

DRAFT DECISION Australian Gas Networks Access Arrangement 2016 to 2021

Attachment 13 – Demand

November 2015



and an a strend of

© Commonwealth of Australia 2015

This work is copyright. In addition to any use permitted under the Copyright Act 1968, all material contained within this work is provided under a Creative Commons Attributions 3.0 Australia licence, with the exception of:

- the Commonwealth Coat of Arms
- the ACCC and AER logos
- any illustration, diagram, photograph or graphic over which the Australian Competition and Consumer Commission does not hold copyright, but which may be part of or contained within this publication. The details of the relevant licence conditions are available on the Creative Commons website, as is the full legal code for the CC BY 3.0 AU licence.

Requests and inquiries concerning reproduction and rights should be addressed to the:

Director, Corporate Communications Australian Competition and Consumer Commission GPO Box 4141, Canberra ACT 2601

or publishing.unit@accc.gov.au.

Inquiries about this publication should be addressed to:

Australian Energy Regulator GPO Box 520 Melbourne Vic 3001

Tel: (03) 9290 1444 Fax: (03) 9290 1457

Email: AERInguiry@aer.gov.au

Note

This attachment forms part of the AER's draft decision on Australian Gas Networks' access arrangement for 2016–21. 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

Note	
Contents	
Shortened for	ms13-4
13 Demand	
13.1 Dr	aft decision13-6
13.2 AE	R's assessment approach13-8
13.2.1	Interrelationships13-9
13.2.2	Minimum, maximum and average demand 13-10
13.2.3	Forecast pipeline capacity and utilisation
13.3 Re	asons for draft decision13-10
13.4 Ta	riff V consumption per connection13-11
13.4.1	Methodological error with Core Energy's forecasting approach13-12
13.5 Re	visions13-16

Shortened forms

Shortened form	Extended form
AA	Access Arrangement
AAI	Access Arrangement Information
AER	Australian Energy Regulator
ATO	Australian Tax Office
capex	capital expenditure
CAPM	capital asset pricing model
ССР	Consumer Challenge Panel
CESS	Capital Expenditure Sharing Scheme
CPI	consumer price index
CSIS	Customer Service Incentive Scheme
DRP	debt risk premium
EBSS	Efficiency Benefit Sharing Scheme
ERP	equity risk premium
Expenditure Guideline	Expenditure Forecast Assessment Guideline
gamma	Value of Imputation Credits
GSL	Guaranteed Service Level
MRP	market risk premium
NECF	National Energy Customer Framework
NERL	National Energy Retail Law
NERR	National Energy Retail Rules
NGL	national gas law
NGO	national gas objective
NGR	national gas rules
NIS	Network Incentive Scheme
NPV	net present value
opex	operating expenditure
PFP	partial factor productivity
PPI	partial performance indicators
PTRM	post-tax revenue model
RBA	Reserve Bank of Australia

Shortened form	Extended form
RFM	roll forward model
RIN	regulatory information notice
RoLR	retailer of last resort
RPP	revenue and pricing principles
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	Service Target Performance Incentive Scheme
ТАВ	Tax asset base
UAFG	Unaccounted for gas
WACC	weighted average cost of capital
WPI	Wage Price Index

13 Demand

This attachment sets out our assessment of the demand forecasts for AGN for the 2016–21 access arrangement period. Demand is an important input into the derivation of AGN's reference tariffs. It also affects operating expenditure (opex) and capital expenditure (capex) linked to network growth (new connections).¹

13.1 Draft decision

Our position in this draft decision is to not approve AGN's proposed demand forecasts.

The forecasts AGN proposed in its access arrangement proposal were prepared by Core Energy. Our review of those forecasts has identified concerns with the forecasting method that Core Energy has used to forecast tariff V residential and commercial consumption per connection. We are not satisfied that these forecasts comply with the NGR. They have not been arrived at on a reasonable basis and are not the best estimates in the circumstances.²

We have developed alternative demand forecasts that we consider address these concerns and comply with the NGR. We have used these alternative demand forecasts in this draft decision. These forecasts are set out in Table 13.1 and Table 13.2 below. In particular, they result in an annual average decline in forecast consumption per connection over the 2016–21 access arrangement period of:

- -3.53 per cent for all residential customers, compared to Core Energy's estimate of -3.96 per cent
- -1.44 per cent for all commercial customers, compared to Core Energy's estimate of -1.9 per cent.

The figures for consumption per connection reflect an adjustment to remove zeroconsuming meters.³ This adjustment is reasonable.

We agree with advice from our consultant, ACIL Allen, that AGN's forecast Tariff V connection numbers is consistent with rule 74(2) of the NGR.

Based on ACIL Allen's advice, we are also satisfied that AGN's Tariff D demand forecasts are consistent with rule 74(2) of the NGR.

¹ Our draft decisions on AGN's capex and opex are set out in attachments 6 and 7 to this draft decision.

² NGR, r. 74(2).

³ AGN's 'zero-consuming meters' program in 2016 and 2017 results in the removal of approximately 6800 meters that do not consume any gas. Of these, 1088 are assumed to be commercial meters and 5712, residential meters. This program results in a fall particularly in commercial customer numbers over 2015 to 2017. ACIL Allen assessed the effect of this program on Tariff V connection numbers and was satisfied with Core Energy's adjustments (ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 5 November 2015, pp. 38–40)

Table 13.1Draft decision on consumption and consumption per
connection for tariff V and tariff D

	2016–17	2017–18	2018–19	2019–20	2020–21
Tariff V total consumption					
Residential	6,375,499	6,218,183	6,072,174	5,937,029	5,807,417
Commercial	2,909,806	2,904,930	2,884,557	2,861,440	2,849,001
Tariff V consumption per connection					
Existing Residential	-	-	-	-	-
New E-to-G	-	-	-	-	-
New Estates	-	-	-	-	-
New Med Density	-	-	-	-	-
Total Residential	15.0	14.5	14.0	13.5	13.0
Existing commercial	-	-	-	-	-
New commercial	-	-	-	-	-
Total Commercial [®]	297	293	286	279	273
Tariff D total consumption					
Total consumption	9,285,305	9,123,112	8,956,731	8,798,468	8,656,418
MDQ	60.57	56.96	56.59	56.27	56.04
ACQ (GJ)	11,801,188	11,352,437	11,190,175	11,052,034	10,931,438

Source: AER analysis.

Notes: a. This also accounts for the transfer from Tariff D.

Table 13.2Draft decision total connections, new connections and
disconnection numbers

	2016–17	2017–18	2018–19	2019–20	2020–21
Total connections					
Residential	424,321	429,376	434,603	440,208	446,004
Commercial	9,781	9,913	10,086	10,261	10,439
Tariff D	125	118	118	118	118
New connections					
Electricity to gas	1,435	1,435	1,435	1,435	1,435
New estates	4,886	4,592	4,781	5,093	5,306
Medium/high density	498	464	463	547	544
Commercial	259	229	272	277	281
Disconnections					
Residential	1,424	1,435	1,453	1,470	1,489
Commercial	97	98	100	101	103
Tariff D to tariff V movement	0	1	0	0	0
Tariff V to tariff D movement	0	0	0	0	0

Source: AER analysis.

13.2 AER's assessment approach

The NGR require a full access arrangement proposal for a distribution pipeline to include usage of the pipeline over the earlier access arrangement period showing:

- minimum, maximum and average demand; and customer numbers in total and by tariff \mbox{class}^4
- to the extent that it is practicable to forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period, a forecast of pipeline capacity and utilisation of pipeline capacity over that period and the basis on which the forecast has been derived.⁵

The NGR also require that forecasts and estimates:⁶

• are arrived at on a reasonable basis

⁴ NGR, r. 72(1)(a)(iii).

⁵ NGR, r. 72(1)(d).

⁶ NGR, r. 74(2).

• represent the best forecast or estimate possible in the circumstances.

The AER considers that there are two important considerations in assessing whether demand forecasts are arrived at on a reasonable basis and whether they represent the best forecasts possible in the circumstances.⁷ These are:

- the appropriateness of the forecast methodology this involves consideration of how the demand forecast has been developed and whether or not relevant factors have been taken into account.
- the application of the forecasting methodology this involves consideration of the accuracy of data and assumptions on each of the input parameters.

To determine whether AGN's proposed demand forecasts are arrived at on a reasonable basis and are the best possible forecasts in the circumstances, we reviewed:

- information provided by AGN as part of its proposed access arrangement; specifically, Core Energy demand model and its report on AGN's demand forecasts, access arrangement information and responses to the regulatory information notice (RIN)
- advice from ACIL Allen in its review of AGN's demand forecasts. ACIL Allen reviewed AGN's demand forecasts and assisted in developing alternative demand forecasts where we were not satisfied that forecasts comply with the requirements of the NGR.
- additional information provided by AGN in response to our information requests

13.2.1 Interrelationships

We have considered the relevant interrelationships between different components of AGN's access arrangement as part of our analysis.

Several interrelationships exist. This includes the effect of forecast demand on the efficient amount of capex and opex and tariffs in the 2016–21 access arrangement period. In particular, the demand forecasts impact:

- approved tariff V connections capex, given the number of new connections affects the amount of approved connections capex
- approved opex, given the forecast total connections numbers and total consumption (output growth) is used in deriving the additional opex required to service the larger network
- tariff prices, given they depend on forecast consumption (demand) per connection. Changes in these forecasts will change tariff prices. In simple terms, tariff prices are determined by cost divided by quantity (where quantity is measured by demand

⁷ NGR, r. 74(2).

per connection). This means that an increase in forecast quantity has the effect of reducing the tariff price.

13.2.2 Minimum, maximum and average demand

Under the NGR, AGN's access arrangement information must include minimum, maximum and average demand for the earlier access arrangement period.⁸

We consider that AGN's access arrangement information satisfies the requirement of rule 72(1)(a)(iii) of the NGR.⁹

13.2.3 Forecast pipeline capacity and utilisation

The NGR require that to the extent practicable, the AAI should include forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period.¹⁰ AGN did not provide information and submitted that:¹¹

Rule 72 of the National Gas Rules (NGR) requires AGN, to the extent it is practicable, to provide a forecast of pipeline capacity and utilisation over the next (2016/17 to 2020/21) AA period. As previously indicated to the Australian Energy Regulator (AER), such parameters are not relevant or have no meaning in the context of a natural gas distribution network. This reflects that the Network consists of a variety of inter-linked pipe materials, each with a different capacity (unlike natural gas transmission pipelines).

We recognise there are practical considerations which mean that calculating capacity is not straightforward.

13.3 Reasons for draft decision

Our position in this draft decision is to:

- not approve AGN's proposed Tariff V demand forecasts
- approve AGN's proposed Tariff D demand forecasts.

We do not consider AGN's proposed Tariff V demand forecasts comply with the NGR.¹² In particular, we do not consider that AGN's forecasting methodology for Tariff V residential and business consumption per connection results in forecasts that are arrived at on a reasonable basis and that represent the best estimates in the circumstances.

We discuss our reasons below.

⁸ NGR, r. 72(1)(a)(iii)(A).

⁹ AGN, Access Arrangement Information, July 2015, p. 79–81.

¹⁰ NGR, r. 72(1)(d).

¹¹ AGN, Access Arrangement Information, July 2015, p. 31.

¹² NGR, r. 74(2).

We consider that proposed Tariff D demand forecasts are arrived at on a reasonable basis and that represent the best estimates in the circumstances.

13.4 Tariff V consumption per connection

Core Energy's approach to forecasting Tariff V consumption projects is to separately forecast consumption per connection and the number of customer connections. Total forecast demand is calculated as the product of the two.¹³

Based on the information before us, we are satisfied with Core Energy's forecasts of number of customer connections. We are also persuaded by ACIL Allen's advice that arrives at the same conclusion.¹⁴ Our concerns relate to Core Energy's forecasting methodology for Tariff V residential and commercial consumption per connection.

Core Energy uses the following methodology to forecast Tariff V residential and commercial consumption per connection:

1. Historic demand is normalised to remove the impact of abnormal weather and to derive a per customer forecast based on historic trends (i.e. where demand is primarily a function of demand in the previous year plus a trend factor).¹⁵

Based on the information before us, we are satisfied with Core Energy's weather normalisation of the historical data. We are also persuaded by ACIL Allen's advice that arrives at the same conclusion.¹⁶

- 2. The historical trend is projected forward based on an analysis of the change in consumption per connection from 2011 to 2014 for each of the following:
 - residential connection types:
 - incumbent customers (Core Energy refers to these customers as 'existing customers')
 - new dwellings new estates:
 - new dwellings medium density/high rise (MD/HR)
 - o new electricity to gas (E to G) connections
 - commercial connections types:
 - incumbent (Core Energy refers to these customers as 'existing customers')
 - o new commercial

¹³ Core Energy, Gas Demand Forecasts, AGN – SA Gas Access Arrangement 2017–21, June 2015, p. 38.

¹⁴ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, pp. 31–32.

¹⁵ The trend factor is calculated as the historical average annual growth rate.

¹⁶ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, p. 15.

3. Two post-model adjustments are made to the historic trend to account for forecast changes in the price of gas and electricity, which may differ from historical changes.¹⁷

13.4.1 Methodological error with Core Energy's forecasting approach

We do not consider that AGN's proposed forecasts for residential and commercial consumption per connection have been arrived at on a reasonable basis and are the best estimates in the circumstances.

In particular, how Core Energy has calculated the average annual growth rate that it applied to the historical trend to forecast residential and commercial consumption per connection appears incorrect.

Table 13.4 sets out AGN's proposed average annual change in consumption per connection as well as our alternative estimate over the forecast period.

Table 13.4 – Consumption per connection – average annual growth (per cent)

Tariff V connections	Core Energy forecast of average annual consumption per connection (%)	AER decision
Existing Residential	-3.43	
New E-to-G	-3.16	
New Estates	-3.16	
New MD/HR	-3.16	
Total Residential	-3.96 (weighted) ^a	-3.53 ^b
Existing commercial	-1.29	
New commercial	2.29	
Total commercial	-1.9 (weighted) ^a	-1.44 ^b

Source: Core Energy demand model.

Notes: (a) weighted by connection numbers

(b) includes the effect of zero consuming meters.

¹⁷ This uses an estimate of own-price elasticity of -0.3 for residential demand per connection and -0.35 for commercial demand per connection and an estimate of cross-price elasticity of 0.1 for both tariff classes.

Residential consumption per connection

As table 13.4 shows, AGN applies the average annual growth rate of -3.16 per cent to each of the new residential customer types, and -3.46 to existing customers, to forecast consumption per connection.¹⁸

We consider that applying these rates has the effect of double counting the reduction in gas consumption at the total residential customer level. This is because:

- Our analysis of Core Energy's model reveals that the calculation of the average declining rate for existing customer (-3.43) is actually for total (overall) residential customers. This is because consumption per connection for this category is calculated as total consumption divided by total connections, including the new estates, new E to G and new MD/HR connections;
- the overall declining rate includes the effect of 'dwelling substitution' where
 existing customers with higher consumption (e.g. older houses) are replaced with
 new customers with relatively lower consumption (e.g. new dwellings). As average
 consumption for new residential connections is lower relative to existing residential
 connections, the overall declining rate is higher than the rate of decline for existing
 customers were the latter does not include the substitution effect;
- When applying the overall declining rate that directly accounts for the dwelling substitution effect to each individual connection type, double counting occurs because Core Energy's forecasting approach accounts for the same dwelling substitution effect via its method of adding new connection types (new MD/HR, new E to G and new estates). As these new customer types have relatively lower consumption, Core Energy's forecasting approach results in an overstatement of the forecast decline in total residential consumption per connection.¹⁹ The double counting is evident in Core Energy's forecast of a greater declining average annual rate of -3.96 per cent compared to the rate of 3.16 per cent applied to new customer connection and -3.43 applied to existing customer connections.

ACIL Allen has advised us that to avoid this overstatement the overall declining rate should be applied to the total residential consumption.²⁰ We agree with this assessment and position and have therefore applied the overall declining rate to total residential consumption per connection.

¹⁸ Note that -3.16 and -3.43 growth rates for existing and new connection types respectively include the post model adjustments for cross and own –price elasticity effects. The growth rates differ because Core Energy attempts to derive new connection demand reflecting the lagged nature of new connections coming online through the year. Note that this lagged nature of new connections is not relevant to our alternative approach given our starting value of average consumption per connection in 2014 is measured on the average of year basis.

¹⁹ Core Energy applies a cumulative new connections method to forecasting. That is, starting from 2014, 'existing' connections continue to fall (as these connections are forecast as existing connections net of disconnections), while new connections accumulate over time.

²⁰ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, p. 27.

Our estimate of the overall declining rate (-3.53) differs from Core Energy's rate of -3.43 because of the adjustment for the impact of zero-consuming meters.²¹ In particular, the difference is due to our adjustment which is applied to total residential customers while Core Energy's adjustment only applies to existing connections.²²

We consider that forecasts of consumption based on the average annual change in consumption of -3.53 per cent for all residential customers results in best estimate in the circumstances.

Commercial consumption per connection

Similarly, for commercial connections, our analysis of Core Energy's model reveals that the calculation of the average declining rate for existing commercial customers (-1.29) is actually for total (overall) commercial customers.²³ Applying the overall declining rate to each connection type overstates the decline in consumption at the total customer level as new commercial customers are forecast to have lower average gas consumption compared to existing commercial customers. This results in an overstated decline of -1.90 per cent annually for the total commercial customer group.

As with residential consumption per connection, to avoid this overstatement the overall declining rate is applied to the total commercial consumption.²⁴ Our estimate of the overall declining rate (-1.44 per cent) differs from Core Energy's rate of -1.29 because of the adjustment for the impact of zero-consuming meters.²⁵ In particular, the difference is due to our adjustment which is applied to total commercial customers while Core Energy's adjustment only applies to existing connections.²⁶

²¹ AGN's 'zero-consuming meters' program in 2016 and 2017 results in the removal of approximately 6800 meters that do not consume any gas. Of these, 1088 are assumed to be commercial meters and 5712, residential meters. This program results in a fall particularly in commercial customer numbers over 2015 to 2017. ACIL Allen assessed the effect of this program on Tariff V connection numbers and was satisfied with Core Energy's adjustments (ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, pp. 38–40).

²² In particular, our estimate is calculated by applying Core Energy's unadjusted annual rate of decline, -3.52 per cent per annum, to starting average consumption, and then further adjusting for removing zero-consuming meters from total residential connections. This gives the decline rate for average consumption per operative connection being -3.53 per annum for residential customers. In contrast, Core Energy's further adjusted decline rate of -3.43 for residential customers.

²³ As with the residential consumption, the growth rates for existing and new commercial connections differ due to the lagged nature of new connections. Note that this lagged nature of new connections is not relevant to our alternative approach given our starting value of average consumption per connection in 2014 is measured on the average of year basis.

²⁴ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, p. 27.

²⁵ AGN's 'zero-consuming meters' program in 2016 and 2017 results in the removal of approximately 6800 meters that do not consume any gas. Of these, 1088 are assumed to be commercial meters and 5712, residential meters. This program results in a fall particularly in commercial customer numbers over 2015 to 2017. ACIL Allen assessed the effect of this program on Tariff V connection numbers and was satisfied with Core Energy's adjustments (ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, pp. 38–40).

²⁶ In particular, our estimate is calculated by applying Core Energy's unadjusted annual rate of decline, -2.02 per cent per annum, to starting average consumption, and then further adjusting for removing zero-consuming meters from total commercial connections. This gives the decline rate for average consumption per operative connection being -1.44 per annum for commercial customers. In contrast, Core Energy's further adjustment for the removal of

We consider that forecasts of consumption based on the average annual change in consumption of -1.44 per cent for all commercial customers results in best estimate in the circumstances.

Double-counting effect

ACIL Allen were able to further demonstrate the existence of the double counting effect through its analysis of the historical data.

In the historical period, the number of connections in each type changes. In particular, existing connections at the start of the period continue to decline and other connection types (new connection types) increase at various rates. AGN provided Core Energy with data relating to historical consumption of each customer type as well as the number of customers of each type. From this, Core Energy calculated the average annual change in consumption per connection for each customer type.

As noted previously, the average change in consumption for existing residential customer connections is actually for the total residential customer group. To test the existence of the double counting effect, ACIL Allen 'backed out' the consumption of 'residual' customers (residential customers net of the other residential connection types) from total consumption.

ACIL Allen observed that the historical average change in annual consumption by 'residual' residential connection types is –2.48 per cent. This compares to Core Energy's reported –3.08 per cent decline (calculated as total residential consumption divided by total residential connections).²⁷ Core Energy's approach therefore overstates the decline in the residual customer type.

Similarly, for commercial consumption per connection, the residual commercial customers grew at an average rate of -0.52 per cent. This compares to Core Energy's reported existing commercial declining rate of -1.42 per cent (calculated as total commercial consumption divided by total commercial connections).²⁸

ACIL Allen has advised us that it is conceptually better to use different growth rates for different customer types. However, in this case, it is not possible to derive a reliable basis for forecasting future consumption for each of the residential connection types.²⁹ This is because the data for the last year (2014) of the small sample (and the starting point to project the historical trend forward) is a calculated value and not an actual historical data point. Further, if the historical decline rates for each connection type were to be applied to the 2016–21 access arrangement period, the resulting estimates do not appear reasonable.

zero-consuming meters applies only to the existing connections, which results in adjusted decline rate of -1.29 for commercial customers.

²⁷ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, p. 24.

²⁸ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, p. 25.

²⁹ ACIL Allen, *Review of Demand Forecasts for the AGN South Australian Gas Networks*, 11 November 2015, p. 25.

ACIL Allen has therefore not calculated alternate different growth rates for each individual connection type over the historical and the 2016–21 access arrangement period given that reliable forecasts cannot be determined on the basis of the available data.³⁰ To the extent it is relevant in setting reference tariffs, we invite AGN to provide forecasts of consumption per connection at the individual connection level

13.5 Revisions

We require the following revisions to make the access arrangement proposal acceptable:

Revision 13.1: Make all necessary revisions to reflect this draft decision, as set out in Table 13.1 and Table 13.2.

³⁰ For the purposes of setting reference tariff calculation at the draft decision stage, adjustments are been made to our estimates on a pro rate basis.