards and that AGN's proposal is prudent and efficient.[107]

For these reasons and on the basis of the information available, including Zincara's advice, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[108]

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104 AGN, *Attachment 8.3 – Meter Replacement Plan*, December 2016, p. 19.
105 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).
106 AGN, *Final Plan*, December 2016, p. 95.
107 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 83.
108 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).

Other assets

This category captures remaining capex that does not fall into any of the categories discussed above. AGN proposed $34.8 million ($2017) for other capex in its Final Plan as well as the supporting documentation.[109]

We are satisfied that AGN's proposal is conforming capex and have included it in our alternative capex estimate.

AGN's proposed other capex includes:

- $14 million to modify two transmission pipelines to enable effective pipeline condition monitoring as required by AS 2885[110]
- $4 million to upgrade some of its plant and equipment to maintain the integrity and the safety of the network
- $3 million to install thermal safety devices in its service areas as part of its bushfire preparedness program
- $14 million to replace of cathodic protection systems, regulators, meter sets and valves and refurbish city gates and key depots.

Zincara advised that the majority of AGN's proposal is prudent and efficient.[111] Zincara did advise a reduction to AGN's proposed $4 million to upgrade some of its plant and equipment[112] of approximately $0.6 million ($2017), which represents 0.1 per cent of AGN's total proposed capex.

We reviewed AGN's supporting documents and Zincara's advice. We have concluded that the expenditure is prudent and efficient as AGN's methodology is based on a three-year average of actual historical expenditure. For this reason we are satisfied that no adjustment is required.

On the basis of the information available, we are satisfied that AGN's proposal is conforming capex justified on the grounds of maintaining the integrity and safety of services.[113]

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109 AGN, *Attachment 8.6 – Business Cases – Public*, December 2016, p. 309

110 The two transmission pipelines are Dandenong to Frankston and Dandenong to North Melbourne. AGN is required by AS2885.3-2012 (Clause 6.5), to monitor pipe wall integrity and maintain a minimum wall thickness in order to contain the fluid at the maximum allowable operating pressure. See AGN, *Response to Information Request #15*, 05 May 2017, p.5.

111 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017.

112 Zincara, *AER Access Arrangement 2017 – AGN*, June 2017, p. 74.

113 NGR, rr. 79(1)(a), 79(1)(b), 79(2)(c)(i) and 79(2)(c)(ii).

Overheads

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

We are satisfied that AGN's proposed $57.3 million ($2017, unescalated direct costs) for overheads is conforming capex and have included it in our alternative capex estimate.

AGN submitted that it applied the same approach that we approved for its South Australian network. This involves:

- splitting historic overhead costs into identified overhead categories (such as operations and maintenance, technical assurance and network engineering);
- identifying the proportion of these overhead category costs attributable to fixed or variable overhead costs;
- calculating an average fixed overhead cost incurred by AGN over the 2013 to 2015 period; and
- calculating the average percentage of variable overhead costs out of total capex over the 2013 to 2015 period and applying this percentage to total forecast capex over the next access arrangement period.

AGN's total overheads forecast for the 2018–22 access arrangement period is the total of the above forecast fixed and variable components. On the available information, including on the basis of our review for AGN's South Australian network, we are satisfied that AGN's proposed forecast overheads are conforming capex.[114]

[114] AER, *Draft decision Australian Gas Networks Access Arrangement 2016 to 2021 attachment 6 – capital expenditure*, November 2015, pp. 41–45, and AER, *Final decision Australian Gas Networks Access Arrangement 2016 to 2021 attachment 6 – capital expenditure*, May 2016.