

Mount Barker Natural Gas Extension

Business Case

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Mount Barker natural gas extension

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1 Introduction

1.1 Project overview

Description of Project	Extension and reticulation of the natural gas distribution network from Murray Bridge through Monarto South and Kanmantoo to Mount Barker
Estimated Cost	Total capex: \$57.3 million (real \$2017/18) Extension cost: \$29.7 million; Reticulation, meters and services costs: \$27.6 million Current period cost: \$35.4 million; Future period costs: \$21.9 million
NPV Economic Value Test	\$29.9 million (\$2017/18) over a 30-year assessment period
NPV Incremental Revenue Test	\$5.1 million (\$2017/18) over a 30-year assessment period
Consistency with the SA Access Arrangement and the National Gas Rules (NGR)	Application to AER under section 8 of our South Australian Access Arrangement (AA) for the high pressure extension to be covered by the AA. Seeking advanced determination on conforming capex under National Gas Rule (NGR) 80. The project complies with the criteria for conforming capex under NGR 79 as: <ul style="list-style-type: none"> the overall economic value of the expenditure is positive (NGR 79(2)(a)), and the present value (PV) of the incremental revenue from the project exceeds the PV of the capital costs incurred in delivering the extension to Mount Barker (NGR 79(2)(b)).
Stakeholder Engagement	<ul style="list-style-type: none"> Local and state government Land owners and developers Potential commercial customers
Supporting Information	<ul style="list-style-type: none"> <i>Attachment 1: Comparison of assumptions</i> <i>Attachment 2: Previous Information Requests</i> <i>Attachment 3: Natural Gas to Mount Barker Headworks Summary</i> <i>Attachment 4A: Core Energy – AGN Mt Barker Final Report</i> <i>Attachment 4B: Additional Support for Commercial and Industrial Forecasts</i> <i>Attachment 5: Core Energy – AGN Mt Barker Model</i> <i>Attachment 6A: Penetration Data</i> <i>Attachment 6B: Additional Support for Penetration Rate</i> <i>Attachment 7: Consumption Data</i> <i>Attachment 8: Customer Survey Summary</i> <i>Attachment 9: Natural Gas to Mount Barker Concept Route Options Study</i> <i>Attachment 10: Frontier Economics – Economic costs and Benefits of the Mt Barker Extension Report</i> <i>Attachment 11A: Frontier Economics – Mount Barker Extension Economic Analysis Model</i> <i>Attachment 11B: Additional Support for Economic Analysis</i> <i>Attachment 12: Mount Barker Cashflow Model</i>

1.2 Executive Summary

Our vision is to be the leading natural gas distributor in Australia. One of the ways we strive to be sustainably cost efficient is delivering profitable growth. Mount Barker is one of the fastest

growing regions in South Australia, with its population forecast to grow by more than 65% over the next twenty years. The South Australian Government has also identified the nearby industrial centre of Monarto South, which is an important job centre for the region, as a key region for further industrial development.

We are applying to the AER under Section 8 of our South Australian Access Arrangement (AA) to construct a high-pressure extension and reticulation to service growth in Mount Barker as well as industry in Monarto South and Kanmantoo. We are also applying for an advanced determination under NGR 80 with regard to future capital expenditure required in 2019/20 and 2020/21. A NGR 80 determination confirms the capital expenditure is conforming (under NGR 79) and will be included in the regulatory asset base (RAB) at the start of the 2021-26 AA period.

Proposed capital expenditure must meet the 'conforming' capital expenditure criteria in NGR 79 to be included in our RAB. Firstly, all capital expenditure must be prudent, efficient, consistent with good industry practice and achieve the lowest sustainable cost of providing services.

Secondly, capital expenditure must be justifiable by either having an overall positive economic value, earning enough revenue to cover the costs in net present terms, or being necessary to maintain or improve safety, maintain integrity, comply with regulatory obligations or maintain current supply capacity.

This business case provides relevant economic analysis that justifies extending the natural gas distribution network to the Mount Barker region at a total capital cost of \$57.3 million (\$2017/18). The extension provides an overall net positive economic benefit of \$29.9 million (\$2017/18) [NGR 79(2)(a)] and derives sufficient revenue to cover the costs, with a positive net present value of \$5.1 million (\$2017/18) [NGR 79(2)(b)].

Table 1 sets out the future capital expenditure in 2019/20 and 2020/21 we are seeking for advance determination under NGR 80, which totals \$35.4 million (\$2017/18). We intend to undertake this work within our existing AA capital allowance and therefore are not asking for additional funding in 2019/20 and 2020/21.

Table 1: Capital expenditure 2019/20 – 2020/21 (\$ million 2017/18)

	2019/20	2020/21	Total
Pipeline	26.2	-	26.2
Offtakes	2.2	-	2.2
Trunk reticulation (CBD & Glen Lea)	-	4.4	4.4
Reticulation	-	0.6	0.6
Meters & Services	-	0.4	0.4
Overhead	1.4	0.3	1.6
Total	29.7	5.7	35.4

Consistent with our AA capital allowance, we will only include the amount of capital expenditure we actually incur that is aligned with the advance determination under NGR 80 into the RAB.

1.3 Background

Mount Barker is 36 kilometres south-east of Adelaide and the largest town in the Adelaide Hills, with a population of around 14,000 people.¹ The wider Mount Barker region is one of the fastest growing regions in South Australia,² with its population predicted to grow from 33,000 now to 55,000 by 2036. The Mount Barker region includes Littlehampton, Nairne and Kanmantoo, which are also home to manufacturing, food processing, logistics and mining businesses.

In 2010, the South Australian government re-zoned rural land surrounding Mount Barker to residential, unlocking 1,300 hectares of land to be developed for new dwellings.³ Growth is also forecast to continue beyond this horizon.⁴

The region is not currently served by natural gas, but does have some reticulated LPG.⁵ There is an opportunity to provide natural gas to the region now and connect customers as the region continues to grow. There is also further potential upside in connecting existing homes, as well as converting reticulated LPG networks to natural gas.

The Adelaide Hills has a cooler climate than metropolitan Adelaide. This makes it a logical area to extend the natural gas network due to the demand for space heating, as well as cooking and hot water. The extension would provide homes and businesses in the region with greater fuel choice, more affordable energy and would result in lower carbon emissions. An increase in the total customer base also allows us to spread our fixed costs over more customers, reducing costs to all existing customers.

The proposed high pressure pipeline extension will originate in Murray Bridge, and pass Kanmantoo and the Monarto South industrial precinct, which has been earmarked for expansion.⁶ This presents opportunities to connect a number of large businesses and promote further economic development in the region.

Our stakeholder engagement program undertaken during the South Australian AA review showed *“customers support expanding and improving the network where there is a clear benefit to residents and business”*⁷ and, *“customers are looking for assurances that proposed initiatives will support local jobs and business or that AGN has at least considered this issue. They are also more willing to pay for initiatives that provide wider community benefits.”*⁸

The proposed extension has received both Local and State Government support with the South Australian Minister for Mineral Resources and Energy saying that:

*“(A)ccess to natural gas will allow Mt Barker residents to take advantage of an alternative low emission energy source for various applications including cooking, water heating and space and central heating. Natural gas can also be used for a wide range of commercial and industrial applications. Provision of natural gas in Mt Barker will offer residents and businesses greater choice and improve energy security.”*⁹

¹Australian Bureau of Statistics,

http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC40923?opendocument

²Australian Bureau of Statistics, <http://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/3218.0Main%20Features352014-15?opendocument&tabname=Summary&prodno=3218.0&issue=2014-15&num=&view=>

³ South Australian Government Website,

https://www.sa.gov.au/data/assets/pdf_file/0005/16493/Mount_Barker_Community_Information_Sheet.pdf

⁴ <http://forecast.id.com.au/mount-barker>

⁵ 638 LPG distribution connections as at 2016-17 <https://www.escosa.sa.gov.au/ArticleDocuments/539/20171219-Energy-PerformanceReport2016-17-OffGridNetworks.pdf.aspx?Embed=Y>

⁶ See *Monarto Masterplan, prepared for the Rural City of Murray Bridge, District Council of Mount Barker, and RDA Murraylands and Riverland*, Jensen Planning and Design, November 2016.

⁷ Deloitte, *Australian Gas Networks stakeholder insights report*, South Australian Stakeholder Engagement Program, Feb 2015, p4

⁸ Deloitte, *Australian Gas Networks stakeholder insights report*, South Australian Stakeholder Engagement Program, Feb 2015, p13

⁹ The Hon Tom Koutsantonis MP, Letter to the AER, Australian Gas Networks' (AGN) proposed Access Arrangement for 2016-21, 20 November 2015.

Further, the District Council of Mount Barker (“Mount Barker Council”):

sees natural gas as an effective, affordable fuel with positive environmental outcomes. Council has adopted an Economic Development Strategy and recently employed a full time Economic Development Officer to implement the strategy. Access to natural gas is likely to enhance economic development in Mt Barker, providing businesses with access to a clean, efficient and environmentally friendly fuel.¹⁰

There is strong community support for the extension, which is backed by the benefits to new and current customers in the area, as well as customers connected to the existing network.

1.3.1 Growth potential

The South Australian Government released its 30-year plan for Greater Adelaide in 2010. The plan identified the Mount Barker region as a key part of Adelaide’s urban land supply.¹¹ The Government released an update in 2017 which reaffirms expected population growth in the Greater Adelaide region, including the need for an additional 248,000 dwellings (nearly 8,300 per year) by 2045.¹²

Multiple medium and large residential estates are being developed in the east, south and west of Mount Barker. Around 6,800 new homes are forecast to be built over the 20 years from 2020/21.¹³ There are also several large businesses within Mount Barker, Monarto South and Kanmantoo. Reticulated natural gas can provide considerable savings and support expansion opportunities for these businesses.

We have monitored developments in the Mount Barker region over the past five years. Between 2011 and 2016 the number of dwellings in Mount Barker grew by 1,400 (following growth of 1,500 between 2006 and 2011)¹⁴ with a similar level of growth forecast over the next 20 to 30 years.

Delivering the mains extension in the next 2-3 years will allow customers to realise benefits sooner, minimise costs and maximise the number of customers who will have the choice of natural gas.

1.3.2 South Australian Access Arrangement

We proposed to include a Significant Extensions Event pass-through in our Initial AA Proposal submitted on 1 July 2015 as we were in the early stages of our analysis for Mount Barker. The AER did not accept this proposal in its draft decision as it did not consider the proposed costs unpredictable or uncontrollable and as such, considered the proposed event did not meet the requirements of a pass-through event. The AER also considered such expenditure should be assessed as part of the proposed capital and operating expenditure for the current 2016-21 AA period.¹⁵

<https://www.aer.gov.au/system/files/Government%20of%20South%20Australia%20-%20Additional%20submission%20on%20Australian%20Gas%20Networks%20proposed%20Access%20Arrangement%20for%202016-2021%20-%202020%20November%202015.PDF>

¹⁰ Andrew Stuart, CEO Mount Barker District Council, Letter to the AER Re Reticulation of Mount Barker with Natural Gas, 2 February 2016.

<https://www.aer.gov.au/system/files/Mount%20Barker%20District%20Council%20-%20Letter%20re%20Reticulation%20of%20Mount%20Barker%20with%20Natural%20Gas%20-%202020%20February%202016.pdf>

¹¹ http://livingadelaide.sa.gov.au/_data/assets/pdf_file/0003/319809/The_30-Year_Plan_for_Greater_Adelaide.pdf

¹² Page 17, *The 30-Year Plan for Greater Adelaide - 2017 Update*, Government of South Australia, 2017.

¹³ AGN Mount Barker Report, Core Energy, December 2017.

¹⁴ <http://profile.id.com.au/mount-barker/dwellings?EndYear=2011&DataType=EN>

¹⁵ AER, Draft decision: Australian Gas Networks Access Arrangement 2016–21, Attachment 11 - Reference tariff variation mechanism, p 37.

In our Revised AA Proposal, we submitted a business case for the Mount Barker extension based on early estimates of costs, customer connections and expected demand. This business case was developed over a short period of time in response to the draft decision (around 20 days) and therefore did not benefit from the more detailed analysis we have now undertaken.

The AER did not accept our proposed capital expenditure in its final decision as there was insufficient information to convince it the relevant requirements of the NGR had been satisfied. The key assumption that led to this conclusion was the proposed penetration rate.

The AER assumed a value of 65%, which is the South Australian statewide average forecast of connection penetration for 2021 (and therefore includes areas where our gas network is not present). We had proposed 95%, which reflected the actual penetration rate achieved in new housing developments most similar in size and scope to those in Mount Barker.

Given this was late in the AA review process, there was not enough time to rectify the lack of information available to reconcile the differing penetration rate estimates. Since then we have undertaken further, and more detailed, analysis of the viability of the extension. This includes overall economic value analysis, independent connection and demand forecasts, additional analysis of the forecast penetration rate and further engagement.

To assist with the review of this extension proposal, a comparison of the assumptions used in this business case to the Revised AA Proposal business case is provided in *Attachment 1: Comparison of assumptions*. Updated responses to previous information requested by the AER during the South Australian AA review process is provided in *Attachment 2: Previous Information Requests*.

We note the analysis we have now undertaken is far more detailed than our previous business case (due to time) and, indeed, than any other business case normally provided as part of an AA proposal.

1.3.3 New information - FEED study, Core Energy Group demand forecast

In November 2016, APA (on behalf of AGN) commenced a front end engineering design (FEED) study, which further investigated the cost of reticulating natural gas in the Mount Barker region. This was preceded by a Pre-FEED study, which examined preferred pipeline route options and considered potential demand in Mount Barker, Monarto, Callington, Littlehampton and Kanmantoo.

The FEED work indicates greater demand growth than previously thought, particularly when the Monarto South industrial area is factored into the assessment. The FEED work further progresses design and costing of the preferred pipeline route, with *Attachment 3: Natural Gas to Mount Barker Headworks Summary* report summarising progress to date.

In 2017, we commissioned Core Energy Group (CE) to conduct an independent forecast of customers and demand expected to connect to the Mount Barker extension. CE forecasts 6,678 new gas customers over the next 20 years comprising 6,502 new residential (Tariff R) connections, as well as 171 commercial (Tariff C) customers and at least 5 industrial (Tariff D) customers.

CE has developed assumptions that best represent the characteristics of the region. These assumptions incorporate a mix of statewide and extension specific factors where appropriate based on recent greenfield projects across South Australia that bear similarities in climate, customer profile and construction type that impact on expected penetration. CE also utilise the customer survey information obtained by APA.

The demand forecasts, assumptions and methodology are explained in *Attachment 4A: Core Energy – AGN Mt Barker Final Report* and *4B: Commercial and Industrial Forecasts Additional Support*. Also see CE's demand model at *Attachment 5: Core Energy – AGN Mt Barker Model* and the residential penetration and consumption data at *Attachment 6A: Penetration Data Attachment 6B – Penetration Rate Additional Support* and *Attachment 7: Consumption Data*. APA's customer survey information is provided at *Attachment 8: Customer Survey Summary*.

1.3.4 Investment evaluation and benefits

The conforming capital expenditure criteria under NGR 79(1)(a) require us to demonstrate the expenditure is prudent, efficient, in line with good industry practice and achieves the lowest sustainable cost of service delivery. The expenditure will expand natural gas supply to the growing Mount Barker region, providing benefits to residential and business customers in the area, as well as increasing overall gas demand and therefore lowering the average cost of service delivery across South Australia.

The extension reflects conforming capital expenditure and is justifiable under two tests; the economic value test at NGR 79(2)(a) and the incremental revenue test at NGR 79(2)(b). We note that both assessments consider a 30 year period. However, the assessment assumes that growth in Mount Barker occurs only in the first 20 years with no further new connections in the remaining 10 years of the assessment.

Mount Barker however will continue to grow beyond this horizon and we will continue to connect new customers over the full 60 year life of the pipeline. Although not included in the assessment, we expect there will be opportunities to connect existing homes in Mount Barker to the extension, and as such, consider the assumptions underpinning our analysis to be conservative.

The assessment also includes a small number of existing and new commercial and industrial customers in Monarto South and Kanmantoo connecting to the extension.

1.3.4.1 Economic value test

The economic value test under NGR 79(2)(a) sums the net economic benefits directly accruing to the service provider, gas producers, users and end users. The net economic benefits assessed include a reduction in total energy costs to customers that connect to the extension arising from being able to use natural gas over more expensive alternative fuels.

The net economic benefits accruing to the service provider, gas producers and users (retailers) is the efficiency gains from being able to sell more gas and offer services across a greater volume of gas sold. The sum of the economic benefits is then compared to the economic cost of building the extension, amortised over its economic life. A conservative estimate of the overall economic value over 30 years is \$29.9 million.

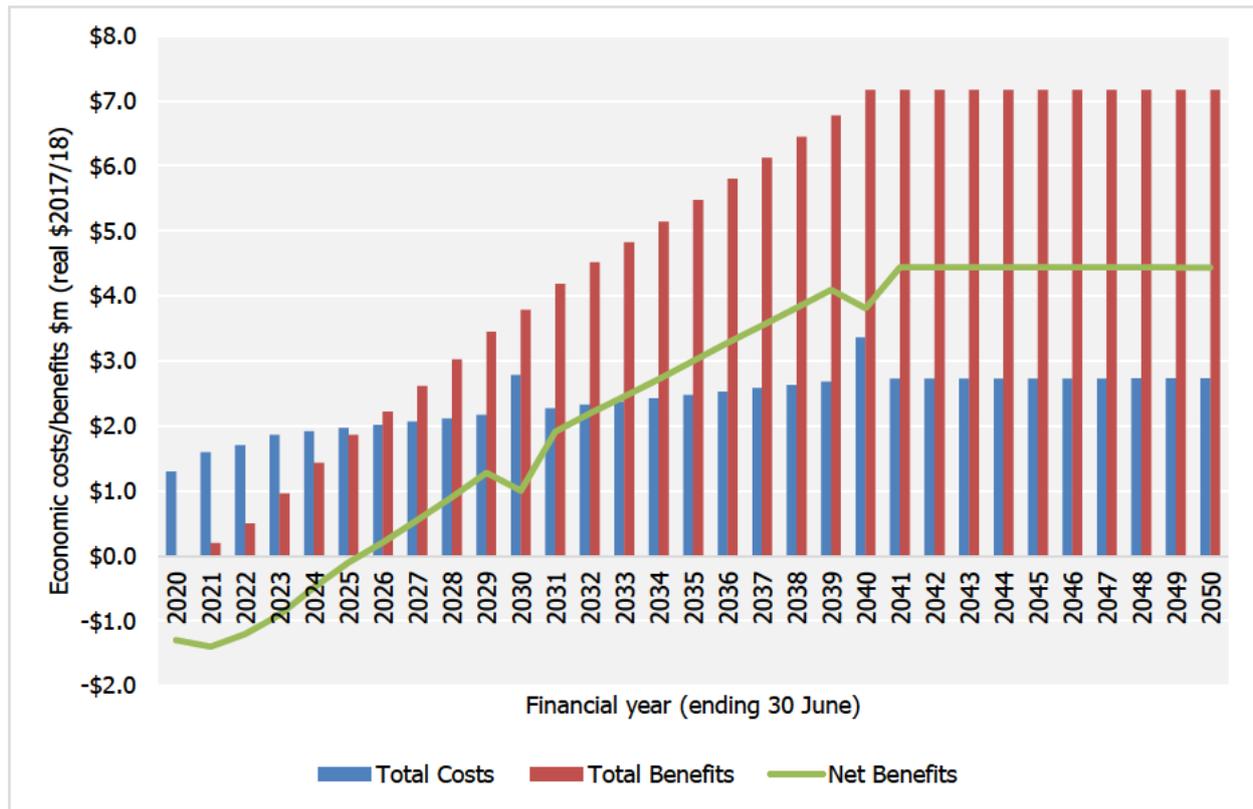
The extension will also derive additional benefits such as greater energy security, fuel choice, reduced carbon emissions, improved air quality by displacing wood burning for heating and economic growth in South Australia which we have not quantified as part of the assessment, but can do so if this is required. Again, this demonstrates the assumptions we have used in our analysis are conservative.

Table 2 below summarises the total quantified economic benefits and costs of the extension. Figure 1 below depicts the spread of total economic costs and benefits over the 31 years of the economic analysis.

Table 2: Summary of economic value test, 30 years (\$ million 2017/18)

Total economic benefit	\$148.2
Total economic costs	\$74.4
Total economic value	\$73.8 (positive in year 6)
Discount rate (real pre-tax)	3.94%
NPV	\$29.9 (NPV neutral after year 11)

Figure 1: Economic value analysis



Source: Frontier Economics

1.3.4.2 Incremental revenue test

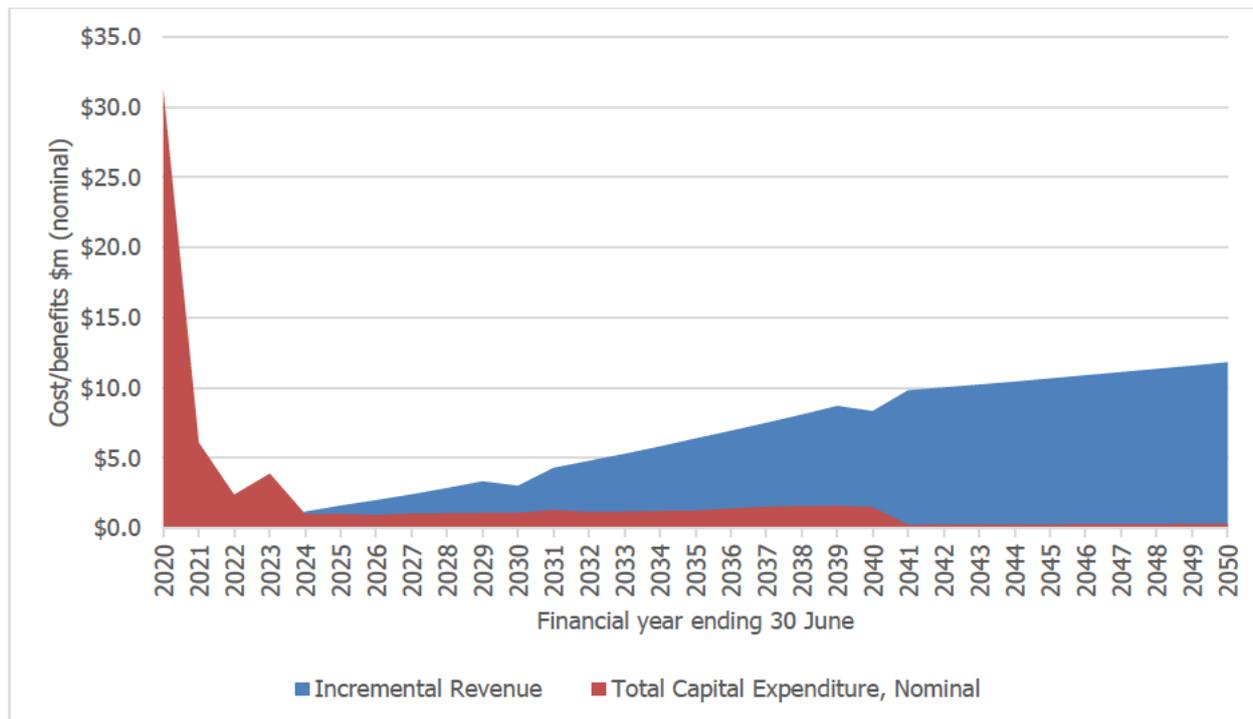
The incremental revenue test under NGR 79(2)(b) compares incremental revenue (revenue less operating costs) to the capital costs of the extension on a cash flow basis. It shows a positive NPV outcome of \$5.1 million over 30 years, thereby confirming capital costs will be recovered from customers who connect to the new network (without cross-subsidy from other gas customers). The project will be NPV neutral after 28 years, with increasing positive cash flows over the life of the longest-lived assets (60 years for the gas mains and services). All gas customers will benefit from economies of scale as the network grows.

Table 3 below summarises the total revenues and costs of the extension. Figure 2 below depicts the spread of incremental revenue and capital expenditure on a cash flow basis over the 31 years.

Table 3: Summary of incremental revenue test, 30 years (\$ million nominal unless otherwise stated)

Total revenue	\$200.3
Tariff	Tanunda tariff for Residential & Commercial customers Riverland tariff for Demand customers
Total opex	\$8.7
Total capital expenditure	\$67.3
Total net cashflow (pre-tax)	\$124.4 (positive in year 4)
Discount rate (nominal pre-tax)	6.42%
NPV (\$2017/18)	\$5.1 (NPV neutral from year 28)

Figure 2: Cash flow analysis



Residential customers in the region would benefit from the availability of natural gas through average savings of \$300 per year when substituting natural gas for LPG and \$900 per year when substituting natural gas for electricity for cooking, hot water and space heating. This reiterates considerable savings on energy bills for Mount Barker residents at a time of rising electricity prices.

Average emissions from natural gas use by residential customers are also 15% lower than LPG and 52% lower than electricity. We expect a total reduction of almost 12,000 tonnes CO₂ from residential energy use in Mount Barker over 30 years if natural gas is made available to the region. We also expect a reduction in particulate pollution by displacing wood burning for heating.

Providing natural gas to Mount Barker also improves energy security to the region. It not only brings an additional energy supply, but also improves reliability reflecting that our natural gas customers, on average, experience only one supply interruption every 40 years.

The lower price, improved environmental outcomes and increased security of supply of natural gas represents significant benefits to the region, and the state as a whole.

1.4 Investment drivers and key assumptions

The following section outlines the investment drivers for the Mount Barker extension and some of the key assumptions underpinning the investment evaluation.

1.4.1 Growth in the Mount Barker Region

The primary driver for investing in natural gas distribution in the Mount Barker Region is the area is a key growth corridor in Adelaide’s economic and population expansion. The extension will also support the expansion of the industrial and commercial load centres in the region.

Strong forecast demand in the area underpins the positive NPV of the network extension, even under our conservative assumption of only reticulating new greenfield connections. Table 4 summarises the potential demand in Mount Barker, Monarto South and Kanmantoo based on the demand forecast developed by CE and customer surveys.

Table 4: Summary of potential demand in the Mount Barker, Monarto South and Kanmantoo, 20-year horizon

Customer type	Area	Number of connections	Average demand per connection	Total consumption (GJ)
Residential Tariff R	Mount Barker	6,502	27.3 GJ p.a.*	168,815
Commercial Tariff C	Mount Barker	165	273 GJ p.a.*	42,879
Commercial Tariff C	Monarto South	5	██████████	██████████
Commercial Tariff C	Kanmantoo	1	██████████	██████████
Industrial Tariff D	Mount Barker	2	50 GJ MDQ	16,168**
Industrial Tariff D	Monarto South	2	50 GJ MDQ	16,168**
Industrial Tariff D	Monarto South	1	██████████	██████████
		6,678		

*declining by 1% p.a. from 2036 consistent with AEMO’s 2016 NGFR estimate

**based on average monthly consumption of all existing 50 GJ MDQ and ██████████ MDQ customers

Detailed demand projections in relation to Mount Barker and Monarto South are provided below at 2.1.

1.4.1.1 Greenfield residential development in Mount Barker

As noted earlier, several new housing estates are being built in the east, west and south of Mount Barker. These developments are greenfield developments of former agricultural land. The costs and demand assumptions associated with greenfield developments are significantly different to brownfield projects.

Firstly, the cost of extending the natural gas network into an undeveloped area is generally lower than connecting developed areas and established properties. This is because construction in established urban areas typically requires excavating sealed roads/pathways, traffic management, and moving (or re-routing around) established utility services. Installing gas mains and services in common trenches with other utilities is the most cost effective installation method, and is often only possible during a greenfield project.

Natural gas uptake and usage in new homes also tends to be higher than established homes as:

- a new home owner makes appliance decisions for cooking, hot water, space heating and cooling as part of a whole-of-home energy solution, rather than individual appliance replacement which is typically the case for existing homes. If natural gas is available at the time of construction, then natural gas appliances can be considered and installed at a time when it is most economically efficient to do so;
- South Australian residential water heater requirements specify new homes must install a low emission water heater, of which gas is the most popular choice;¹⁶
- new home developers often offer packages of all-gas or all non-gas appliances to buyers (depending on the fuel options available). Where natural gas is available, buyers tend to opt for at least gas cooking and hot water, and gas space heating in cooler regions;
- new homes are typically bigger than older homes. As a result they often use more energy, even though they are better insulated. New homes may also use ducted heating systems to warm the whole house rather than room-by-room space heating options. This all contributes to higher gas consumption; and
- gas appliances also provide customers with the lowest cost option of reducing carbon emissions relative to other solutions.

Further, heating requirements are a major driver of gas consumption and therefore the cooler climate of Mount Barker will drive higher average gas consumption than observed in many other areas of South Australia.

Our analysis only considers new customers in new development areas. Therefore, we have applied greenfield assumptions of costs, consumption and penetration rates to the Mount Barker extension as determined in the recent South Australian AA review.

The Mount Barker township is currently home to around 14,000 people. While there are around 640 homes connected to reticulated LPG, many residents use wood burners to heat their homes. These residents would likely convert from wood to natural gas in the future. Furthermore, there is the potential to connect customers who only have an electricity connection.

We intend to actively pursue connection of existing customers, but have applied a conservative approach by not including demand from existing customers in our economic modelling.

1.4.1.2 Mount Barker Commercial customers

Mount Barker operates as a regional centre for the Adelaide Hills, with an established town CBD offering a diverse range of retail, commercial, institutional and community services (e.g. Mount Barker Memorial Hospital). The number of businesses continues to grow, as evidenced by the new Mount Barker Central shopping centre and construction of a new reception to year 12 school.

1.4.1.3 Monarto South Industrial Precinct

Monarto South has been earmarked for industrial growth. The potential to supply natural gas to industrial customers in Monarto South and surrounds is a key consideration when selecting the most appropriate pipeline route for the network expansion.

In 2015, the Rural City of Murray Bridge (“Murray Bridge Council”) released the Monarto South Development Plan. The plan outlines the Council and its peers’ vision for Monarto, stating:

¹⁶ They are also much cheaper than other low emission water heaters such as solar and electric heat pump systems.

The economic potential of the Monarto area has been recognised for many years, commencing with investigations undertaken by the Monarto Development Commission in the 1970s. More recently, the Rural City of Murray Bridge (RCMB) and the District Council of Mount Barker (DCMB) have collaborated with the objective of ensuring that the economic potential of Monarto is achieved in a sympathetic and sustainable way.¹⁷

On 2 August 2016, the South Australia Minister for Planning approved¹⁸ an amendment to the Monarto South Development Plan, which sought “to increase the amount of industrially zoned land at Monarto, whilst also facilitating the development of an intermodal facility.”¹⁹ The amendment was designed to enable Australian Portable Camps to proceed with a \$100 million expansion of its manufacturing plant, and to encourage other industries to move to the area.

In the development plan, RCMB states:

...Australian Portable Camps (APC), which is one of the major employers in the region. APC has indicated that it is planning to expand its operations in Monarto South towards the west. More specifically, APC has advised that:

- They are actively seeking to expand operations to the west of their current site;*
- More than \$100 million will be invested to expand their manufacturing operations;*
- An additional 400-500 full time employees will be required;*
- Work will commence as soon as the new zoning framework is in place; and*
- If the land cannot be rezoned in a timely manner, the company may be forced to consider relocating interstate.*

Council officers have also been approached by a developer who is keen to establish an intermodal facility at Monarto.²⁰

The Monarto South Development Plan (and subsequent Ministerial approval²¹) provides important evidence of proposed growth in the region, and helps support the proposed extension.

Further, in November 2016 Murray Bridge Council commissioned a Monarto Masterplan in collaboration with Mount Barker Council and Regional Development Australia Murraylands and Riverlands. The purpose of the Masterplan is “to provide a long-term planning vision for Monarto, a vision which sees Monarto becoming an important employment hub for the region.”²²

The Masterplan identifies the Mount Barker to Murray Bridge region traversing Monarto South as an important economic corridor for Greater Adelaide:

For the purposes of state-wide strategic planning, the Rural City of Murray Bridge (RCMB) and District Council of Mount Barker (DCMB) form part of the Adelaide Hills and Murray Bridge regions within the Greater Adelaide region. The 30 Year Plan for Greater Adelaide targets an additional 13,000 dwellings, 29,000 residents and 13,000 jobs in the 30 year time-frame for Adelaide Hills and Murray Bridge.

¹⁷ Page 1, *Rural City of Murray Bridge Monarto South DPA Explanatory Statement and Analysis*, August 2015.

¹⁸ <http://www.governmentgazette.sa.gov.au/featured-notices/monarto-south-development-plan-amendment>

¹⁹ Page 1, *Rural City of Murray Bridge Monarto South DPA Explanatory Statement and Analysis*, August 2015.

²⁰ Page 2, *Rural City of Murray Bridge Monarto South DPA Explanatory Statement and Analysis*, August 2015.

²¹ <http://www.governmentgazette.sa.gov.au/featured-notices/monarto-south-development-plan-amendment>

²² Page 4, *Monarto Masterplan, prepared for the Rural City of Murray Bridge, District Council of Mount Barker, and RDA Murraylands and Riverland*, Jensen Planning and Design, November 2016.

Most of this population growth is expected to be in Mount Barker and Murray Bridge townships. RCMB and DCMB have identified an economic corridor comprising three main employment nodes at Mount Barker, Monarto South and Murray Bridge (see Figure 6). This corridor responds directly to the employment targets outlined in the 30 Year Plan for Greater Adelaide - 13,000 additional jobs within 30 years. The proposed distribution of additional jobs within the corridor is as follows:

- 5,300 jobs in Murray Bridge;
- 4,200 jobs in Mount Barker;
- 3,700 jobs in Monarto; (DPTI, 2009)

Representing a total of 13,200 additional jobs within the three regions.

A key strategy of the Mount Barker Economic Development Strategy is to develop an advanced manufacturing precinct in the Mount Barker - Monarto Murray Bridge corridor with a focus on one or a combination of food value adding, defence and mining industries. Australian Portable Camps provides an anchor tenant for such a precinct.²³

Figure 3 below maps out key urban and employment growth across the Mount Barker to Murray Bridge corridor.

Figure 3: Mount Barker-Murray Bridge economic corridor - Figure 6 - Monarto Masterplan, page 15.

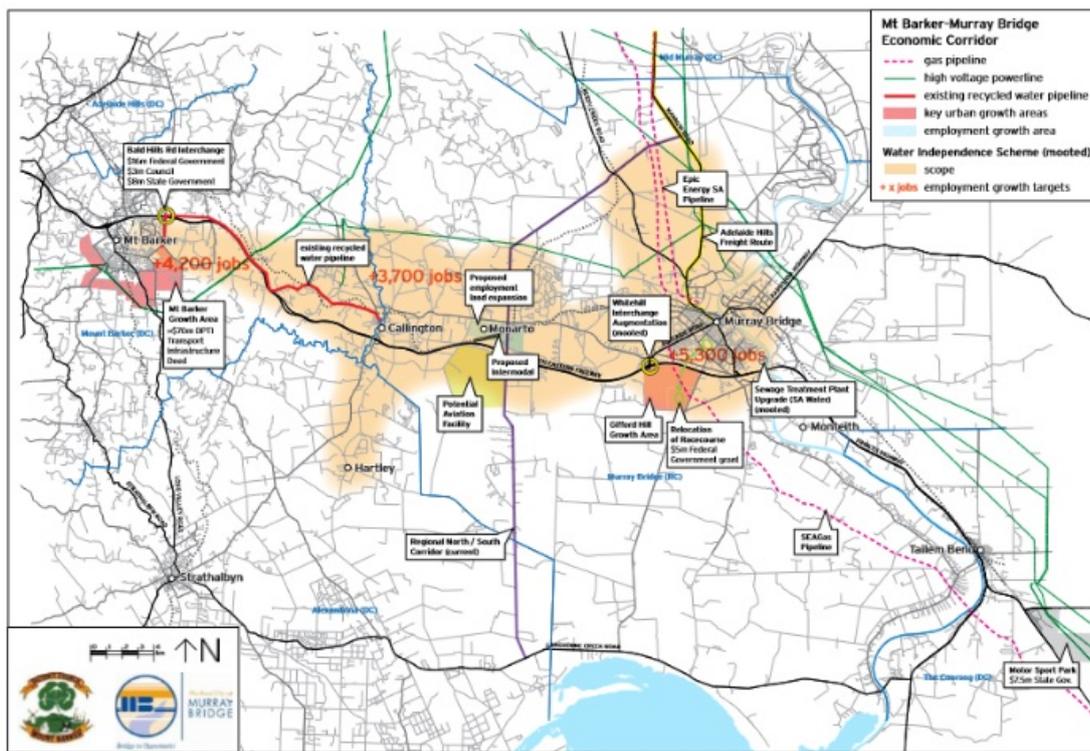


Figure 6: Murray Bridge-Monarto-Mount Barker economic corridor and regional development projects

The Monarto South Development Plan, and subsequent Monarto Masterplan, explains the economic expansion of Monarto and the Mount Barker to Murray Bridge corridor to happen in the near future. These plans also suggest inter infrastructure upgrades, including access to natural gas, are necessary to support economic expansion.

²³ Page 15, *ibid.*

The Monarto South Development Plan Amendment (draft for consultation) states ‘the township and industry is at a disadvantage from not having mains gas supply.’²⁴ A key infrastructure report (prepared by Tonkin Consulting) attached to the Masterplan concludes that:

‘while some of the Monarto South Enterprise Precinct proposed development (such as the intermodal terminal and Freeway Service Area) may be able to proceed without major service upgrades, the significant expansion of industrial activities will not be able to proceed without substantial expenditure on upgrades to existing infrastructure.’²⁵

Enabling reticulation into Monarto South was a key consideration of the route analysis described in section 3.1.1 below, with the proposed route passing through the economic corridor depicted in Figure 3.

1.4.2 Assessment period of 30 years

The investment analysis has been undertaken based on a 30-year period, capturing 20 years of customer growth in new developments. This is standard industry practice when considering large network expansions.

We have not assumed any new connections beyond 20 years, although growth in the area is expected to continue. The 30-year horizon gives fair consideration to the revenues of customers connecting towards the end of the 20-year period. It also reflects the fact customers are unlikely to disconnect and ensures replacement costs of short lived assets, such as meters, are factored in for customers who connect in the early years of the assessment.

It is likely to underestimate the total economic value of the project as the network mains and inlets will continue to serve the area for another 30 years before reaching the end of their useful life of 60 years. We also note the AER stated in its final decision for South Australia:

‘in this instance we are satisfied that AGN’s reasons for extending the assessment of revenue for connections by a further 10 years to ensure fair consideration of those late term connections is justified.’²⁶

1.4.3 Customer capital contributions

We undertake an assessment of network growth expenditure against the relevant requirements of NGR 79 for capital expenditure to be conforming. Where this isn’t the case, we may seek a capital contribution to cover the non-conforming capital expenditure. We have not included any capital contributions for the Mount Barker extension on the basis the capital expenditure is conforming under the economic value and the incremental revenue tests set out in NGR 79(2)(a) and NGR 79(2)(b) respectively.

²⁴ Page 24, above n 20.

²⁵ Page 16, above n 22.

²⁶ AER, Final decision Australian Gas Networks Access Arrangement 2016–21, Attachment 6 – Capital expenditure, May 2016, page 39.

2 Revenue and projected costs

In order to evaluate the proposed extension, an estimate of associated revenues and costs is required. Revenue is a function of expected gas usage (Section 2.1) and tariffs (Section 2.2).

2.1 Demand forecast

We commissioned CE to conduct an independent forecast of natural gas customers and demand for the distribution network in the Mount Barker region, including Monarto South and Kanmantoo.

CE used available population and dwellings forecasts for the region, average penetration data for similar developments, average commercial and demand customer ratios across the state, average usage in areas with similar climate and APA customer surveys to compile its forecast.

The following sections provide more detail of the forecast connections and demand expected to connect to the extension. The customer surveys undertaken by APA are summarised in *Attachment 8: Customer Survey Summary*.

2.1.1 Residential (Tariff R)

CE developed its forecast of total residential demand as a product of separate forecasts of gas connections and average consumption per connection. The sections below explain how each forecast was developed and the resulting forecasts of total demand.

2.1.1.1 Residential Connections

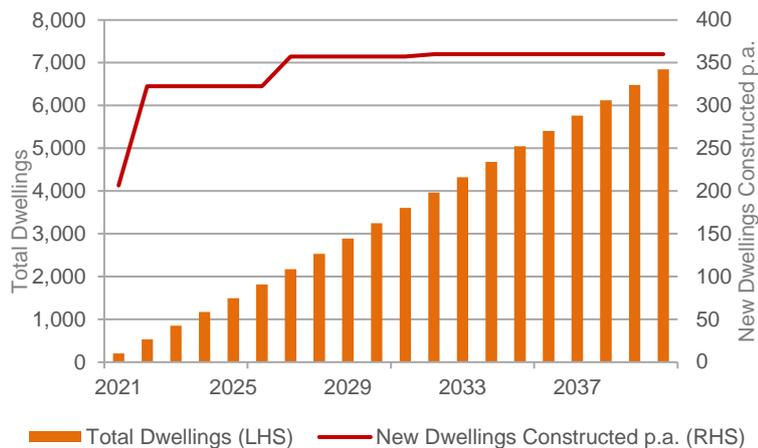
CE's connection forecast was derived by estimating the total number of new dwellings in the Mount Barker Growth Area and multiplying this by a gas connection penetration rate.

CE used *forecast.id*²⁷ as it provides population forecasts and demographic resources to councils across Australia and New Zealand (including the South Australian state government and the Mount Barker Council). CE used *forecast.id* as a source for its long-term forecast of total new dwellings in the area.

Several medium and large residential estates are already planned for construction in the Mount Barker Growth Area over the next 20 years, bringing almost 7,000 new homes to the area. *Forecast.id* provided a dwelling forecast to 2036, which CE has extrapolated to 2040. CE forecasts 6,845 new dwellings will be built in the Mount Barker region over the 20 years from 2020/21 as shown in Figure 4 below.

²⁷ <https://forecast.id.com.au/>

Figure 4: Mount Barker growth area dwelling projections



Source: Forecast.id & Core Energy Group, 2017

The next step is to determine the expected penetration rate for new residential gas connections in Mount Barker. To support our penetration rate of 95% for residential gas connections in Mount Barker we have relied on two sources of data:

1. Our residential connections count by suburb; and
2. SA Power Networks' residential connections count by suburb.

The raw data can be seen in *Attachment 6A: Penetration Data* and show:

- a suburb by suburb comparison yields an average penetration of 74%;
- however, this does not reflect a true penetration rate as our network does not cover every suburb entirely;
- newer suburbs (largely developed post-2000) have higher penetration than older suburbs; and
- penetration rates in new developments of similar size to Mount Barker average 95%.

The average penetration of 74% reflects the broad spectrum of residential gas penetration rates in suburbs and towns where our network is present. Suburbs and towns with low penetration are generally either not fully covered by the gas network or are high-density areas with more apartment blocks.²⁸

However, we observe significantly higher penetration rates in newer areas compared to our overall network penetration rates. Therefore, we identified suburbs that have undergone significant new development to derive the likely penetration rate in Mount Barker.

The test we have applied to determine if a suburb qualifies as a new development suburb is if the suburb constitutes significant new land release of a similar scale to those that will occur in Mount Barker and whose growth in gas customers over the 2011/12 to 2016/17 period falls within the top 10% of all suburbs.

Table 5 below shows the natural gas penetration rates at March 2018 for new subdivisions of a comparable size and development type to those in Mount Barker. The developments consist of primarily detached dwellings either on the outskirts of Adelaide or where significant portions of land have been repurposed for residential use. The data show the average penetration across

²⁸ See *Attachment 6B: Additional Support for Penetration Rate* for maps of suburbs which are not fully serviced by the gas network and for penetration rates in high-density suburbs

these suburbs is 95%, most of which are on the outskirts of the Adelaide metropolitan area, and as such, reflect growth consistent with that occurring in Mount Barker.

Table 5: South Australia, New Subdivisions

Suburb	Total gas customers [^]	New gas customers 2011/12-16/17	Total homes*	Penetration
Andrews Farm	2,838	544	2,892	98%
Blakeview	2,909	822	3,021	96%
Munno Para	1,690	426	1,715	96%
Northfield	1,489	344 [#]	1,713	87%
Northgate	1,122	1,150 [#]	1,169	96%
Seaford Meadows	1,626	886	1,702	96%
St Clair	861	385	992	87%
Whyalla Jenkins	768	252	818	94%
Total	13,303	4,809	14,022	95%

[^]Number of residential gas connections as at March 2018

^{*}Number of residential electricity connections as at March 2018

[#]A section of Northgate, Northfield and Greenacres was renamed to Lightsview in April 2016 with many of the new connections in these suburbs between July 2011 and April 2016 now gas customers in Lightsview

We also note three new development suburbs which overlap boundaries of the new subdivisions above and have significant natural gas penetration rates. These suburbs were not considered above as they did not fall into the top 10% growth for new development areas.²⁹ Table 6 below shows the average penetration rate across these suburbs is 97%.

Table 6: Penetration rate, renamed new development suburbs, March 2018

Suburb	Total gas customers [^]	New gas customers 2011/12-16/17	Total homes*	Penetration
Craigburn Farm	894	232	937	95%
Eyre	211	181 [#]	227	93%
Lightsview	1,856	136 [~]	1,891	98%
Total	2,961	368	3,055	97%

[^]Number of residential gas connections as at March 2018

^{*}Number of residential electricity connections as at March 2018

[#]New home connections captured under old suburb name, Penfield

[~]Lightsview was created in April 2016 encompassing parts of Northgate, Northfield and Greenacres - therefore this only represents new gas customers in Lightsview from April 2016

To derive the penetration rate in Mount Barker, we have focused on suburbs with significant new housing development, reflective of the housing developments we see in Mount Barker.

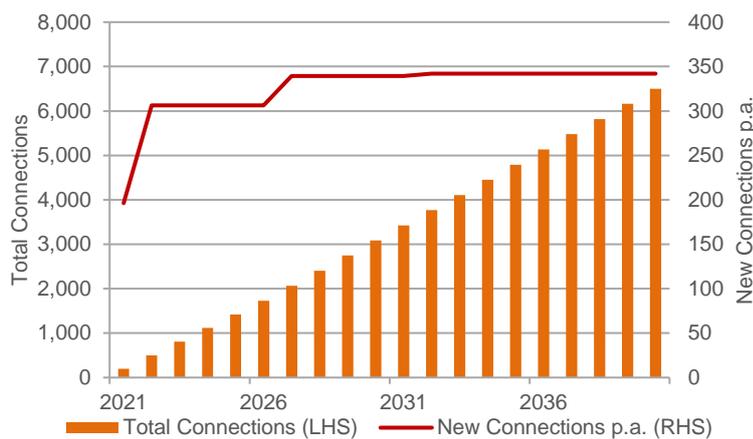
²⁹While they fall outside the largest growth and highest proportion of new housing stock over the last six years, significant development in Lightsview prior to April 2016 is captured under Northgate, Greenacres and Northfield, for Craigburn Farm occurring just prior to this period, and Eyre picked up more recently.

This is the most appropriate data available to estimate the penetration rate, and as such, the forecast penetration rate of 95% is:

- the best possible forecast of residential penetration for Mount Barker in the circumstances; and
- has been arrived at on a reasonable basis (the observed residential gas and electricity connections for new development suburbs).³⁰

The penetration rate was applied to the dwellings forecast to derive the connections forecast as shown in Figure 5 below. This results in an estimated 6,502 new residential connections by 2039/40.

Figure 5: Mount Barker growth area connection projections



2.1.1.2 Average Residential Consumption

The key drivers of average residential consumption are climate and demographics. Based on available information we expect an average consumption of 27.3GJ per year for residential customers who connect to the natural gas network. Appliances are most commonly cookers, hot water and space heating.

Consumption per connection was derived by looking at residential consumption in towns with similar climate and demographics to Mount Barker. Mount Gambier was identified as having the most similar characteristics to Mount Barker and therefore formed the basis for the estimate of average residential consumption. The average of 27.3GJ per year reflects actual usage of homes in Mount Gambier.

Climate

Table 7 compares the relative climatic conditions of Mount Barker and other towns and cities as sourced from the Bureau of Meteorology.

The weather data show Mount Barker has similar mean maximum and mean minimum temperatures to Mount Gambier, more rainfall and a significantly greater number of days with a minimum temperature less than 2°C. Nuriootpa is similar, but milder, than both Mount Barker and Mount Gambier. Adelaide and other regional centres in South Australia have milder climates.

³⁰National Gas Rules, 74.

Table 7: Climate indicators of towns and cities within AGN's operations

Weather Comparison	Mount Barker	Mount Gambier	Nuriootpa	Whyalla	Port Pirie	Berri	Adelaide	Albury	Melbourne
Mean maximum temperature (°C)	20.0	19.0	21.6	23.7	24.5	23.4	22.4	22.1	19.9
Mean minimum temperature (°C)	8.1	8.2	9.2	11.5	12.7	10.2	12.3	8.7	10.2
Mean temperature (°C)*	14.1	13.6	15.4	17.6	18.6	16.8	17.4	15.4	15.1
Mean number of days < 2°C	27.3	19.0	27.9	13.5	1.2	Not Available	1.1	48.8	7.6
Mean rainfall (mm)	765.1	711.1	481.4	267.2	345.6	263.2	551.0	711.7	648.3
Mean number of days of rain	137.6	184.1	122.6	79.8	78.3	68.1	121.0	115.1	150.6

*Calculated as the average of the mean maximum and mean minimum temperature

Source: Bureau of Meteorology, 2017

There is no other area in South Australia with access to natural gas that has exactly the same climate as Mount Barker. However, Mount Gambier has the most similar climate, and accordingly consumption data of new dwellings built in Mount Gambier has been used to derive the average residential consumption. CE did not consider Adelaide data directly relevant to the average residential consumption expected in Mount Barker because of its significantly milder climate and lower rainfall.

New homes (constructed from 2011) in Mount Gambier consume an average of 27.3 GJ pa (see Table 8 below). Consumption per connection for new homes is the most relevant to new residential developments in Mount Barker since this assessment consists only of new dwellings (reflecting our conservative assumption of not connecting existing customers).

As heating load is a significant driver of residential gas consumption, it is reasonable to assume consumption in Mount Barker would closely reflect Mount Gambier given its similar climate.

Table 8: Demand per connection by year

Region	2012	2013	2014	2015	2016	Average Consumption (GJ)
Mt Gambier	30.2	27.3	26.9	26.9	25.3	27.3
Number of MIRNs	109	199	270	377	443	N/A

Importantly, CE also noted the climate in Mount Barker is cooler on average than the climate in Albury and Melbourne (although there are fewer days less than two degrees in Mount Barker than Albury). Average residential gas consumption is around 45 GJ pa in Albury and around 49 GJ pa in Melbourne, which is considerably higher than that assumed for Mount Barker despite the relative similarities in weather.

Demographics

Mount Barker also has a larger average household size and significantly higher household income than Mount Gambier. These characteristics indicate households in Mount Barker are more likely to include natural gas as part of their energy mix if the area were to be reticulated, with higher consumption from their natural gas appliances than in Mount Gambier.

Table 9 below compares 2016 Census data for household size and income in Mount Barker, Mount Gambier, Nuriootpa, Greater Adelaide, Albury and Greater Melbourne. It indicates households in the Mount Barker region are generally larger, with a much higher percentage of 4 or more bedroom homes. They also have a higher median income than in other parts of South Australia and Albury, but slightly below Greater Melbourne.

Table 9: 2016 Census community profiles³¹

Measure	Mount Barker	Mount Gambier	Nuriootpa	Greater Adelaide	Albury	Greater Melbourne
Average household size (persons)	2.6	2.3	2.3	2.5	2.3	2.7
Median household weekly income	\$1,435	\$1,052	\$1,143	\$1,265	\$1,185	\$1,542
% of dwellings with 4 or more bedrooms	37%	21%	29%	23%	30%	29%
% of households with 3 or more persons	43%	33%	33%	39%	35%	45%

Source: ABS 2017

The higher average household size and median income in Mount Barker, together with its colder climate, suggests higher average gas use than in Adelaide and most other regions, with the exception of Melbourne. Indeed, it could be argued that Melbourne and Albury provide a more comparable climate and demographic to Mount Barker.

CE also apply a reduction to average consumption after 2035 of 1% per year due to efficiency gains in appliances, consistent with the Australian Energy Market Operator's (AEMO) 2016 National Gas Forecasting Report (NGFR) estimate. The lifecycle of appliances averages 15 years, after which time they are most likely replaced with new, more efficient appliances, contributing to lower average demand per household.

We undertake active marketing of gas connection and use to customers in South Australia. We would continue this marketing as Mount Barker is developed and expect this will help drive penetration rates and higher average consumption than is seen in existing, and relatively warmer reticulated areas of South Australia.

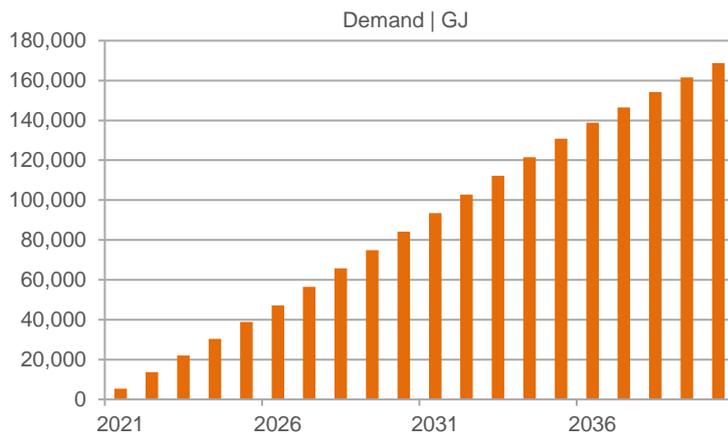
Based on the analysis by CE as well as other considerations such as average household income and size, we consider average consumption of 27.3 GJ pa is a reasonable, and conservative, estimate for Mount Barker. This assumption is much lower than average use in Melbourne, which has similar climate and demographics to Mount Barker.

2.1.1.3 Total Residential Demand

Total residential demand is the product of the connections forecast and average consumption per connection. CE forecasts total annual residential demand will grow from almost 5,400 GJ in 2021 to around 169,000 GJ in 2040.

³¹ ABS, 2016 Census Community Profiles for LGA, capital city and state geographic areas.

Figure 6: Mount Barker residential customer demand, GJ



Source: Core Energy Group, 2017

2.1.2 Commercial (Tariff C)

CE has provided a forecast of the commercial customers expected to connect in Mount Barker, Monarto South and Kanmantoo over the next 20 years.

Commercial demand in Mount Barker was forecast by:

- applying the three-year average ratio of residential and commercial customers in South Australia³² to the forecast of residential customers in Mount Barker to estimate the number of commercial customers required to support the Mount Barker population; and
- multiplying this by the average commercial consumption per customer per year.

The Mount Barker commercial customer forecast is derived using a statewide ratio as we estimate the commercial activity in Mount Barker will broadly reflect that across our network. This is because the Mount Barker township is of significant size and includes a commercial precinct which offers a full range of goods and services to meet local demand.

This is a more conservative approach than applying the ratio observed in regional centres, which would have resulted in a higher forecast of commercial connections.³³ It also does not reflect the high heating load expected in Mount Barker given the cooler climate. While conservative, this is reasonable given the intent is to understand the commercial industry required to support a given population.

In Monarto South and Kanmantoo, the commercial connections and consumption forecast was derived using a more specific method, i.e. via a customer survey. This differing methodology is driven by the fact that these areas have a small number of businesses and little or no residential population, so the commercial connections need to be specifically identified.

2.1.2.1 Commercial Mount Barker Connections

The proposed extension includes the Mount Barker CBD, with the intention of attracting existing business customers. The customers in the town centre are mostly retail businesses such as supermarkets, restaurants and cafes, and public administration such as a hospital and schools. These types of businesses are connected to our natural gas network where it is available in South Australia.

³² The three-year network wide average ratio of residential to commercial customers is 2.54%: Core Energy, AGN Mount Barker Report, October 2017

³³ The ratio in Mount Gambier is 3.62%, Nuripotpa 3.62%, Port Pirie 2.83% and Whyalla 3.28%. See Attachment 4B: Additional Support for Commercial and Industrial Forecasts.

Based on the historical ratio of commercial customers to residential customers across South Australia, CE estimate 165 Commercial Mount Barker connections by 2040.

2.1.2.2 Commercial Mount Barker Consumption

The average consumption for Commercial Mount Barker customers is based on the average commercial customer in metropolitan Adelaide of 273 GJ p.a. This is consistent with the 2020/21 Tariff C consumption forecast in the South Australian AA. This is a conservative estimate as it has not considered a potential increase in heating load due to the relatively cooler climate of Mount Barker.

Consistent with the residential forecast, average annual demand per connection of 273 GJ for Commercial Mount Barker customers is assumed to decline after 2035 at a rate of 1% per year consistent with the AEMO's 2016 NGFR estimate and reasoning at 2.1.1.2 above.

2.1.2.3 Commercial Monarto South

The consumption profile of Commercial Monarto South customers is based on surveys of businesses in Monarto South. Based on these surveys³⁴, five commercial customers each consuming [REDACTED] are assumed in Monarto South, with one connecting per year between 2025 and 2029.

This is likely to be a conservative estimate as it does not include any demand response by customers switching from LPG to natural gas, which is cheaper. Further, it does not fully account for growth in businesses in the Monarto South Industrial Park arising from the rezoning and promotion of the area by local council and state government.

Commercial businesses in the area include a chicken hatchery and growing sites. The hatchery currently uses around [REDACTED] of LPG p.a. whilst the 26 chicken growing sheds are estimated to use 31TJ p.a. combined. There is significant investment into new breeder and grower farms as part of a wider chicken industry expansion in the area which will require significant energy. We therefore consider CE's forecast of five connections consuming [REDACTED] each is conservative, and our own expectation is demand in the area will exceed that CE's forecast.

Further information on our Commercial Monarto South customer forecast is provided in *Attachment 4B – Additional support for commercial and industrial forecasts*.

2.1.2.4 Commercial Kanmantoo

As with Monarto South, the consumption profile of the Kanmantoo customer is based on surveys of local businesses. We have identified at least one Commercial Kanmantoo customer that has indicated it would connect to the natural gas network.

The site is currently supplied by LPG, and consumes approximately [REDACTED] p.a.. They have indicated a keen interest in converting to natural gas as soon as it becomes available.

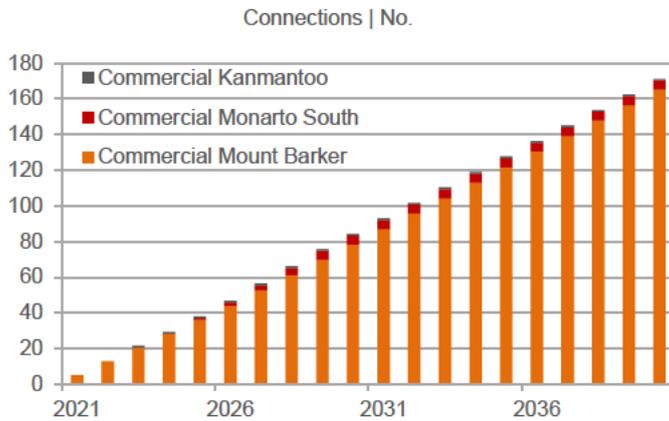
The Commercial Kanmantoo customer is assumed to connect in 2023 and consume [REDACTED] p.a. which is its current LPG use and represents the likely natural gas requirements of this customer.³⁵ As with Monarto South, this is likely to be a conservative estimate as it does not include any demand response when switching from LPG to natural gas.

Figure 7 shows the forecast growth in commercial customer connections across the three areas should the extension proceed.

³⁴ Refer Attachment 8: Customer Survey Summary

³⁵ Refer Attachment 8: Customer Survey Summary

Figure 7: Forecast commercial customer connections



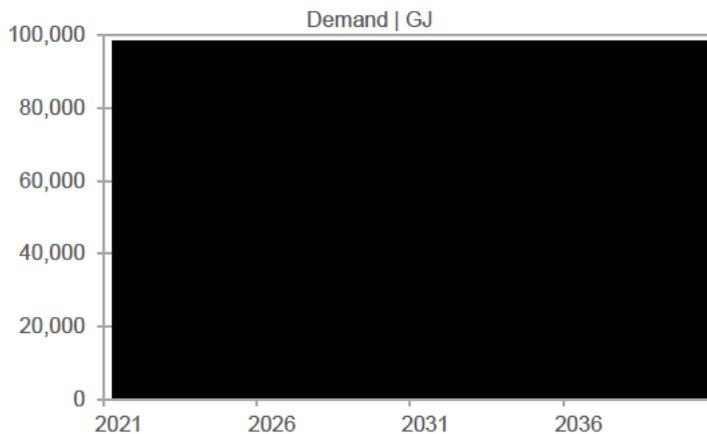
Source: Core Energy Group, 2017

The forecast of commercial customer connections presented only considers areas we currently plan to reticulate. There is potential for further growth in commercial customer connections if the natural gas network is extended to other business centres in the Mount Barker region, such as Littlehampton and Nairne.

2.1.2.5 Total Commercial Demand

Total commercial demand is the product of forecast commercial connections and average consumption. CE forecasts commercial customer demand will increase from 1,360 GJ in 2021, to 81,380 GJ in 2040. Figure 8 below presents the commercial customer demand by location.³⁶

Figure 8: Forecast commercial customer demand, GJ



Source: Core Energy Group, 2017

2.1.3 Industrial (Tariff D)

CE has provided a forecast of the industrial customers expected to connect in Mount Barker and Monarto South over the next 20 years. No industrial connections are assumed for Kanmantoo.

³⁶ See Attachment 4A: Core Energy AGN Mount Barker Final Report and Attachment 5: Core Energy AGN Mount Barker Model for further detail.

Similar to the Commercial segment, CE has applied:

- the ratio of residential and industrial customers in South Australia over the past three years (which is 0.03%) to the forecast of residential customers in Mount Barker to estimate the number of Industrial Mount Barker customers; and
- the results of our customer survey to estimate the number of Industrial Monarto South customers.

This reflects the characteristics of the Mount Barker and Monarto South areas and the anticipated growth in industry and employment driven by population growth. Further detail is provided in *Attachment 4B – Additional support for commercial and industrial forecasts*.

2.1.3.1 Industrial Mount Barker

Based on the historical ratio of industrial customers to residential customers, CE estimates two industrial customers in Mount Barker by 2040 (one connecting in 2031 and one in 2040). The assumed capacity requirement of those customers has been conservatively set at the minimum allowable MDQ of 50 GJ.

2.1.3.2 Industrial Monarto South

As with commercial customer connections in Monarto South, CE have forecast three industrial connections based on our customer survey and individual business discussions (refer *Attachment 8 – Customer Survey Summary*). Two industrial customers at Monarto South are conservatively assumed to use the minimum allowable MDQ of 50GJ, connecting in 2023 and 2025.

One industrial customer has an assumed MDQ of [REDACTED]

[REDACTED] It is expected this customer will connect in 2024.

2.2 Projected Tariffs & Revenue

The NGR requires us to assess the project assuming a tariff for incremental services based on prevailing reference tariffs.³⁷ We have applied Tanunda tariffs to Mount Barker residential and commercial customers as this tariff reflects the most recent example approved by the AER in undertaking a major network extension to service a new area that is located at the fringe of the Adelaide metropolitan area.

Demand customers are subject to different tariffs depending on their location. Monarto South, Kanmantoo and Mount Barker are proximal to the Riverland region, therefore we have assumed the prevailing Riverland tariff for demand customers.

Applying the Tanunda network tariff to residential and commercial customers, and the Riverland tariff for demand customers, results in a positive NPV of \$5.1 million (\$2017/18).

Under the Tanunda residential tariff there are large customer benefits associated with switching from electricity (\$900) and LPG (\$300) to natural gas, which means there is a compelling case for the expected connections and demand presented above at 2.1.

³⁷ National Gas Rules 79(4)(a)

2.2.1 Residential (Tariff R)

The residential tariffs for Mount Barker are based on the 2017-18 Tariff R Tanunda tariff (shown below in Table 10). A summary of revenues is included below at 2.2.4.

Table 10: 2017-18 Tariff R Tanunda

Tariff R Tanunda	\$2017/18
Fixed charge (per day)	0.3023
First 0.274 GJ (per GJ)	34.0875
Next 0.0219 GJ (per GJ)	15.0908
Additional GJ (per GJ)	5.1085

Real Tariff R residential revenue in each year is derived by:

- calculating the applicable annual bill for each residential connection based on the prevailing 2017/18 Tariff R Tanunda tariff;
- multiplying the annual bill per residential connection by the total number of connections;
- applying the X-factor of -3.8% for the current AA period 2016/17 to 2020/21, with an X-factor of zero applied from 2021/22; and
- applying an 'average bill index' which takes into account reduced average consumption per connection after year 15 due to uptake of more efficient appliances (see 2.1.1.1).

2.2.2 Commercial (Tariff C)

The commercial tariffs for Mount Barker are based on the 2017-18 Tariff C Tanunda tariff (shown below in Table 11). A summary of revenues is included below at 2.2.4.

Table 11: 2017-18 Tariff C Tanunda

Tariff C Tanunda	\$2017/18
Fixed Charge (per day)	0.6367
First 0.9863 GJ (per GJ)	16.9191
Next 4.2740 GJ (per GJ)	8.3509
Next 11.1780 GJ (per GJ)	3.5789
Additional GJ (per GJ)	2.0341

As outlined at 2.1.2, forecast Tariff C connections are categorised based on location. The revenue for each has been derived separately.

Real Tariff C commercial revenue in each year is derived by:

- calculating the applicable annual bill for each commercial connection by customer type based on the prevailing 2017/18 Tariff C Tanunda tariff;

- multiplying the annual bill per commercial connection by the total number of connections of that type;
- applying the X-factor of -3.8% for the current AA period 2016/17 to 2020/21, with an X-factor of zero applied from 2021/22; and
- applying an 'average bill index' to Type 1 commercial connections which takes into account reduced average consumption per connection after year 15 due to uptake of more efficient appliances (see 2.1.2.1).

2.2.3 Industrial (Tariff D)

The demand tariffs for Mount Barker are based on the 2017-18 Tariff D Riverland tariff (shown below in Table 12). A summary of revenues is included below at 2.2.4.

Table 12: 2017-18 Tariff D Riverland

Tariff D Riverland	\$2017/18
50 GJ or less (fixed per month)	3,423.5931
Next 50GJ (per GJ)	68.8617
Next 900GJ (per GJ)	42.9098
Additional GJ (per GJ)	8.9211

Forecast Tariff D connections are categorised based on location and demand. The revenue for each has been derived separately.

Real Tariff D revenue in each year is derived by:

- calculating the applicable annual bill for the average Tariff D connection of each customer type based on the prevailing 2017/18 Tariff D Riverland;
- multiplying the annual bill per Tariff D connection by the total number of connections; and
- applying the X-factor of -3.8% for the current AA period 2016/17 to 2020/21, with an X-factor of zero applied beyond 2021/22.

2.2.4 Summary of revenues

Table 13 below provides a summary of the forecast revenues per connection for each customer type. It also shows the majority of revenue is forecast to be recovered from residential customers, which is consistent with the existing South Australian network.

Table 13: Forecast revenues by customer type

Customer type	Average revenue per connection (\$2017/18)	Total revenue (NPV \$2019/20)
Residential	\$620*	\$44.1m
Commercial		
• Mount Barker	\$4,851*	\$11.9m
• Monarto South	██████	
• Kanmantoo	██████	
Industrial Demand		
• Mount Barker & Monarto South	\$41,083	\$4.9m
• Large Monarto South	██████	

* reducing from 2036 in line with declining average consumption

3 Route assessment

Costs are a function of the pipeline route (Section 3.1), expected capital expenditure (Section 3.2) and operating costs (Section 3.3).

We have examined the technical viability of extending the natural gas distribution network to the Mount Barker region. This involved:

- conducting a detailed desktop analysis of a number of alternative routes;
- selecting a preferred route to use in a high-level screening economic analysis;
- preparing a capital cost estimate and risk analysis for each route;
- comparing the number and type of additional customers that could be connected along each route; and
- refining the capital cost of the preferred route.

The preferred route alignment (Alignment 0.3) is 39.7km from Murray Bridge, passing Monarto South and Kanmantoo to Mount Barker, and is detailed in *Attachment 3: Natural Gas to Mount Barker Headworks Summary*. The following sections discuss this further.

3.1.1 Concept Route Options Study

APA completed *Attachment 9: Natural Gas to Mount Barker Concept Route Options Study* in January 2016, which found constructing an extension west from Murray Bridge (rather than south-east from Adelaide) represents the most prudent investment. Table 14 summarises the route options considered.

Table 14: Summary of route options considered (\$2017/18)

Option	Description	Length	Desktop cost estimate	Risk ranking score ³⁸
Route A	Greenhill Rd to Mt Barker via SE Freeway	28km	\$17.5m	28
Route B	Greenhill Rd to Mt Barker via Summertown and old Princes Highway	32km	\$21.0m	38
Route C	Greenhill Rd to Mt Barker via Summertown and Balhannah	30km	\$17.5m	32
Route D	Murray Bridge to Mt Barker via old Princes Highway (39km)	39km	\$22.8m	30
Route E	Murray Bridge to Mt Barker via country roads and cross country	32km	\$19.2m	25
Route F	Murray Bridge to Mt Barker via old Princes Highway and others	36km	\$20.6m	25

Routes A, B and C would commence from the Adelaide metropolitan network while Routes D, E and F would commence from new connection points in Murray Bridge. Each route was subject to a detailed desktop analysis using available software tools, which analyse a range of factors including the length of the extension, the terrain (i.e. the amount of rock, river, rail and road crossings), construction and operational challenges. This analysis resulted in high level cost

³⁸ Where a ranking of 1 represents 'very good/best' and 5 'very bad/worst' against 10 categories for a total score out of 50. The lower the score the better the ranking.

estimates and risk ranking scores. The higher the risk ranking score, the more significant the risk.

Routes E and F were chosen to proceed to Pre-FEED analysis as they had the lowest overall risk and most opportunity to connect additional customers along the route.

Routes A, B, C and D were ranked as having the highest risk in the route analysis associated with capital cost (B and D), length (D), rock (A, B and D), constrictions (A, B and C), crossings (B and C), design and constructability issues (A, B and C), operational issues (A, B and C), environmental and community issues (A, B and C) and future loads (A and C). Though routes A and C are shorter, they do not pass the industrial areas of Monarto South and Kanmantoo, meaning there would be little opportunity to connect additional customers along the route. This would considerably reduce incremental revenues (NPV of \$8.0m).

Specifically:

- Route A would have heavy vehicle traffic (50,000 per day) increasing traffic disruption to the South-Eastern Freeway (major arterial route to Melbourne) and the risk of a vehicle related incident
- Route B passed through 23km of rock and risked environmental damage within Cleland Conservation Park and would require closing a major arterial road between Adelaide and the Adelaide Hills
- Route C, a variant of Route B, risked environmental damage within Cleland Conservation Park and would require closing the same major arterial road between Adelaide and the Adelaide Hills, but for a much longer length
- Route D was the longest and most expensive at concept screening, and also would pass through 15km of rock

Of the remaining Routes E and F, Route F provided greater opportunities to connect existing businesses in Monarto South and Kanmantoo (due to proximity) compared to Route E. Therefore, Route F was identified as the preferred option, although Route E is likely to be cheaper to construct, but with lower potential revenue. Both routes progressed to a Pre-FEED study.

3.1.2 Pre-FEED Study

A Pre-FEED study was conducted between July and November 2016, with the objectives of firming up demand and firming up a preferred route to progress to a full FEED study.

The Pre-FEED study identified an additional route option. Route G commences geographically between Routes E and F, also passing through Monarto South before heading north-west to join the original Route E alignment east of the South-Eastern Freeway. Several factors revealed during the Pre-FEED study through route and design options testing, stakeholder engagement, demand study and economic analysis make Route G preferable over Routes E and F:

- the commencement point of Route G is not constrained by residential zoning (as was the case for Route F), and has more space for a conventional city gate connection in future, reducing cost and risk;
- Route G deviates around Monarto Zoo, addressing stakeholder concerns and reducing risk;

- Route G is further from Kanmantoo Mine than Route F which means the pipeline would be at lower risk of damage caused by blasting at the mine;
- Route G avoids Back Callington Road, which is narrow and winding, and has had a waste water main constructed down its length recently;
- Route G is more proximal to Monarto South and Kanmantoo than Route E, providing for higher incremental revenue of \$5.0m, additional capex of \$3.3m which has a positive impact of \$1.7m in NPV terms; and
- While Route G is estimated to be slightly more expensive than Route F to construct, this is outweighed by its lower risk, and therefore lesser chance of cost overruns.

As a result, Route G was selected to progress to the more detailed FEED study. Table 15 below summarises the capital cost estimates from the Pre-FEED work.

Table 15: Concept/Pre-FEED route options summary (\$2017/18)

Option	Description	Cost estimate
Route E	Murray Bridge to Mt Barker via country roads and cross country	\$20.3m
Route F	Murray Bridge to Mt Barker via old Princes Highway and others	\$23.8m
Route G	Murray Bridge to Mt Barker via Monarto zoo boundary, old Princes Highway and others	\$24.1m

3.1.3 FEED Study

During the FEED study, preliminary discussions with landowners along Route G were undertaken to:

- gain their input on an acceptable alignment across their properties, including any future development plans; and
- conduct on-foot investigations of difficult terrain in the western half of the route.

The information gathered helped to further refine the route based on constructability and landowner acceptance.

Engagement was also undertaken with other stakeholders along the route such as local indigenous groups, mining tenement holders and also local and state government bodies and developers of major subdivisions within the township of Mount Barker.

These discussions resulted in the formalised Alignment 0.3. Figure 9 below maps the preferred alignment in blue, the existing Riverland Pipeline in red and Table 16 summarises the key features of the extension pipeline.

Figure 9: Proposed pipeline extension to Mount Barker

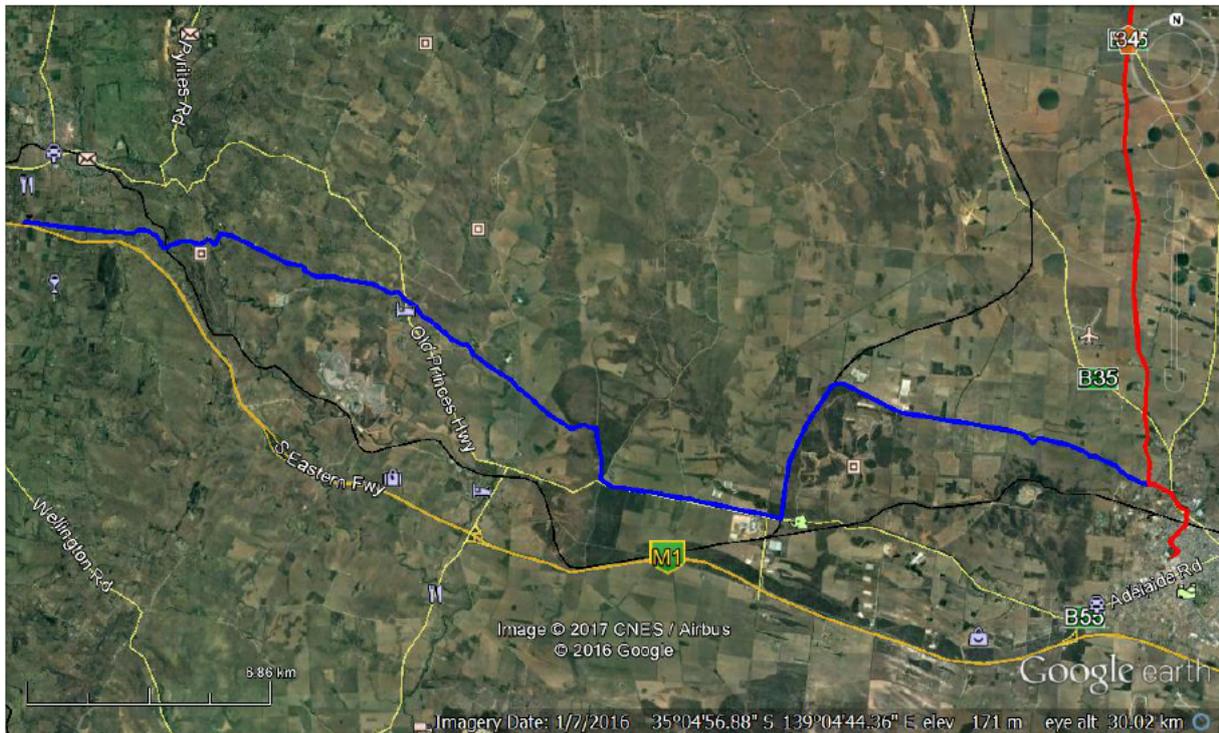


Table 16: Key features of the proposed extension

Parameter	Description
Length	39.7 km
Pressure	ANSI Class 600, MAOP 10.2 MPa
Pipe	DN150 (6"), steel, FBE coated. Nominally X60 strength rating
Offtakes	Monarto South and Kanmantoo

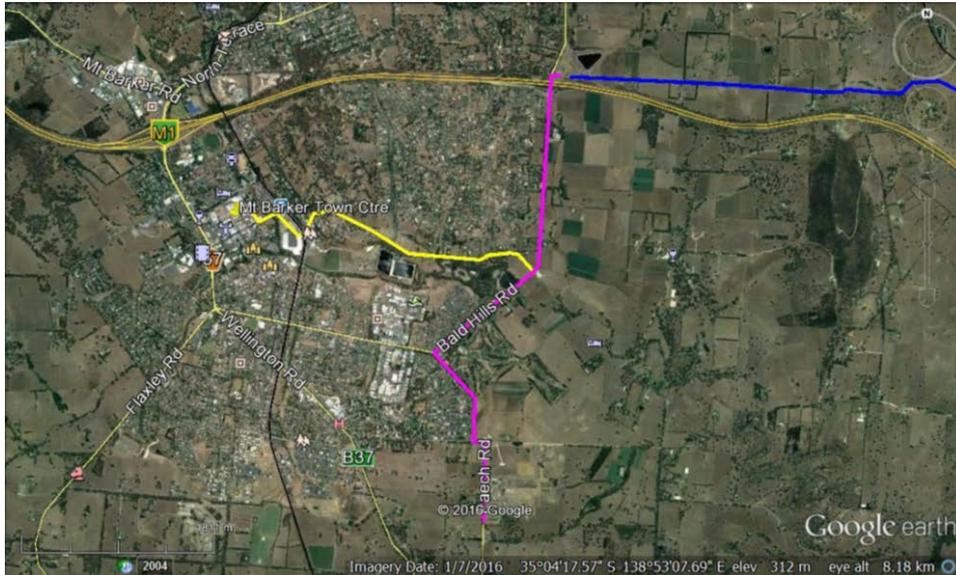
Once constructability and landowner acceptance of the alignment was confirmed, estimated pipeline costs were updated from the Pre-FEED and are set out at 3.2 below.

3.1.4 Trunk reticulation

The FEED study has also identified the trunk reticulation mains to Mount Barker, Monarto South and Kanmantoo. The design work and cost estimates for the initial Mount Barker trunk reticulation were developed and cost estimates for Monarto South, Kanmantoo and further Mount Barker trunk reticulation estimated by using benchmark unit rates as per the most recent AER final decision for the SA network.

Figure 10 shows the trunk reticulation mains to supply the new residential developments (magenta) and the town centre of Mount Barker (yellow).

Figure 10: Mount Barker new developments and town centre trunk reticulation mains



3.2 Forecast capital expenditure

3.2.1 Transmission pipeline and trunk reticulation

Forecast capital expenditure for the preferred alignment of the pipeline extension is based on:

- the length of Alignment 0.3 over Route G; and
- a detailed assessment by a pipeline construction consultant to:
 - review and assess construction methodologies;
 - estimate pipeline contractor costs;
 - determine a construction footprint based on access points and transport logistics; and
 - advise a cost estimate for drill and blast rock excavation from an experienced Australian drill and blast contractor incorporating information from land surveys.

Forecast capital expenditure for the reticulation trunk mains is based on typical metropolitan mainlaying rates, plus additional costs associated with the rocky terrain in Mount Barker.

Table 17 below summarises the extension headworks cost estimate. This estimate includes the trunk reticulation and preliminary costing for offtake facilities.

Table 17: Total direct cost of extension headworks

Capital	\$m 2017/18
Pipeline (Alignment 0.3)	\$26.2m
Offtake facilities (filtration, metering, heating, pressure regulation, controls and control hut as required)	\$2.2m
Trunk reticulation	\$7.9m
Total direct cost	\$36.3m

3.2.2 Reticulation, meters and services

We have used the AER approved benchmark unit rates for reticulation, meters and services wherever possible as summarised in Table 18 below.

Table 18: Capital expenditure and volumes for reticulation, meters and services

Capital	Unit cost \$ 2017/18	Total volume	Basis
Reticulation - Domestic/m	█	█	Benchmark costs for 12m per lot
Reticulation - I&C (total cost)	█	1	FEED fixed cost estimate
Meters – Domestic/meter	█	█	Benchmark costs for domestic connections and replacements
Meters - I&C/meter	█	█	Benchmark costs for I&C connections and replacements
Connection Cost - Demand	█	5	FEED fixed cost estimate for historic average demand connections
Services – Domestic/service	█	█	Benchmark cost for domestic connections
Services - I&C/service	█	█	Benchmark cost for I&C connections

3.2.3 Total forecast capital expenditure

The total forecast capital expenditure over the 31 year period is \$57.3 million (real \$2017/18). This comprises transmission pipeline capital costs of \$29.7 million and reticulation, meters and services costs of \$27.6 million.

The focus of this application is an advance determination the \$35.4 million to be spent on the extension in the current period will be rolled into the RAB as conforming capital expenditure at the next reset.

3.3 Forecast operating expenditure

3.3.1 Transmission pipeline

Transmission pipeline operating expenditure is based on estimates provided by APA. This is made up of general opex of around \$40,000 p.a. over the 30 years. There is also \$592,000 of additional operating expenditure in year 10 and \$666,000 in year 20 for pigging and replacement/upgrades of meters, valves and regulators.

3.3.2 Incremental operating expenditure

Incremental operating and maintenance costs have been included for the additional customers connecting to the network. This is our estimate of the incremental operating expenditure to account for additional costs such as billing and meter reading. The incremental cost included in our analysis is \$23 per connection per year (\$2017/18).³⁹

³⁹ The AER's approach to calculating output growth escalation for operating expenditure (as applied in its final decision for our SA AA) results in output growth escalation of effectively zero, hence our estimate of \$23 per connection per year is conservative.

4 Analysis Results

4.1 Investment evaluation

For the capital expenditure outlined at 3.2 above to be rolled into the RAB, it must be conforming capital expenditure under NGR 79(1)(a) and justifiable under one of the grounds at NGR 79(2).

We consider the extension is conforming as it expands natural gas supply to the growing Mount Barker region, also incorporating industrial demand at Monarto South and Kanmantoo and therefore providing benefits to residential and business customers in the area. We have also undertaken detailed route option analysis to select the most efficient pipeline alignment based on achieving lowest risk and cost, also factoring in potential connections and demand.

We have applied two tests to demonstrate the proposed Mount Barker extension is justifiable under NGR 79(2). The first assesses whether the overall economic value of the project is positive (79(2)(a)) and the second assesses whether the present value of expected incremental revenue is likely to exceed the present value of the capital costs (79(2)(b)).

We have estimated the expected economic benefits and costs, incremental revenue (revenue less operating expenditure) and capital expenditure over the period 2019/20 - 2049/50. The extension is justifiable with

- an overall economic value of at least \$29.9 million (\$2017/18) under 79(2)(a); and
- a positive net present value of \$5.1 million (\$2017/18) under 79(2)(b).

This highlights the economic benefit to customers in Mount Barker, Monarto South and Kanmantoo of having access to reticulated natural gas exceeds the cost of the extension, and that revenue derived from customers who connect will cover the cost of the extension – there will be no cross-subsidy from existing customers already connected to our network. Further, the positive NPV under 79(2)(b) recognises that over time there will be net benefits to all customers connected to our South Australian network via economies of scale.

Calculations underpinning this analysis have been summarised below at 4.1.1 and 4.1.2.

4.1.1 Economic value test

We engaged Frontier Economics to assess whether the overall economic value of the proposed Mount Barker extension is positive and therefore justifiable under NGR 79(2)(a). The methodology and assumptions that underpin the economic analysis can be found at *Attachment 10: Frontier Economics – Economic costs and benefits of the Mt Barker Extension Report* and *Attachment 11B: Economic Analysis Base Case Additional Support*.

Frontier Economics' analysis suggests the quantifiable benefits of the extension are approximately \$70.1 million (NPV \$2017/18), which benefit materially exceeds the economic costs of approximately \$40.2 million (NPV \$2017/18) and delivers a quantified net economic benefit of approximately \$29.9 million. Detailed workings can be found in *Attachment 11A: Frontier Economics – Mount Barker Extension Economic Analysis Model*.

The economic costs and benefits considered by Frontier Economics are based only on the costs and benefits to the customers expected to connect to natural gas, consistent with the assumptions in the incremental revenue test. The costs and benefits are summarised in Table 19 below.

Table 19: Summary of economic value test

Group	Economic value	Estimate	Comment
Economic benefits			
End users	Net increase in consumer surplus associated with substituting electricity and LPG use for natural gas use.	~\$70million	Driven by the difference in the price of electricity or LPG and natural gas (once accounting for any difference in appliance efficiency).
End users	Increase in consumer surplus associated with 'new' demand.	Not quantified.	Increase in consumer surplus due to 'new' demand from the largest Monarto South Industrial customer could be ~\$2 million.
End users	Increase in consumer surplus associated with demand growth due to elasticity of demand.	Not quantified.	Increased demand due to price elasticity of six Monarto South and Kanmantoo commercial and four Mt Barker and Monarto South industrial customers switching from LPG to natural gas. Not expected to be material given the total benefits quantified and relatively small contribution to total gas demand in the analysis.
End users	Increase in consumer surplus associated with demand growth beyond 2039/40.	Not quantified.	Growth is likely to continue past 2039/40, materially increasing consumer surplus.
End users	Increase in consumer surplus associated with preference for gas.	Not quantified.	Customer WTP for natural gas not available.
End users	Increase in consumer surplus in the event that there is a price on carbon (or carbon abatement is otherwise valued).	Not quantified.	Increase in consumer surplus at carbon price of \$25/tCO ₂ e would be ~\$0.75 million.
Gas producers	Increase in producer surplus associated with selling more gas.	Not quantified.	Wholesale gas price unlikely to increase, and likely to be equal to opportunity cost.
Gas retailers	Increase in producer surplus from providing services over a greater volume.	Not quantified.	Unlikely to be material given relative size of Mt Barker market.
Service provider	Increase in producer surplus from providing services over a greater volume.	Not quantified.	Unlikely to be material given relative size of Mt Barker market.
Total quantified benefits		~\$70 million	
Economic costs			
Service provider	Capital and operating cost of Mt Barker extension.	~\$40 million	Based on AGN's business case.
End users	The capital costs of buying and installing new gas appliances or converting existing appliances.	Not quantified.	Upfront appliance costs are comparable. Small cost to existing customers to alter/replace appliances, depending on the age of their current appliances. Insignificant compared to \$70 million in benefits.
Total quantified costs		~\$40 million	
Net benefits			
Quantified net benefit		~\$30 million	

Where there is no natural gas (the base case) we assume residential customers will use LPG for cooking and hot water, and electricity for space heating, and commercial and industrial customers use LPG. This reflects current development, building and consumption trends in Mount Barker and South Australia. Additional support for the base case is provided in *Attachment 11B: Economic Analysis Base Case Additional Support*.

Alternatively, if we consider an all-electric base case for residential customers, the economic benefits are reduced to a range of \$7-\$17m. This is a result of:

- the assumption of significant real reductions in electricity prices in the forward price curves used by AEMO (whereas natural gas and LPG prices are assumed to remain flat);
- the relatively low electricity consumption of these systems (with solar electric also able to access lower “controlled load” electricity tariffs); and is
- somewhat offset by significantly higher upfront appliance and maintenance costs of solar electric and electric heat pump hot water systems compared to natural gas and LPG systems.

Therefore the economic benefits of the project are NPV positive by at least \$7 million when comparing the extension case (all gas appliances) against an alternative base case with all electric appliances.

We however reiterate the most appropriate energy mix assumed for the residential base case is LPG for cooking and hot water, and electricity for space heating. This energy mix reflects the current energy utilisation in Mount Barker, and the expected energy mix into the future if our proposed natural gas extension does not proceed.

4.1.2 Incremental revenue test

We have undertaken cash flow analysis to assess whether the incremental revenue of the proposed Mount Barker extension exceeds the capital expenditure and is therefore justifiable under NGR 79(2)(b). We estimate the extension has a positive NPV of \$5.1 million. Detailed calculations are provided in *Attachment 12: Mount Barker Cashflow Model*.

Table 20: Summary of Mount Barker extension incremental revenue test (\$'000 nominal unless otherwise stated)

	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	34/35	39/40	44/45	49/50
Year#	0	1	2	3	4	5	6	7	8	9	10	15	20	25	30
Total revenue	-	102	342	738	1,261	1,690	2,084	2,515	2,981	3,467	3,924	6,603	9,745	11,024	12,229
Opex	-	46	55	64	74	84	94	106	119	132	895	223	1,386	357	402
Incremental revenue	-	56	288	674	1,187	1,606	1,990	2,409	2,862	3,335	3,029	6,380	8,359	10,667	11,828
Capex	31,177	6,097	2,383	3,878	995	1,029	935	1,034	1,059	1,084	1,098	1,245	1,502	278	316
Net cashflow (pre-tax)	-31,177	-6,041	-2,096	-3,204	193	577	1,054	1,375	1,803	2,251	1,932	5,135	6,857	10,389	11,512
Discount rate														6.42% (nominal pre-tax WACC)	
NPV (\$17/18)															5,070

Table 21: General and revenue assumptions

Parameter	Assumption	Customer	Volume	Revenue p.a. per single connection (\$17/18)
Tariff	Tanunda/Riverland	Residential	27.3 GJ p.a.	\$620
Opex – incremental only	\$23 per connection, \$2017/18	Commercial Mount Barker	273 GJ p.a.	\$4,851
Overhead cost allocation	4.81%	Commercial Monarto South	██████████	██████████
CPI	2.39%	Commercial Kanmantoo	██████████	██████████
X-factor	-3.8%	Demand Mount Barker/Monarto South	50 GJ/day MDQ	\$41,083
Penetration rate	95%	Demand large Monarto South	██████████	██████████

4.2 Consistency with the South Australian Access Arrangement and National Gas Rules

4.2.1 South Australian Access Arrangement

Pursuant to section 8 of the AA, we are required to submit to the AER for any high pressure extension to be considered part of the South Australian AA before the proposed extension comes into service. This business case and supporting information describes the high pressure extension to Mount Barker, why we are undertaking it and our intention for it to be covered by the South Australian AA.

4.2.2 Conforming Capital Expenditure

Consistent with the requirements of NGR 79(1)(a), we consider the required capital expenditure for this project to be conforming as it is:

- *Prudent* – The project increases the supply of natural gas to customers in South Australia and provides positive incremental revenue and economic benefit. Therefore, customers on the rest of the South Australian system will benefit from the positive NPV over the life of the project and customers in Mt Barker will benefit from a positive economic value over the life of the project. The proposed expenditure is therefore of a nature that would be incurred by a prudent service provider.
- *Efficient* – The forecast expenditure is based on costing and unit rates that have been developed using recent market engagement and regulatory benchmarks, consistent with those found to be efficient by the AER in our most recent South Australian AA. A route option assessment was undertaken and the preferred route option chosen as it is comparatively lower risk and provides the highest NPV. The supply and reticulation mains have been designed to maximise customer numbers during the development phase. It is more efficient to supply gas in greenfield developments than it is to wait and make infill connections. The proposed expenditure is therefore consistent with the expenditure a prudent service provider acting efficiently would incur.
- *Consistent with accepted good industry practice* – The proposed project involves expanding the South Australian network to meet potential demand growth, where the investment meets the incremental revenue test. In addition, the demand forecasts underpinning the economic analysis are considered to be conservative. A higher number of customer connections or average use than that forecast may be achieved, and ultimately provide greater benefits to customers (in the form of lower tariffs) than have been assumed in the Business Case.
- *Achieves the lowest sustainable cost of delivering pipeline services* – The project will lower the cost of delivering pipeline services because it will enable the largely fixed costs of operating the gas network to be spread over a larger customer base.

The capital expenditure is therefore consistent with NGR 79(1)(a). It is also consistent with NGR 79(1)(b) as it meets both the economic value test [NGR 79(2)(a)] and incremental revenue test [NGR79(2)(b)] as outlined in section 4.1.2 above.

4.2.3 Advance determination

NGR 80 allows the AER to make an advance determination that capital expenditure will meet the new capital expenditure criteria if the capital expenditure is delivered in accordance with a proposal submitted by a service provider.

We are seeking advance determination for \$35.4 million (\$2017/18) of capital expenditure to be rolled into the RAB at the start of the next 2021/22 to 2025/26 AA period. This amount reflects the capital expenditure expected to be incurred in the current 2016/17 to 2020/21 AA period and will provide the AGN Board with greater confidence to invest in the Mount Barker extension given the AER's previous rejection of the project.

Consistent with our AA capital allowance, we will only include the amount of actual capital expenditure we incur that is aligned with the advance determination under NGR 80 into the RAB.

5 Conclusion

Mount Barker is a fast growing region of South Australia, approximately 36km south-east of the Adelaide CBD. Recent rezoning of land has seen significant population growth, which will continue into the future. Further, the proposed transmission pipeline route will pass by Monarto South industrial precinct, which has been identified by the Rural City of Murray Bridge, District Council of Mount Barker and state government as a growing jobs centre for the region.

Under Section 8 of our South Australian AA we are required to apply to the AER to have a high-pressure extension covered by the AA. Consistent with our vision to be sustainably cost efficient by delivering profitable growth we are proposing a high pressure extension of our network to service growth in the Mount Barker area. We are also seeking an advanced determination of future capital expenditure under NGR 80 of \$35.4 million (\$2017/18).

We consider the information provided as part of this business case demonstrates the proposed extension is conforming capital expenditure as defined by NGR 79. In summary the incremental revenue from the extension exceeds capital costs, with a positive NPV of \$5.1 million (\$2017/18). The extension also provides at least \$29.9 million (\$2017/18) of overall net economic benefits through:

- lower cost energy for customers;
- diversity of energy options for homes and businesses, improving energy security;
- reduced carbon emissions from energy use;
- reduced harmful particulates emitted into the air from wood heaters;
- new energy uses that are not available with alternative fuels;
- improved reliability of energy supply; and
- a contribution to increased economies of scale in production, transportation and retailing.

We note that a far greater level of analysis has been undertaken in respect of this important network extension compared to the business case we previously presented to the AER (due to time) and compared to any business case we would normally provide as part of an AA proposal.

Appendix 1 – Summary of confidentiality claims

Table 1 lists the confidentiality claims we have made in relation to our Mount Barker Extension Proposal Business Case and Attachments. In summary, the claims relate to:

- personal information of potential and existing customers including names, addresses, consumption and intentions to connect;
- market sensitive cost estimates which may jeopardise our competitive negotiation of services;
- market intelligence and proprietary information of expert consultants we have engaged; and
- strategic information in relation to options testing and strategic business decisions.

Table 1: Summary of confidentiality claims in the Mount Barker Business Case and Attachments

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Business Case, p10, Table 4	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Business Case, p22, Paras 4, 6, 8 & 9	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Business Case, p23, Figure 8	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Business Case, p24, Para 5	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual's privacy and may harm AGN's ability to get such information from prospective customers in future
Business Case, p27, Table 13	Individual customer bill estimates	Revenue forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual's privacy and may harm AGN's ability to get such information from prospective customers in future
Business Case, p33, Table 18	Unit rate and volume forecasts	Capital Expenditure	Market sensitive cost inputs	Contains detail on forecast cost for undertaking works. Publishing the material will prejudice future tender and commercial negotiation processes between AGN/APA Asset Management and current and potential contractors/suppliers.	Public disclosure of this information will undermine the request for quote, request for tender and negotiating strategies to achieve efficient costs. Disclosure could therefore harm AGN's legitimate business interests.	Disclosure could harm AGN's legitimate business interests and, ultimately, increase costs passed on to customers.
Business Case, p38, Table 21	Individual customer consumption & bill estimates	Demand & Revenue forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual's privacy and may harm AGN's ability to get such information from prospective customers in future

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Attachment 1 – Comparison of Assumptions, p3, Table 3	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 1 – Comparison of Assumptions, p4, Table 4	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 1 – Comparison of Assumptions, p5, Table 5	Unit rate and volume forecasts	Capital Expenditure	Market sensitive cost inputs	Contains detail on forecast cost for undertaking works. Publishing the material will prejudice future tender and commercial negotiation processes between AGN/APA Asset Management and current and potential contractors/suppliers.	Public disclosure of this information will undermine the request for quote, request for tender and negotiating strategies to achieve efficient costs. Disclosure could therefore harm AGN’s legitimate business interests.	Disclosure could harm AGN’s legitimate business interests and, ultimately, increase costs passed on to customers.
Attachment 4A – Core Energy Report, p5, Para 7	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Attachment 4A – Core Energy Report, p12, Para 3	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4A – Core Energy Report, p13, Paras 2, 3 & 4 and Figure 2.6	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4A – Core Energy Report, p14, Para 4	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4A – Core Energy Report, p15, Paras 1 & 2	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4A – Core Energy Report, p19, Table A1.4	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Attachment 4A – Core Energy Report, p21, Table A1.6	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4A – Core Energy Report, p22, Table A1.7	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4A – Core Energy Report, p24, MDQ Tables	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 4B – Additional Support for Commercial and Industrial Demand Forecasts, Page 1, Para 8	Individual customer name and consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future

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Attachment 4B – Additional Support for Commercial and Industrial Demand Forecasts, Page 2, Paras 1 & 4	Individual customer name and consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 5 – Core Energy Model (spreadsheet)	Core Energy proprietary methodology	Core Energy demand and customer forecasts	Market intelligence and personal information	Model contains proprietary information that if disclosed would provide an advantage to Core Energy’s competitors. Contains easily identifiable personal information relating to individual customer demand.	Core Energy operates in a competitive market, and disclosing their proprietary information would provide an advantage to Core Energy’s competitors. Competitors to our individual customers that operate in competitive markets may also be advantaged. Information was sought from these customers on a confidential basis.	AGN’s customers would be detrimentally impacted if the intellectual property contained in successful tender bids (such as Core Energy’s proposal to develop Demand Forecasts) was released. This would diminish the incentive of potential tenderers to develop intellectual property, which would be detrimental to the quality of experts available to the AA process.
Attachment 7 – Consumption Data	Customer MIRNs and Addresses	Demand forecast	Personal information	Information about individual customers whose identity can reasonable be ascertained from the information		Disclosure will impact an individual’s privacy

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Attachment 8 – Customer Survey Summary, p1, Table 1	Customer names and conversations	Demand forecast	Personal information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 8 – Customer Survey Summary, p2, Para 1	Customer names and consumption forecasts	Demand forecast	Personal information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 9 – Concept Route Options Study	Options analysis of various routes in relation to the proposed network extension to Mt Barker	Operating and Capital Expenditure	Strategic information	Contains AGN’s intellectual property that could advantage AGN’s competitors on route development and design.	Public disclosure of this information has the potential to undermine AGN’s ability to obtain services at a fair market price.	AGN’s customers would be detrimentally impacted if AGN’s strategic developments were publicly disclosed and jeopardise AGN’s ability to obtain services at a fair market price. As a result, customers may face increased costs.
Attachment 10 – Frontier Economic Analysis Report, page 10, Table 3	Commercial and Industrial customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future
Attachment 10 – Frontier Economic Analysis Report, page 12, Table 4	Individual customer consumption estimates	Demand forecast	Personal Information	Information about individual businesses whose identity can reasonably be ascertained from the information	Jeopardise business relations with potential customers and disclosure of operating information of potential customers	Disclosure will impact an individual’s privacy and may harm AGN’s ability to get such information from prospective customers in future

Title, Page and Paragraph Number of Document Containing the Confidential Information	Description of the Confidential Information	Topic the Confidential Information Relates to	Identify the Recognised Confidentiality Category that the Confidential Information Falls Within	Provide a Brief Explanation of why the Confidential Information Falls into the Selected Category	Specify Reasons Supporting How and Why Detriment would be Caused from Disclosing the Confidential Information	Provide any Reasons Supporting why the Identified Detriment is Not Outweighed by the Public Benefit (Especially Public Benefits Such as the Effect on the Long-Term Interests of Consumers)
Attachment 11A – Frontier Economic Analysis Model (spreadsheet)	Frontier Economics proprietary methodology	Frontier Economics Economic Analysis	Market intelligence and personal information	Model contains proprietary information that if disclosed would provide an advantage to Frontier Economics' competitors. Contains identifiable personal information relating to individual customer demand.	Frontier Economics operates in a competitive market, and disclosing their proprietary information would provide an advantage to competitors. Competitors to our individual customers that operate in competitive markets may also be advantaged by disclosure of operating information. Information was sought from potential customers on a confidential basis so disclosure could jeopardise business relations with potential customers.	AGN's customers would be detrimentally impacted if the intellectual property contained in successful tender bids (such as Frontier Economics' Economic Analysis) was released. This would diminish the incentive of potential tenderers to develop intellectual property, which would be detrimental to the quality of experts available to the regulatory process.
Attachment 12 – Mount Barker Cashflow model	Cash flow model for assessing the Mount Barker network extension	Operating and Capital Expenditure, Demand and Revenue forecasts	Market intelligence	Contains details on various input costs and strategic decisions. Publishing the cash flow model has the potential to prejudice future negotiations with suppliers.	Public disclosure of this information will undermine negotiating strategies to achieve efficient costs. Disclosure could therefore harm AGN's legitimate business interests.	As mentioned previously, disclosure could harm AGN's legitimate business interest and, ultimately, increase costs passed on to customers.

Table 2 summarises the proportion of confidentiality claims across the Mount Barker Extension Business Case and Attachments. The highest proportion of confidentiality claims relate to market intelligence and proprietary models from expert consultants.

Table 2: Confidentiality statistics

Submission Title	Number of pages of submission that include information subject to a claim of confidentiality	Number of pages of submission that do not include information subject to a claim of confidentiality	Total number of pages of submission	Percentage of pages of submission that include information subject to a claim of confidentiality	Percentage of pages of submission that do not include information subject to a claim of confidentiality
Business Case	7	44	51	14%	86%
Attachment 1 – Comparison of Assumptions	3	2	5	60%	40%
Attachment 2 – Previous Information Requests	0	5	5	0%	100%
Attachment 3 – Natural Gas to Mount Barker Headworks Summary	0	26	26	0%	100%
Attachment 4A – Core Energy Report	9	17	26	35%	65%
Attachment 4B – Additional Support for Commercial and Industrial Forecasts	2	3	5	40%	60%
Attachment 5 – Core Energy Model (spreadsheet)	5	0	5	100%	0%
Attachment 6A – Penetration Data (spreadsheet)	0	5	5	0%	100%
Attachment 6B – Additional Support for Penetration Rate	0	18	18	0%	100%
Attachment 7 – Consumption Data	0.3	0.7	1	30%	70%

Submission Title	Number of pages of submission that include information subject to a claim of confidentiality	Number of pages of submission that do not include information subject to a claim of confidentiality	Total number of pages of submission	Percentage of pages of submission that include information subject to a claim of confidentiality	Percentage of pages of submission that do not include information subject to a claim of confidentiality
Attachment 8 – Customer Survey Summary	1	1	2	50%	50%
Attachment 9 – Concept Route Options Study	34	0	34	100%	0%
Attachment 10 – Frontier Report	2	32	34	6%	94%
Attachment 11A – Frontier Model (spreadsheet)	30	0	30	100%	0%
Attachment 11B – Additional Support for Economic Base Case	0	4	4	0%	100%
Attachment 12 – Mount Barker Cashflow Model (spreadsheet)	9	0	9	100%	0%
Overall Proportion of Confidentiality Claims				39%	61%