DISCUSSION PAPER

NATIONAL GAS STRATEGY OPTIONS
APRIL 2019

EUAA
Energy Users Association of Australia

EXECUTIVE SUMMARY

The Energy Users Association of Australia (EUAA) is the peak body representing Australian commercial and industrial energy users. We believe the east-cost gas market, already facing significant price increases, will be facing a tipping point within the next 12-18 months with many commercial and industrial gas users facing an uncertain future.

Commercial and industrial users tend to fall into two categories:

- Those who have survived because of legacy contracts that are gradually being replaced by new contracts at 2-3 times the legacy contract price.
- Those who have faced those higher prices since 2015-16 in the expectation that governments will take action so that when they renew those contracts the price will be low enough to make their business sustainable.

The first gas price shock saw delivered prices for commercial and industrial customers escalate to as high as $20.00GJ in the 2015/2016 period. While the EUAA sought to highlight the seriousness of the issue, the gas industry sought to downplay the concerns. It was only after the ACCC East Coast Gas Enquiry came into being and with the exercising of its information gathering powers, that the ACCC Chair said in September 2015:

> "…gas user complaints about a dearth of offers for the supply of gas in recent years are largely true."[1]

Governments reacted to the initial April 2016 ACCC report with a reform programme focussing on pipeline tariffs and gas trading through the Gas Market Reform Group. Additionally, the Federal Government established the Australian Domestic Gas Security Mechanism with the objective of balancing the domestic gas market to ensure sufficient supply of gas for domestic use, though it is yet to be actually invoked.

While these and other measures like the Gas Pipeline Arbitration Framework and improved information flows have resulted in welcome improvements, the domestic gas market is still very immature and requires significant additional development and potential direct government intervention before it is capable of delivering better outcomes for consumers.

More recent ACCC reports indicate that there are still issues around the supply of gas to the domestic east coast market and the level of competition commercial and industrial customers face in seeking supply. Contributing to this issue are restrictions in many States regarding on-shore gas development and concerns around the level of gas exporters reserves to meet their LNG commitments which, if realised, will have a disastrous impact on supply availability in the domestic market.[2]

Unfortunately, we see a forward curve for gas at the Wallumbilla Hub (ASX Futures) showing a netback price in 2020 of $10.50GJ rising sharply to $15.00GJ in 2021. With pipeline costs adding between $3.00GJ to $4.00GJ, domestic gas users are facing a second, potentially more destructive price shock that could represent "the final straw".

[1] See Speech by Rod Simms 17 September 2015 https://www.accc.gov.au/speech/the-importance-of-adequate-competition-for-the-east-coast-gas-market

[2] See Angela Macdonald Smith " A third of Qld's LNG industry at risk of closure by 2025: report" AFR 21 February 2019 https://www.afr.com/business/energy/gas/onethird-of-qlds-lng-industry-at-risk-of-closure-by-2025-report-20190220-h1bhdd

The tipping point many commercial and industrial customers are approaching means that continuation of prices based on and above forecast LNG netback, exacerbated by supply constraints, will result in many companies closing or reducing production if they are not able to pass these increases onto their customer base. This would be in the form of higher prices for many everyday items such as processed food, dairy products, building supplies, glass and paper products to name but a few.

How did we get to this point? We assert that the acute problems in today's gas market:

- Are contrary to the many assurances from the gas producers at the time the LNG projects were being developed that there will be enough gas for all.
- Are contributed to by explicit Government policies that restrict onshore exploration and development.
- Are exacerbated by the immaturity of the domestic gas market including the presence of monopoly power, high barriers to entry and information asymmetry that puts industrial gas buyers and shippers at a disadvantage.

Therefore, the lack of a competitive gas market is due to both market and Government failure. This suggests that arguments for no further Government intervention are problematic. Further the EUAA has been highlighting these problems for many years and the longer the problems are left unaddressed, the narrowing of the policy options that are available.

We are also concerned that to make simplistic statements like "aligning the domestic price to LNG netback" is an "efficient" policy ignores this context and may in fact validate a higher domestic gas price than could otherwise materialise. We suggest an alternate methodology of assessing an appropriate domestic LNG netback price based on a philosophy that customers should only pay for a service that has been provided.

The philosophical basis for policy discussions tends to be around what is seen as the appropriate role of Government. The gas supply side tends to argue for minimal Government intervention because of claimed sovereign risks around the investments they have made in Gladstone LNG terminals.

Our members are also intimately aware of the risks around changing Government policy, or to be more precise in the case of LNG, the lack of policy to ensure a balance between domestic and export objectives, once they have invested in their facilities.

With this policy tension in mind, the EUAA are proposing a range of options for domestic gas market reform that fall into 5 broad groups:

- Immediate actions
- Maintaining the status quo
- Accelerated regulatory and market development
- Establishment of a Commonwealth Gas Company
- Domestic gas reservation.

In this paper we provide an overview of each of these groups along with an initial assessment of what impacts each are likely to have.

The EUAA hope that this discussion paper will provide policy makers and the gas industry with some additional insights into the impact on Australian business of the continuing gas crisis and demonstrate that we are willing to work with all stakeholders on a pathway forward that allows all parties to prosper from our abundant natural resources.

SUMMARY OF POLICY OPTIONS

Immediate Actions

Given the gravity of the current gas crisis, two immediate actions should be considered being a revised LNG netback methodology that excludes the capital and financing costs associated with the gas trains themselves and the establishment of a short-term domestic gas support fund. Combined, these two initiatives have the objective of reducing domestic gas costs to between $7Gj and $7.50Gj.

Status Quo

ADGSM and some pipeline reforms aside, governments have a largely hands-off approach. The market is largely left to develop over time meaning that concentration of market power, finely balanced supply/demand, low levels of liquidity, poor transparency and a domestic price that is largely aligned with an international price will continue.

Accelerated Regulatory and Market Development

Primarily look to electricity market reform over the last 20 years and seek to replicate the most successful elements in the gas market. This needs to be a deliberative process, supported by the COAG Energy Council. We suggest a continuation of efforts to deal with the issue of information asymmetry and look to replicate successful technology development and deployment programs and institutions. Finally, industry development policies and funding sources that have already proven highly successful in the electricity market should be seriously considered.

Establish a Commonwealth Gas Company

The establishment of a Commonwealth Gas Company to not only manage new funding and support programs identified previously but to act as a wholesale participant who can provide longer term contracting for new gas developments.

This could be developed in two stages. Stage one would see the Commonwealth Gas Company act as the coordinator of the various initiatives and broad reform agenda. This would provide some assistance for junior developers to get new supply to market, to support the development of new gas pipelines, to increase liquidity and reduce monopoly power of incumbents.

Stage two, would be for the Commonwealth Gas Company to take a position as a gas wholesaler in addition to the coordinator role described in stage one. We note the Commonwealth already owns Snowy Hydro which is set to become the most influential player in the wholesale electricity market so there is a clear precedent for government involvement in this way.

Domestic Gas Reservation

Initially reserve a quantity of both existing and new gas development for domestic use similar to the current Queensland Government policy of tendering leases for domestic supply only. We would place a particular focus on delivering gas at a newly defined “domestic net-back price”.

After a period of time (yet to be determined), reservation would only apply to new gas development as more supply enters the market, which would be supported by other measures such as accelerated regulatory and market development and the Commonwealth Gas Company.

Potential Outcomes/Consequences

	Potential Outcome/Consequence					
Policy Option	**Lower Consumer Prices**	**Increase Domestic Gas Supply**	**Increase Retail Competition**	**Encourage New Investment**	**Increase Investor Risk**	**Create "Sovereign Risk"**
Immediate Actions	*Yes*	*No*	*No*	*Unlikely*	*No*	*No*
Status Quo	*Unlikely*	*Unlikely*	*No*	*Unlikely*	*Unlikely*	*No*
Accelerated Reg & Mtk Development	*Likely*	*Likely*	*Likely*	*Yes*	*No*	*No*
Commonwealth Gas Co	*Yes*	*Yes*	*Yes*	*Yes*	*Unlikely*	*Unlikely*
Dom Gas Reservation	*Yes*	*Yes*	*Unlikely*	*Unlikely*	*Likely*	*Likely*

INTRODUCTION

The Energy Users Association of Australia (EUAA) is the peak body representing Australian commercial and industrial energy users. Our membership covers a broad cross section of the Australian economy including significant retail, manufacturing, materials and food processing industries. Combined our members directly employ over 1 million Australians, pay billions in energy bills every year and in many cases are exposed to the fluctuations and challenges of international trade.

Our members are highly exposed to movements in both gas and electricity prices and have been under increasing financial stress due to escalating energy costs. These increased costs are either absorbed by the business, making it more difficult to maintain existing levels of employment or passed through to consumers in the form of increases in the prices paid for many everyday items. The companies reinvest millions of dollars in their current business to make sure they are safe and efficient as they try and absorb these higher gas and electricity costs.

We believe the east-cost gas market, already facing significant price increases, will be facing a tipping point within the next 12-18 months with many commercial and industrial gas users facing an uncertain future.

Commercial and industrial users tend to fall into two categories:

- Those who have survived because of legacy contracts that are gradually being replaced by new contracts at 2-3 times the legacy contract price - they are about to decide if they can survive on a new deal – some cannot e.g. Sydney company Remupak[3]

- Those who have faced those higher prices since 2015-16 in the expectation that governments will take action so that when they renew those contracts the price will be low enough to make their business sustainable. For example it was reported in the Australian Financial Review on 25th June 2018 that " A 12-month gas supply lifeline for Incitec Pivot's threatened Gibson Island fertilisers plant in Queensland is expected to wipe out profits at the operation next year."[4]

The first gas price shock saw delivered prices for commercial and industrial customers escalate to as high as $20.00GJ in the 2015/2016 period. While the EUAA sought to highlight the seriousness of the issue, the gas industry sought to downplay the concerns. It was only after the ACCC East Coast Gas Enquiry came into being with its exercise of its information gathering powers, that the ACCC Chair said in September 2015:

> "…gas user complaints about a dearth of offers for the supply of gas in recent years are largely true."[5]

Unfortunately, we see a forward curve for gas at the Wallumbilla Hub (ASX Futures) showing a netback price in 2020 of $10.50GJ rising sharply to $15.00GJ in 2021. The tipping point many commercial and industrial customers are approaching means that continuation of prices based on and above forecast LNG netback, exacerbated by supply constraints, will result in many companies closing or reducing production if they are not able to pass these increases onto their customer base. This would be in the form of higher prices for many everyday items such as processed food, dairy products, building supplies, glass and paper products to name but a few.

[3] https://www.afr.com/business/energy/gas/east-coast-gas-crisis-claims-victim-as-remapak-goes-under-20190119-h1a8s4

[4] https://www.afr.com/business/energy/gas/gas-contract-provides-12month-lifeline-for-incitec-pivot-fertiliser-plant-20180625-h11t4y

[5] See Speech by Rod Simms 17 September 2015 https://www.accc.gov.au/speech/the-importance-of-adequate-competition-for-the-east-coast-gas-market

THE FIRST PRICE SHOCK AND THE 2016 ACCC REPORT

In 2014, the EUAA, Australian Industry Group, Australian Aluminium Council, Australian Food and Grocery Council, Australian Steel Institute and Chemistry Australia (then PACIA) jointly funded a Deloitte study of the impacts of LNG export on the domestic economy.

While this report was conducted at a time of extremely high gas prices, some reported in the $15.00GJ to $20.00GJ range, gas price assumptions used in the report were far more conservative. Key tables from this report are included as Appendix A (Gas Price Assumptions) and Appendix B (Industry Impacts).

The best-case domestic gas price scenario, presented by SKM was a spread of $7.00GJ to $8.50GJ (from 2019 onwards) while under the IES presented scenarios we saw a price spread of $9.50GJ to $10GJ in 2019 rising to $11GJ by 2023. These price forecasts seem somewhat optimistic in the current circumstance.

This report identified that the manufacturing sector was projected to experience the greatest reduction in industry output. This is primarily due to its significant gas usage and high trade exposure, which largely limits the sector's ability to pass on higher gas input costs. In 2021, the final year modelled, manufacturing output is projected to be 3.6% (IES) to 4.4% (SKM) lower than in the baseline scenario.

The net present value of the cumulative reduction in manufacturing output from 2014 to 2022 was around $88 billion under the IES gas price projections, and $120 billion under SKM gas price projections.

Employment is also significantly impacted. By 2021, employment for the manufacturing industries selected by the project consortium was projected to reduce by around 12,227 (IES) to 14,626 (SKM) full time equivalent jobs.

The participating groups continued to express great concern about these impacts but were brushed aside by state and federal government and the gas industry itself. It was not until legacy gas contracts, largely priced in the $4.00GJ range, expired and energy users began the process of re-contracting that the full extent of these price impacts would be felt. Not only had offers escalated to the $15.00GJ range but terms and conditions became more onerous. In many cases one or perhaps two sellers responded to gas tenders.

Compounding this was the clear shortfall of available gas to feed the new gas trains being commissioned at Gladstone. This situation has been well reported so we will not elaborate further than to say, gas traditionally available for domestic gas use was now being re-directed to the LNG trains.

This situation gave rise to the watershed 2016 ACCC East Coast Gas Report that validated energy users concerns, identifying many structural issues along the entire gas value chain. Governments reacted to the initial April 2016 ACCC report with a significant reform programme focussing on pipeline tariffs and gas trading through the Gas Market Reform Group. The Australian Domestic Gas Security Mechanism has the objective of balancing the domestic gas market to ensure sufficient supply of gas for domestic use, though it is yet to be actually invoked.

While these measures resulted in welcome improvements, the domestic gas market is still very immature and requires significant additional development before it is capable of delivering better outcomes for consumers. While many of these structural issues are being addressed through the good work of the Gas Market Reform Group (GMRG) and to some extent the Australian Domestic Gas Security Mechanism (ADGSM), more needs to be done.

More recent ACCC reports indicate that there are still issues around the supply of gas to the domestic east coast market and the level of competition C&I customers face in seeking supply. We see Government restrictions in many

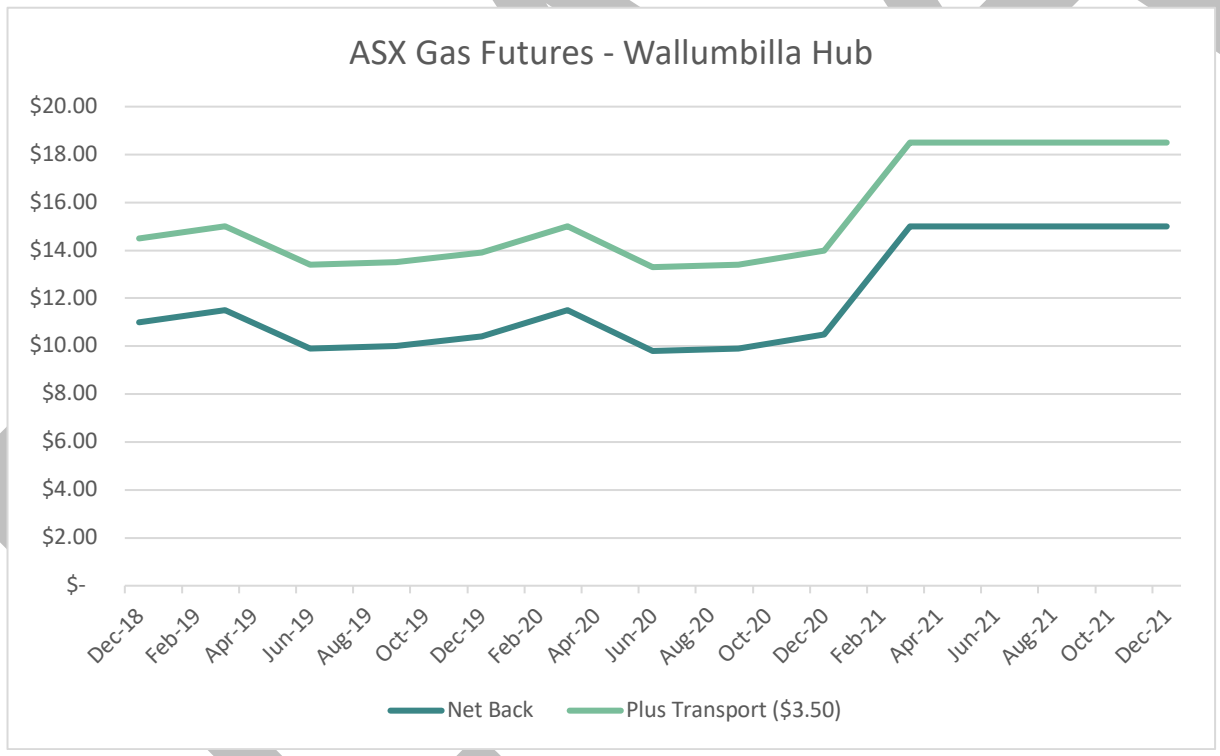
States regarding on-shore gas development and concerns around the level of gas exporters reserves to meet their LNG commitments which, if realised, will have a disastrous impact on supply availability in the domestic market.[6]

In any case, actions to date do not directly address the main cause of significant cost increases being supply constraints, absence of a functioning domestic gas market and the link between domestic and international gas prices. While there is evidence that the ADGSM has at times created some divergence in prices of between $1.50Gj to $2.00Gj, the underlying price for domestic gas will remain too high for many Australian industry to survive in the long term.

We are if the view that domestic prices will not materially come down until we are able to fully address key failings of domestic gas policy including de-linking domestic and international gas prices.

A SECOND SHOCK WAVE IS COMING

Feedback from many EUAA members reveals that while contract prices have come off the extreme highs of 2015 and 2016, prices are still in the $10.00Gj to $12.00Gj range while most tenders are only receiving one response. Futures markets do not provide reason for hope that prices will fall below $10.00GJ.



Recent contract data provided by the ACCC in their December 2018 Interim Report is summarised in the following table tends to validate the ASX Futures estimates. Further to this, anecdotal evidence provided to the EUAA by its members point to offers predominantly in the upper range of the pricing band.

[6] See Angela Macdonald Smith " A third of Qld's LNG industry at risk of closure by 2025: report" AFR 21 February 2019 https://www.afr.com/business/energy/gas/onethird-of-qlds-lng-industry-at-risk-of-closure-by-2025-report-20190220-h1bhdd

Table 3.1: Recent offers made and bids received by producers for gas supply in 2019 (all buyers)[108]

25 October 2017 – 24 April 2018	Offers	Bids
Number of offers or bids	13	47
Gas commodity price range ($/GJ)	8.52 – 10.37	7.25 – 10.62
Average gas commodity price ($/GJ)	9.04	8.43

25 April 2018 – 30 August 2018	Offers	Bids
Number of offers or bids	26	44
Gas commodity price range ($/GJ)	8.05 – 11.16	6.41 – 10.50
Average gas commodity price ($/GJ)	9.78	8.98

Source: ACCC analysis of offer and bid information provided by suppliers.

See p.77 https://www.accc.gov.au/system/files/Gas-Inquiry-December-Interim-Report-2018.pdf

The EUAA are often asked, "what would an acceptable gas price be". While this is a difficult question to answer as a "survival" gas price will differ from sector to sector and even differ from facility to facility depending on factors such as plant age. However, there does seem to be consensus that a long-term delivered gas price of between $7.00GJ and $8.00GJ, coupled with reasonable terms and conditions including contract length is around the mark.

We note that this price range represents a 100% cost increase on historical domestic gas for industrial and commercial customers. Nobody expects a return to $4.00GJ gas, but commercial and industrial gas users were told on many occasions that domestic gas would continue to be "affordable". We can assure you, it isn't!

THE GAS CRISIS AND A SNAPSHOT OF WHATS AT RISK

Progressively, major gas users are beginning to report that future investment decisions are being deferred due to uncertainty over domestic gas prices. Further to this, major gas users are reporting that if domestic gas prices continue to be closely aligned to LNG netback prices, they may have little alternative but to move operations to lower cost jurisdictions.

The tipping point many C&I customers are approaching means that continuation of prices based on and above forecast LNG netback will result in many companies like Remupak, closing[7].

The philosophical basis for policy discussions tends to be around what is seen as the appropriate role of Government. The gas supply side tends to argue for minimal Government intervention because of the sovereign risks around the investments they have made in Gladstone LNG terminals.

Our members are also intimately aware of the risks around changing Government policy, or to be more precise in the case of LNG, the lack of policy to ensure a balance between domestic and export objectives, once they have invested in their facilities.

[7] [7] https://www.afr.com/business/energy/gas/east-coast-gas-crisis-claims-victim-as-remapak-goes-under-20190119-h1a8s4

We assert that the acute problems in today's gas market:

- Are contrary to the many assurances from the gas producers at the time the LNG projects were being developed that there will be enough gas for all.
- Are contributed to by explicit Government policies that restrict onshore exploration and development.
- Are exacerbated by the immaturity of the domestic gas market including the presence of monopoly power, high barriers to entry and information asymmetry that puts industrial gas buyers and shippers at a disadvantage.

Therefore, the lack of a competitive gas market is due to both market and Government failure. This suggests that arguments for no further Government intervention are problematic. Further the EUAA has been highlighting the problems for many years and the longer the problems are left unaddressed, the narrowing of the policy options that are available.

To make simplistic statements like "aligning the domestic price to LNG netback" is an "efficient" policy ignores this context. To argue that government intervention to ensure LNG exporters supply gas to domestic markets is sovereign risk seems to suggest that if the LNG exporters get their reserves wrong and cannot fulfil their export orders then they should be able to reduce supply to the domestic market to meet LNG commitments or to ensure full utilisation of their Gladstone plants. This implies that domestic consumers should take LNG reserve risk.

Our members have already effectively taken this reserves risk which has contributed to the very high prices and influenced investment decisions in energy/gas intensive plant.

There have already been cases where this has occurred such as the decision by Incitec Pivot to construct a new multibillion-dollar, gas intensive facility in Louisiana USA instead of New South Wales. Others in the pulp and paper industries are also reporting they are progressively moving capacity to other jurisdictions such as New Zealand. While other issues such as water costs and availability of sufficient raw materials are factors, energy costs are identified as a key driver.

One of the industry sectors at greatest risk is food processing and associated upstream fruit and vegetable suppliers. According to the Australian Food and Grocery Council the food and grocery processing sector is worth $131.3 billion to the Australian economy and employs 324,450 people. Within that, the food and beverage manufacturing sub sector is the most significant component as can be seen in Appendix C – Food Industry Value.

A majority of the companies involved in this sub sector are gas intensive with few alternatives for fuel switching given the high capital costs involved. Many of these manufacturers are very concerned about future gas prices and its competitive impact against imported goods.

It is not just the direct manufacturing jobs that are at risk through high energy prices. Reduced food processing would directly impact on the farming sector who would be reduced largely to providers of fresh fruit and vegetables, which is approximately one tenth of the size of the food and beverage manufacturing sector.

Other manufacturers in industries such as glass, paper and plastics, would also experience a significant downturn as we rely more on imported products over time. In short, long-term gas prices well in excess of $10.00Gj is highly likely to have a devastating impact on regional and rural Australia where a majority of these industries are located.

Many building products manufacturers such as bricks, steel, cement and aluminium are also gas intensive. While not necessarily at risk from imports, increasing costs flow directly through to the housing and construction industries.

IMMEDIATE ACTIONS TO BE TAKEN

A number of immediate actions can be taken by government to provide short-term relief (1-3 years) for gas intensive industries that will provide a buffer until such time that medium to longer-term policy options start to take effect. The goal of these immediate actions is to ensure the cost of domestic gas is maintained at an affordable level, preserving critical manufacturing and industrial capacity and many thousands of jobs.

While medium to longer-term options are discussed in the next section we suggest policy makers seriously consider the following short-term initiatives to provide immediate relief.

In summary, these actions are:

- That the Federal Government and ACCC put in place a revised domestic LNG netback cost methodology that subtracts the capital and financing costs associated with the gas trains themselves. The argument, supported by the EUAA, is that these fixed costs should not be included in LNG netback calculation given domestically sold gas is never processed by these facilities so it should not incur a cost associated with it. This would remove between $2.00GJ to $2.20GJ from the current LNG netback price that is being used by sellers as a benchmark price.
- That the Federal Government consider a short-term domestic gas support fund where a direct subsidy is provided to gas intensive manufacturing with the goal of ensuring critical industries such as food processing, industrial metals processing and gas intensive manufacturing such as building products, chemicals, plastics, glass and paper are preserved.
- If desired this could also be extended to new entrant gas generators (who may also have access to the proposed asset underwriting scheme) for the purpose of lowering wholesale electricity prices, creating additional competition and assisting the rapid deployment of the highly flexible generation that the evolving electricity market requires.

We envisage these two elements would work together to bring domestic gas costs back into an affordable range of between $7Gj to $7.50Gj. The actual level of this direct subsidy would be linked with the new domestic price benchmark produced by the revised LNG price methodology. Below is a simple example of how this would work.

Existing LNG netback price (current benchmark price)	$10.50Gj
Revised domestic LNG netback price (new domestic benchmark price)	$ 8.50Gj
Short term domestic gas support fund contribution	$ 1.50Gj
Target price achieved	**$ 7.00Gj**

According to the 2019 Gas Statement of Opportunities (GSOO) released by AEMO in March 2019[8] industrial gas demand for 2019/2020 will be in the order of 250Pj (250,000,000Gj).

Assuming 75% of this industrial gas demand is covered by this support mechanism, the annual budget impact would be $0.5B ($500,000,000). To put this in perspective, the 2019/2020 budget surplus is forecast to be $7.1B and the four-year forecast surplus is $45B.

While we recognise this represents significant government actions, and in the case of the domestic gas support fund, a significant budget impact, we are of the firm view that if the gas crisis continues to grip Australia's gas intensive industries we are likely to see significant demand destruction in the near future. Governments should also consider the significant budget impacts of demand destruction and loss of large sections of our manufacturing and industrial base.

[8] https://www.aemo.com.au/Gas/National-planning-and-forecasting/Gas-Statement-of-Opportunities

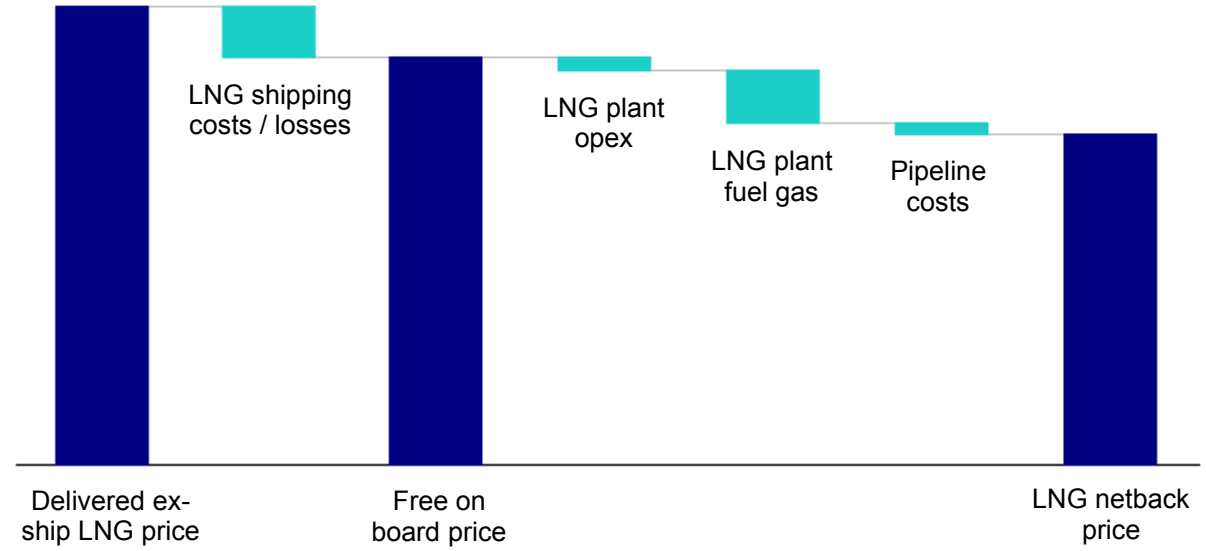
ACCC LNG Netback Price Series

In recent times, LNG netback has been viewed by some, including the ACCC, as a reasonable reference price for domestic gas. In its "Guide to the LNG netback price series" published in October 2018[9], the ACCC describes the process for arriving at an LNG netback price as such:

***LNG netback price**: A pricing concept based on an effective price of gas at a specific location or defined point, calculated by taking the delivered price of LNG and subtracting or 'netting back' costs incurred between the specific location and the delivery point of the LNG. For example, an LNG netback price at Wallumbilla is calculated by taking a delivered LNG price at a destination port and subtracting, as applicable, the cost of transporting gas from Wallumbilla to the liquefaction facility, the cost of liquefaction and the cost of shipping LNG from Gladstone to the destination port.*

The ACCC provides the following stylised calculation of short run LNG on page 15 of the same guide.

Chart 2.1: Stylised short-run LNG netback price calculation



This approach concluded that LNG netback prices for the period January 2016 to January 2019 ranged between 4.50GJ to $13.00GJ and delivered a netback price range for the period January 2019 to December 2020 of between $8.00GJ and $10.50GJ[10].

This appears to be below the actual prices seen by many commercial and industrial gas users over the same period, even when pipeline costs are removed. Some gas users have expressed some scepticism that the LNG price series represents the customers reality or that it truly represents netback. There is a view that LNG netback pricing really represents the opportunity cost to the seller of supplying to a domestic customer instead of an international customer.

[9] https://www.accc.gov.au/system/files/Guide%20to%20the%20LNG%20netback%20price%20series%20-%20October%202018.pdf
[10] https://www.accc.gov.au/regulated-infrastructure/energy/gas-inquiry-2017-2020/lng-netback-price-series

Therefore, the current LNG Netback calculation retains strong links to the international LNG market, does not reflect the suppliers real cost associated with domestic gas provision and should not be used as a proxy for an acceptable domestic gas price. The problem with the ACCC series is that while it is published with the objective of information transparency, it can effectively become a floor price for supplier offers.

Domestic Netback – An Alternative Approach

A number of EUAA member companies, including some of the nation's most significant industrial gas users, have looked at an alternative methodology for calculating LNG netback.

As a first step, it is recommended that the international reference price should be oil linked (i.e. Brent or West Texas Crude) as this is something a buyer can effectively hedge if they desire, therefore representing a more reliable indicator of longer-term contract pricing. Other reference points such as the Japan-Korea Marker (JKM) is more representative of a spot price paid for excess capacity which only reinforces the perception (or perhaps the reality) that domestic gas customers are a secondary market for Australian gas.

From this more representative base, the argument, supported by the EUAA, is that that fixed costs associated with recovery of capital and financing costs of the gas trains themselves should be subtracted from the LNG netback calculation.

Essentially, if these fixed costs continue to be included in LNG netback methodology then Australian consumers will be both paying for a service that is not rendered (i.e. liquification) and subsidising international gas buyers by contributing to capital cost recovery on an asset that is not part of the domestic supply chain. We would point to the recent Financial Services Royal Commission where Commissioner Hayne was highly critical of the practice of financial institutions charging customers for services not actually delivered. We believe there are clear parallels with LNG netback.

Further to this, it has been suggested that linking the trigger for a revised domestic netback methodology to LNG train capacity (export capacity) is an appropriate step. We believe this approach is irrelevant for the following reasons:

- The current LNG netback methodology represents the opportunity cost of not selling to an international buyer or not bidding into an international LNG spot market. If LNG trains are at full capacity then the only market remaining for the seller is domestic. This makes the concept of LNG netback irrelevant as the seller has no means by which to participate in international markets given export capacity has been reached. This should result in a completely independent domestic gas price evolving only it isn't due to the current LNG netback relationship and lack of competition.
- If the option of the seller is to leave the gas in the ground and the domestic market is not fully serviced then the ADGSM would be triggered, requiring these gas reserves to be released to the domestic market. Once again, this makes the concept of LNG netback irrelevant as a domestic price should be the driver for domestic gas.
- In any case, the fact remains that gas for domestic consumption is at no point put through the liquification process and therefore domestic customers should not pay for a service or assist in capital cost recovery of an asset involved in that service when no service was provided.

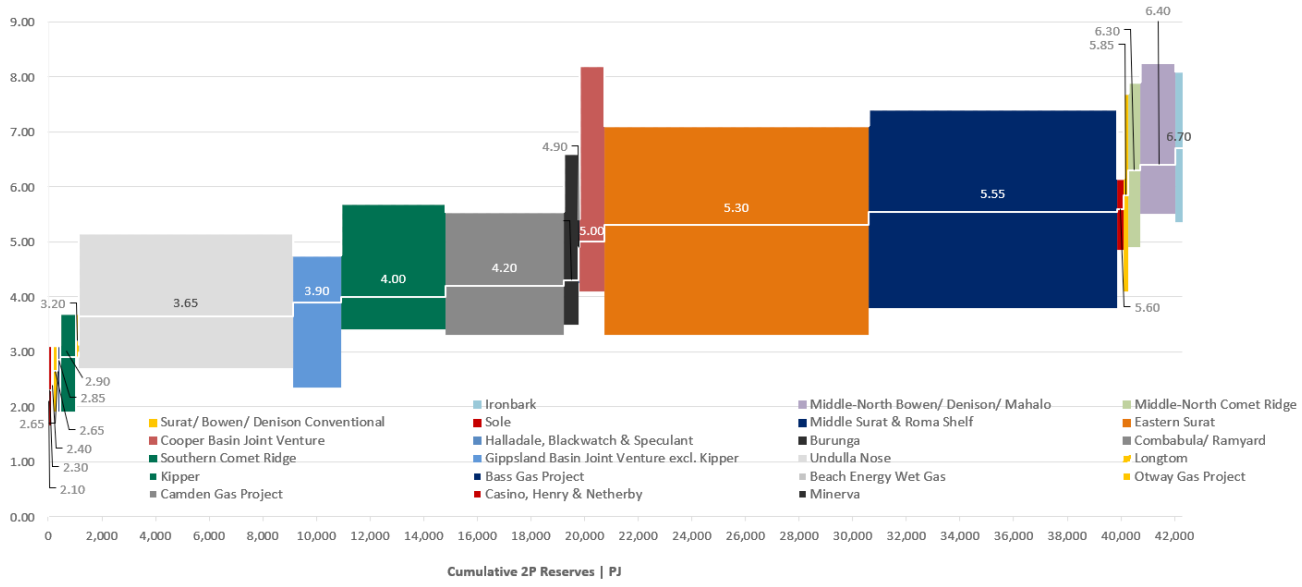
There has also been an argument put forward that gas producers shouldn't be required to price on a "cost plus margin" basis and that other industries do not operate this way. This ignores the reality faced by many gas intensive industries. We would argue that many gas intensive industries do price on a cost-plus margin basis as they operate in a highly competitive market. In fact, in many cases they are being forced to absorb increased costs to remain competitive.

We would argue that gas producers, while exposed to competitive international markets, have a virtual monopoly on the domestic gas market. Given this situation and their assurances that domestic gas would remain affordable are now demonstrated to be clearly incorrect, we firmly believe they have an obligation to domestic gas users to deliver on these past assurances.

Not forcing domestic gas users to pay for services not delivered by removing these fixed costs would reduce LNG Netback by between $2.00GJ to $2.20GJ, providing a true domestic gas price.
The EUAA recommends that the Federal Government and ACCC look at this discrepancy and make immediate changes to the domestic LNG netback methodology.

Interestingly, the cost produced by this domestic LNG netback methodology aligns with the recently published Core Energy and Resources report produced for the ACCC[11]. The chart below is taken form that report and is the "go forward" cost summary of 2P reserves by supply region.

Figure 1.1.2 Go forward cost summary- High low and reference cost range : 1 Jan 2018 $/GJ y axis and X axis PJ of 2P reserves per supply region



Short Term Domestic Gas Support Fund

The EUAA remain very concerned that meaningful gas price relief appears to be many years away, if at all. This strategy paper discusses many medium and long-term reforms that will have an impact over time. However, many gas intensive industry participants have advised us that unless there is immediate relief from un-economic gas prices that significant demand destruction will occur.

Once these manufacturing facilities close they will not come back, even if future gas prices improve.

The goal therefore is to preserve as much of this gas intensive industry as we can until such time that the broader gas market reform package begins to take effect.

[11] https://www.accc.gov.au/system/files/Core%20Energy%20report%20for%20ACCC%20-%20November%202018.pdf

To achieve this goal, we strongly suggest that:

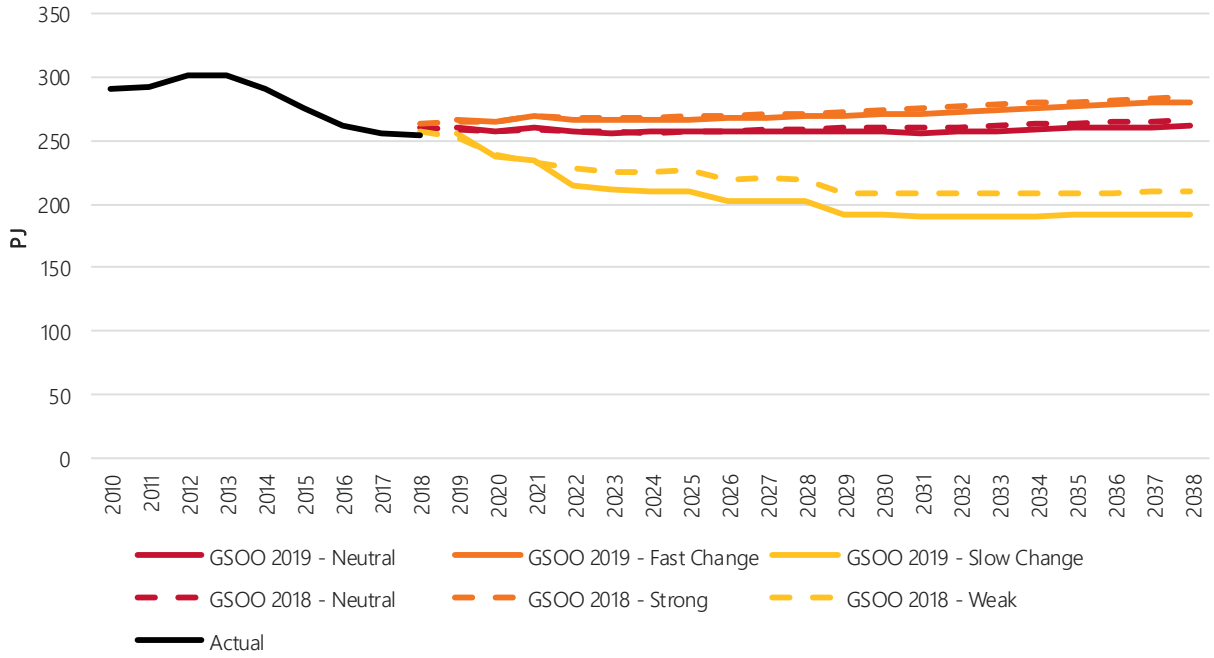
- The Federal Government consider a short-term domestic gas support fund where a direct subsidy is provided to gas intensive manufacturing with the goal of ensuring critical industries such as food processing, industrial metals processing and gas intensive manufacturing such as building products, chemicals, plastics, glass and paper are preserved.
- If desired this could also be extended to new entrant gas generators (who may also have access to the proposed asset underwriting scheme) for the purpose of lowering wholesale electricity prices, creating additional competition and assisting the rapid deployment of the highly flexible generation that the evolving electricity market requires.

We envisage the two immediate actions described in this section would work together to bring domestic gas costs back into an affordable range of between $7Gj to $7.50Gj. Therefore, the actual level of this direct subsidy would be linked with the new domestic price benchmark produced by the revised LNG price methodology. Below is a simple example of how this would work.

Existing LNG netback price (current benchmark price)	$10.50Gj
Revised domestic LNG netback price (new domestic benchmark price)	$ 8.50Gj
Short term domestic gas support fund contribution	$ 1.50Gj
Target price achieved	**$ 7.00Gj**

According to the 2019 Gas Statement of Opportunities (GSOO) released by AEMO in March 2019[12] industrial gas demand for 2019/2020 will be in the order of 250Pj (250,000,000Gj).

Figure 8 Industrial annual consumption actual and forecast, 2010-38, all scenarios, and compared to 2018 GSOO



Note: 2019 scenarios are not directly comparable to 2018 scenarios due to changes in scenario formulation.

[12] https://www.aemo.com.au/Gas/National-planning-and-forecasting/Gas-Statement-of-Opportunities

Assuming 75% of this industrial gas demand is covered by this support mechanism, the annual budget impact would be $0.5B ($500,000,000). To put this in perspective, the 2019 Federal Budget handed down on 2 April 2019, forecast a surplus in the 2019/2020 financial year to be $7.1B and a four-year forecast surplus of $45B.

We are very conscious of the issues surrounding participants gaming this mechanism by simply increasing prices to industrial gas buyers by an equivalent level of the subsidy. We see the role of market oversight and improved transparency being played by the ACCC and the revised domestic LNG netback price, acting as a domestic benchmark price, as critical to ensuring this does not occur. We suggest that it is made clear to participants that civil penalties will apply to those who engage in this type of pricing behaviour.

While we recognise these policies represent significant government actions, and in the case of the domestic gas support fund, a significant budget impact, we are of the firm view that if the gas crisis continues to grip Australia's gas intensive industries that we are likely to see significant demand destruction in the near future.

We reiterate that history clearly shows that once an industry leaves the Australian economy or when a major industrial facility is closed down, it is highly unlikely they will return, even if gas prices moved to more affordable levels.

The longer we wait to act on these issues the harder and more expensive it will be to resolve the crisis. The time to act is now.

INFORMATION ASYMMETRY

Information asymmetry has been a critical issue for large commercial and industrial gas users and a clear indicator of the immaturity of the domestic gas market. This fact was recognised by the COAG Energy Council who instructed the ACCC and GMRG to take steps to begin rectifying this issue.

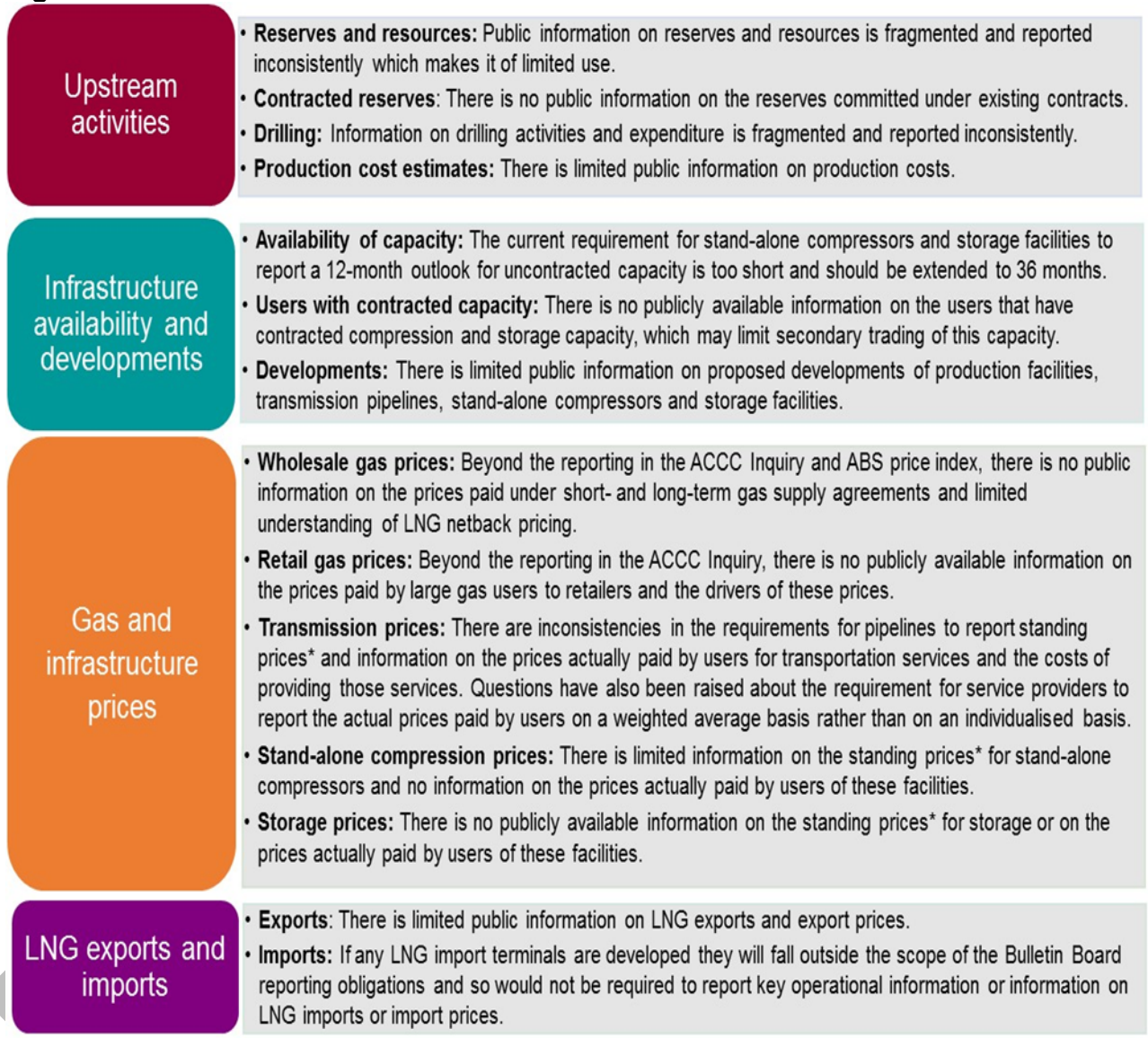
EUAA members also report that the "reverse auction" approach being used by some sellers that requires customers to bid blindly into the sales process further entrenches information asymmetry. Governments should take action to ban this practice, especially in such an opaque market dominated by a small number of significant players.

In late 2018 the ACCC subsequently released two key reports being "Gas Production Cost Estimates, Eastern Australia[13]" compiled by Core Energy and Resources and "ACCC and GMRG joint recommendations. Measures to improve transparency of the gas market[14]" In the Core Energy and Resources report we are able to see, perhaps for the first time, the full lifecycle cost of production from various gas supply regions.

This report clearly demonstrates that plentiful quantities of "affordable" gas are still available for domestic gas users. Even when margin and transportation costs are added, there appears no reason why gas can't be delivered to domestic users, including power generation, at prices below $9GJ.
The second report "ACCC and GMRG joint recommendations. Measures to improve transparency of the gas market[15]" outlines the key information deficiencies in the domestic gas market. They are represented in the following graphic.

[13] https://www.accc.gov.au/system/files/Core%20Energy%20report%20for%20ACCC%20-%20November%202018.pdf
[14] https://www.accc.gov.au/system/files/ACCC-GMRG%20Measures%20to%20Improve%20the%20Transparency%20of%20the%20Gas%20Market.pdf
[15] https://www.accc.gov.au/system/files/ACCC-GMRG%20Measures%20to%20Improve%20the%20Transparency%20of%20the%20Gas%20Market.pdf

Figure 1.2: Information deficiencies



* The term 'standing price' is used to refer to the price offered by a service provider for a standard service.

This clearly sets out a pathway forward for the COAG Energy Council to at least begin to resolve the significant information asymmetry that is currently crippling the ability of large commercial and industrial gas buyers to negotiate on reasonable footing.

We strongly recommend that the COAG Energy Council continue to task both the ACCC and GMRG with resolving these information deficiencies. We would fully support additional funding and resources be provided to the GMRG so this can be achieved. As we discuss later under "Policy Options" this is one of a number of issues that needs to be resolved before we can claim to have a functioning domestic gas market capable of delivering in the long-term interest of consumers.

POLICY OPTIONS

In addition to the immediate actions already described, we have considered medium and longer-term policy options that we believe deserve serious consideration by governments. Our goal is to ensure a vibrant domestic gas market can evolve that delivers strong LNG exports, preserves domestic manufacturing and ensures economically viable fuel for new peaking generation that a rapidly evolving energy market requires.

Status Quo

ADGSM and some pipeline reforms aside, governments have a largely hands-off approach. The market is largely left to develop over time, if at all. It is likely that concentration of market power, finely balanced supply/demand, low levels of liquidity, poor transparency and a domestic price that is largely aligned with an international price will continue.

We firmly believe that maintaining the status quo will lead to significant economic destruction including what remains of our manufacturing base (paper, glass, chemicals etc), our food processing industry and the knock-on effect to many farming communities and the gas fired power generators that will be called upon more frequently as we move to more variable forms of energy supply.

Accelerated Regulatory and Market Development

Despite some recent gains via ACCC market oversight, GMRG work on pipeline capacity trading and arbitration frameworks and the ADGSM to ensure sufficient domestic supply, domestic gas markets are still immature, opaque, lack liquidity and exhibit limited competition.

The economic analysis of markets concludes that, in most sectors of the economy, active competition is the most effective means to achieve:

- Efficiency and innovation in the supply of goods and services; and
- Consumer protection, by providing choice among competitive offerings.

Well-functioning competitive markets are characterised by several important attributes:

- Ease of Market Entry and Exit
- Absence of Significant Monopoly Power
- Widespread Availability of Information
- Absence of Market Externalities
- Achievement of Public Interest Objectives

The current domestic gas market exhibits none of these attributes and it would be unrealistic to expect that the situation will change without some form of structure and guidance by government.

A clear example of this is the National Electricity Market (NEM) which did not happen by accident. It was a conscious decision by state and federal governments to establish a national market for electricity, putting in place the market structures, rules and regulatory bodies to facilitate open, transparent, liquid markets. Much of the potential gas market architecture already exists in electricity markets, it just needs to be applied.

Therefore, we strongly suggest that the COAG Energy Council fast track gas market development as described below. We look to the COAG Energy Council to take control of this agenda and make accelerated market reform a priority in 2019.

This reform agenda includes but is not limited to the following elements:

- Continue the work of the ACCC and GMRG on decreasing information asymmetry by improving market information such as production and transportation costs. We strongly suggest that the GMRG be appropriately staffed and funded to continue work on gas market reform.
- Develop a wholesale domestic gas market similar to the wholesale domestic electricity market. Electricity is currently traded through a "gross pool" market where all energy is traded in an open, transparent fashion that facilitates high levels of liquidity and price discovery. Gas market reform should seek to replicate this outcome.
- Consider "market maker" requirements on major wholesale participants in regions where there is low liquidity and little price discovery. Market marker requirements are already being considered for the South Australian wholesale electricity market for these same reasons.
- Replacing moratoria with transparent technical assessment, robust planning/monitoring and a just compensation framework for landowners.
- Identification of new fields, with an allocation for the domestic market. Queensland has already set a precedent and while it is still early in the process, it has been well received by market participants.
- Incentives/assistance (i.e. asset underwriting, capital fund) for junior developers to provide more gas from more sellers for the domestic market (we can't allow them to be "swallowed up") – ACCC must continue to monitor market structure and market power.
- Incentives for more gas pipeline development. This could include asset underwriting, accelerated planning approvals and favorable regulatory treatment in exchange for price guarantees for shippers.
- Replicate energy efficiency schemes to create a gas efficiency initiative.
- To assist with the above we would suggest development of new funding sources, potentially paid out of royalties to replicate electricity initiatives like ARENA, CEFC, RET and the proposed "asset underwriting". The establishment of a gas transition fund to assist with energy efficiency, fuel switching and acceleration of alternative fuels such as hydrogen. If this approach is good enough to help resolve the "electricity crisis" the it should be good enough to solve the "gas crisis". In the next section we propose the establishment of a Commonwealth Gas Company, which, amongst other tasks, could have primary responsibility for managing these arrangements.

Commonwealth Gas Company

One of the consequences of an immature domestic gas market and the general uncertainty created by escalating prices and restricted supply, is the reluctance of gas wholesalers and large end-users to enter into contract term of sufficient length to help underwrite new gas resources or pipeline infrastructure. In electricity markets, this issue was identified in the 2018 ACCC Retail Electricity Pricing Inquiry[16] which gave rise to Recommendation 4 (asset underwriting).

The reluctance of large commercial and industrial gas buyers to enter into longer-term contracts stems from the following issues:

- Information asymmetry including poor price discovery.
- Seller pricing strategies based on the opportunity cost of LNG, which is linked to volatile international markets, rather than a cost-based approach.
- Uncertainty around future supply meaning many large gas users are often required to absorb a supply risk premium in longer-term offers or supply may not be guaranteed by the seller.
- Long-term contracts (5+ years) are not being offered by sellers with many opting for 1 to 2-year contracts (which is also reflective of the above supply and international price risks).

[16] https://www.accc.gov.au/system/files/Retail%20Electricity%20Pricing%20Inquiry—Final%20Report%20June%202018_0.pdf

Therefore, consideration should be given to establishing a Commonwealth Gas Company to not only manage new funding and support programs identified previously but to act as a wholesale participant who can provide longer term contracting for new gas developments. Again, Recommendation 4 of the 2018 ACCC Retail Electricity Pricing Inquiry sets out the rationale and process for this approach.

The Commonwealth Gas Company could be developed in two stages:

- Under stage one the Commonwealth Gas Company could act as a coordinating body for a range of government initiatives described previously.
- If required, stage two would see the Commonwealth Gas Company establish itself as a gas wholesaler, bringing increased competition to the wholesale market and facilitating the establishment of tier two retailers.

Regardless of the stage, the Commonwealth Gas Company would seek to assist junior developers get new supply to market, support the development of new gas pipelines, increase liquidity and enhance competition. We note the Commonwealth already owns Snowy Hydro which is set to become the most influential player in the wholesale electricity market and has signaled its intention to move ahead with an asset underwriting approach so there is a clear precedent.

This approach could also include the Commonwealth supporting an FSRU for the purpose of transferring cheap, plentiful gas from the North West Shelf (NWS), to feed proposed import terminals in Victoria and New South Wales. This support could come in the form of underwriting cargoes with tolling arrangements with the FSRU operator, taking an equity position in the FSRU or providing capital via a CEFC style arrangement. All of these options would work to effectively subsidise the regasification costs and therefore deliver lower cost gas to consumers.

Initially, the goal should be to provide gas to southern and eastern states at no more than a newly defined domestic netback price. Depending on the support provided, consideration should also be given to an appropriate “exit strategy” whereby the Commonwealth Gas Company has a sunset date to be either wound up or assets divested to new players for the purpose of maintaining competitive pressure. Again, there is clear precedent in asset sales of this type in the electricity market.

The establishment of a Commonwealth Gas Company and the options described in the previous section are not an either-or choice but part of a multi-track approach. The regulatory and policy development options should be pursued regardless to accelerate gas market maturity, which may still take 5 years to fully come in effect.

We would emphasise that many of the tasks assigned to this new Commonwealth Gas Company are already either a feature of the electricity market or are being contemplated as new reforms to the electricity market (i.e. asset underwriting, contract support via CFD’s, market maker provisions and direct project funding). If the question is, should government step in to resolve energy market issues, then governments at state and federal level have answered with an emphatic “yes”.

We would strongly suggest that the magnitude of the issues in the domestic gas market and the ramifications of not materially addressing them in a timely fashion are far greater than what we currently observe in electricity markets. It is our view that if such reforms are worthwhile considering to solve electricity market issues then surely, they are worthwhile considering to solve gas market issues that if left unchecked are highly likely to cause significant economic destruction.

We have also considered what, if any, negative effects such an intervention as the Commonwealth Gas Company would have on the domestic gas market such as crowding out non-government investment or increasing risk for

incumbents. While government intervention of the nature described in this section could have a negative effect on an already well functioning market, we would contend the domestic gas market is not well functioning.

Our view is that a Commonwealth Gas Company would achieve many public interest objectives by increasing competition and lowering consumer prices. It would do this by reducing barriers to entry for new entrants and assets; by decreasing the impact of monopoly power; by improving information through additional price discovery and liquidity and by partially negating a negative externality of higher international LNG prices.

Domestic Reservation

Many major gas producing nations have some form of gas reservation policy - or equivalent laws aimed at ensuring local industry and consumers are not disadvantaged by gas exports. Although schemes introduced by governments across the world vary, the common goal is to ensure the national advantage of affordable gas is not given away through linking to a global LNG price.

Israel, Indonesia, and Egypt have laws mandating that a percentage of gas extracted must stay within their domestic markets. Israel reserves 60 per cent of its offshore natural gas. Egypt has legislated that a third of gas production be directed to domestic consumers. Indonesian reservation is applied on a case-by-case basis to new projects, but reservations of up to 40 per cent have been agreed to in recent years.

In the USA the export of LNG is regulated by the Natural Gas Act of 1938, where exports must be found to be in the 'public interest' by the Department of Energy (DOE). The existence of the public interest test is deliberately loose and allows the US to maintain control over its export volumes and ensure that any increase in LNG demand does not outstrip available supply and create shortages in domestic markets. Canada has similar 'public interest' laws around the export of its gas.

Norway, Qatar, Russia, Algeria, and Malaysia ensure domestic advantage from their gas reserves by having state-owned companies taking the role of dominant producer. Despite these various restrictions there is little evidence to suggest global investment in any of these nations' gas reserves has been hampered.

Closer to home, Western Australia is the only state in Australia with a gas reservation policy. Under Western Australia law, 15 per cent of all the gas produced in that state has to stay in the state. Western Australia's gas reservation scheme has been able to guarantee domestic supply at attractive prices, whilst still allowing investment in the LNG industry and a healthy level of exports. We would note that significant investment continues in Western Australia despite their reservation policy.[17]

We do not suggest domestic gas reservation lightly as we are aware of investor and regulatory risk issues that could be created. We are acutely aware of this as many large commercial and industrial gas users are suffering from a form of investor and regulatory risk themselves given domestic gas has risen between 100% to 200%, putting much of their investment in plant and equipment at risk. This aspect of economic destruction and investor risk seems to have been lost in the debate.

If pursued it would be a significant government intervention but is only necessary due to a lack of government foresight and action in the first instance to ensure some form of structural separation between domestic and

[17] https://www.appea.com.au/media_release/wheatstone-second-train-consolidates-australias-lng-leadership/

international gas markets. Governments who allowed this situation to occur in the first-place must accept responsibility for this oversight, but so too should governments who stand by and do little to repair the damage. In the public eye, all parties are equally to blame.

We recognise domestic gas reservation has its opponents, is seen by many as a last resort and should be pursued with due consideration to investor risk issues. However, we have included it in this option paper as we believe it deserves due consideration given Australia is the only LNG exporting economy that failed to protect its domestic gas market once it started exporting.

This issue brings us back to the underlying philosophical approach to developing our policy options being the genesis of the gas crisis is a combination of a number of elements including that past governments failed to balance domestic and international objectives so direct intervention to address this is now required.

If used as a last resort, it will, by the necessity of the situation it is seeking to address, be implemented quickly with the objective of near immediate effects. To achieve this, it will need to cut deeply and dramatically into the domestic gas market. The impact of implementing domestic gas reservation in these circumstances it is likely to have significantly greater consequences that if implemented in a gradual, coordinated manner that allows market participants to adjust. Therefore, careful consideration should be given to this option now and firm decisions made that provides clear guidance to all market participants.

It should also be noted that large commercial and industrial gas users are already faced with investor and regulatory risk now that domestic gas costs have increased by between 100% and 200%. We note that senior executives from Woodside, Shell and Santos have raised the prospect of domestic gas reservation while the ACCC appear to be open to the prospect of some form of reservation.

DOMESTIC GAS RESERVATION – SHIFTING OPINIONS

Gas reservation may be needed to lower prices, save manufacturers: ACCC chair

(ABC News 19 October 2018)

In an extraordinary move, the competition regulator has backflipped and joined the chorus for a gas reservation policy on the east coast to keep a lid on prices and save key manufacturers from closure.

Australian Competition and Consumer Commission (ACCC) chair Rod Sims is an advocate for free markets and originally thought a policy to reserve some gas production for domestic use was unnecessary interference.

However, he now appears to have had a change of heart.

"Before the [LNG] gas plants were built there were a lot of people, including myself, who said we shouldn't reserve gas, that interrupts the market," he told ABC TV's The Business.

"I think what we hadn't seen, what I hadn't seen, is the fact that we've got three large LNG producers when we really only had gas for two-and-a-half.

Woodside's Peter Coleman slams Australia's 'abyss of indecision' on energy

(AFR 13 November 2018)

After bemoaning Australia's lack of political and commercial leadership, Woodside Petroleum chief executive Peter Coleman has boldly recommended domestic gas reservation and import terminals as solutions to the east coast gas dilemma, and called on the federal government to embrace the international challenge of setting a price on carbon.

Shell and Santos back Queensland gas reservation

(AFR 15 November 2018)

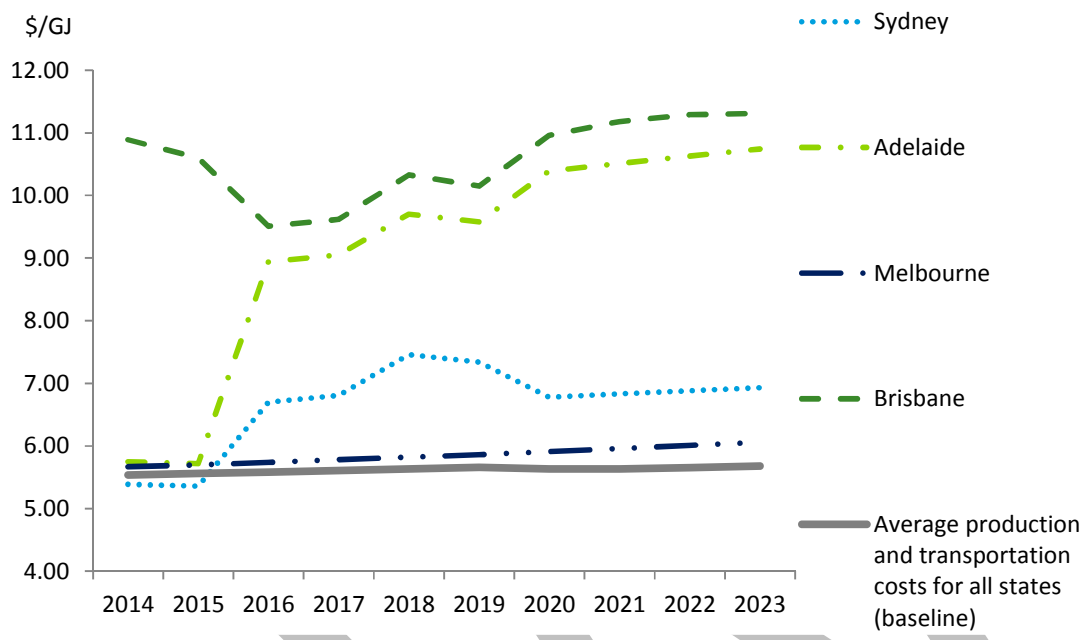
Queensland's innovative approach to gas reservation has entered the mainstream with the surprising news that Shell has joined Santos in an exploration joint venture that must direct what they find into domestic markets.

As recently as Tuesday, Woodside Petroleum boss Peter Coleman recommended Queensland's future-dated reservation policy as a leading-edge, long-term solution to the east coast gas drought.

We note that the Queensland policy was roundly criticised at the time by the APPEA.

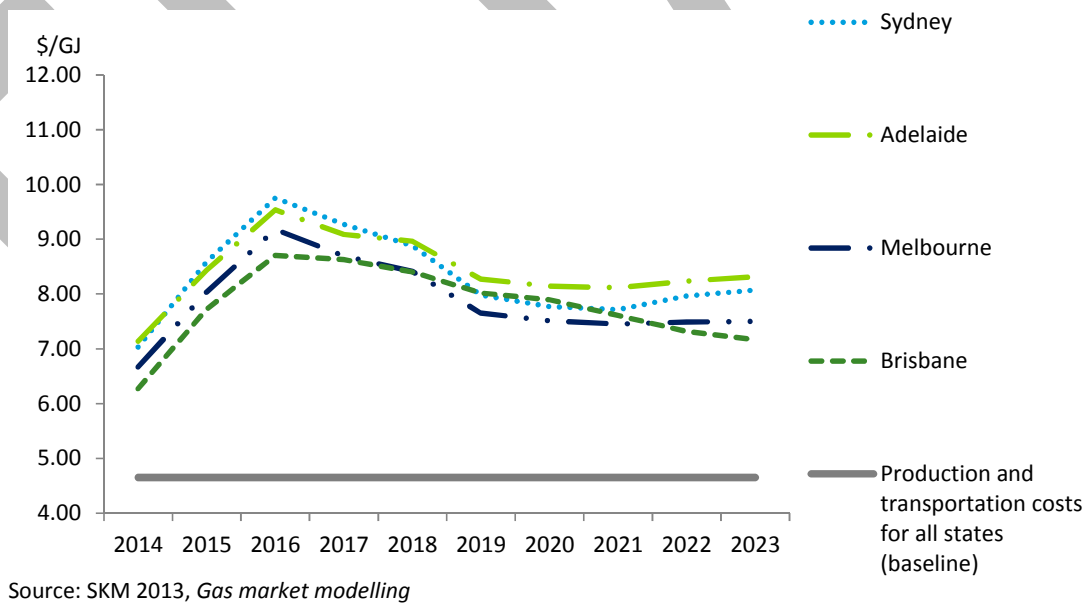
APPENDIX A – GAS PRICE ASSUMPTIONS

Chart 4.1: Baseline and LNG scenarios for East Australian jurisdictions based on IES modelling



Source: IES 2013, Study on the Australian Domestic Gas Market

Chart 4.2: Baseline and LNG scenarios for East Australian jurisdictions based on SKM modelling



Source: SKM 2013, *Gas market modelling*

APPENDIX B – INDUSTRY IMPACTS

Table i: Industry output impacts for Australia for the years 2015, 2018 and 2021 and cumulative Net Present Value (NPV) of output impacts over 2014 - 2021

	Value of difference from baseline			% difference			NPV
	2015	2018	2021	2015	2018	2021	Cumulative impact over 2014-2021
IES scenario							
Output ($ million)							
Manufacturing	-17,937	-15,810	-25,070	-3.07	-2.47	-3.61	-87,701
Gas	7,119	15,448	22,141	38.15	57.37	52.16	69,965
Mining	-6,789	-5,196	-8,773	-3.34	-2.32	-3.59	-30,245
Agriculture	-1,116	-713	-1,304	-1.99	-1.18	-2.01	-4,421
Electricity and Water	-1,277	-1,278	-1,730	-2.19	-1.99	-2.45	-6,812
Construction and Trade	20,077	2,701	12,106	3.11	0.38	1.55	42,644
Transport	-2,226	-1,690	-2,940	-1.61	-1.12	-1.79	-9,856
Commercial & Services	3,296	-558	734	0.28	-0.04	0.05	3,221
SKM scenario							
Output ($ million)							
Manufacturing	-23,199	-22,259	-30,386	-3.97	-3.48	-4.38	-118,069
Gas	8,922	17,672	24,225	47.81	65.63	57.07	80,746
Mining	-7,226	-6,031	-9,679	-3.55	-2.69	-3.96	-33,804
Agriculture	-1,110	-798	-1,430	-1.98	-1.32	-2.21	-4,705
Electricity and Water	-1,962	-1,989	-2,204	-3.36	-3.09	-3.12	-10,269
Construction and Trade	18,049	2,443	13,265	2.80	0.34	1.69	38,519
Transport	-2,328	-1,988	-3,288	-1.68	-1.31	-2.00	-11,044
Commercial & Services	3,015	-897	649	0.26	-0.07	0.05	1,695

Source: Deloitte Access Economics
Note: The discount rate of 7% was used to calculate the NPV figure.

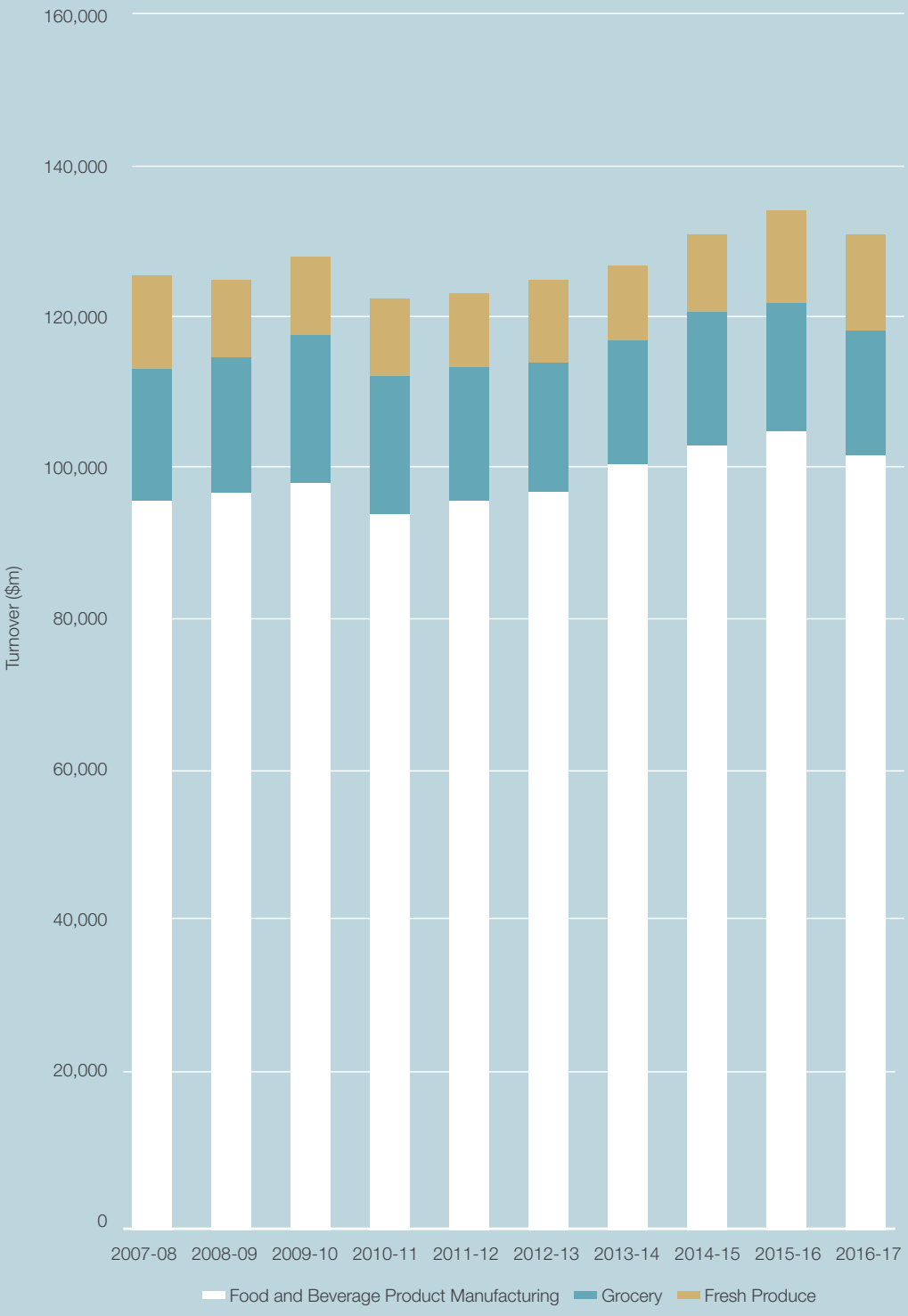
Table iii: Industry output impacts for selected manufacturing subsectors

	IES scenario			SKM scenario		
	Output % difference in 2021	NPV cumulative over 2014-2021	Average FTE jobs difference over 2014-2021	Output % difference in 2021	NPV Cumulative over 2014-2021	Average FTE jobs difference over 2014-2021
Sector						
Food and Beverage products*	-2.3	-8,991	-2,978	-2.5	-9,739	-2986
Paper products	-1.0	-1,653	-688	-1.2	-2,270	-696
Chemical products**	-3.7	-8,875	-3,037	-4.9	-13,664	-4,034
Iron and steel	-3.8	-4,411	-1,267	-4.6	-6,071	-1,552
Basic Non-ferrous Metal products^	-9.8	-23,960	-3,397	-11.6	-29,697	-4,236
Fabricated metal products	-1.3	-1,483	-860	-1.5	-2,064	-1,122

Note: *Includes groceries and fresh foods, **includes basic, specialty and consumer chemicals, and ^includes bauxite, alumina and aluminium manufacturers
Source: Deloitte Access Economics

APPENDIX C – FOOD INDUSTRY VALUE

Figure 6: AFG Turnover by sub-sector, real (2016-17), $ million



Source: ABS catalogue 8155, IBIS World Reports, EY Analysis