FUTURE GAS STRATEGY | *CONSULTATION PAPER*

Australian Energy Producers | 27 November 2023

Australian Energy Producers welcomes the opportunity to provide input into the development of the Australian *Future Gas Strategy*.

Natural gas is essential for reaching net zero in Australia and the region. Natural gas supports the transition away from coal, provides the firm dispatchable energy required to unlock large-scale renewable energy deployment, and powers Australian industries across the economy including those processing the critical minerals necessary for net zero. The oil and gas industry is central to delivering key step-change emissions reduction technologies such as carbon capture, utilisation and storage (CCUS) and low-carbon hydrogen.

Natural gas provides secure, affordable energy with few viable alternatives available for industry today. An approach to natural gas that underestimates its critical role across the economy and in reaching net zero and overestimates alternatives will undermine energy security and drive-up energy prices, exacerbating cost-of-living pressures for all Australians. Alternatives to natural gas, including low-carbon hydrogen and biomethane, have yet to be deployed at scale and are significantly more expensive than natural gas today.

Natural gas provides a significant economic contribution including in regional Australia. Failure to recognise the long-term, critical role of natural gas in the energy mix will cost jobs, reduce investment and undermine manufacturing and industry in Australia – in particular in regional communities – and forego the significant and ongoing economic opportunity that natural gas represents.

Australian natural gas is the foundation of energy security in the region and is central our neighbours' pathways to net zero emissions. Walking back our current and future natural gas and energy supply commitments to our regional partners would have significant economic, political and social impact and derail regional emissions reductions efforts.

Independent analysis from Ernst & Young (EY) found that new gas supply is needed for all plausible net zero pathways for Australia | EY was engaged by Australian Energy Producers to provide an independent assessment of the future role of natural gas in Australia and the region. The analysis found that Australian natural gas will play a key role to 2050 and beyond in all plausible pathways to net zero and that a sustainable Australian gas sector is "*pivotal to managing risks to energy security, cost-of-living, and emissions reductions targets in Australia and the region.*"

The *Future Gas Strategy* must prioritise removing barriers and putting in place the policy drivers necessary to facilitate investment in new gas supply. Barriers to new gas supply persist, including constraints on gas exploration and development in some states, lengthy and uncertain permitting processes, as well as regulatory approvals that are at risk of appeal. Following a year of regulatory interventions and market disruptions, a stable investment environment that gives confidence to investors is urgently needed.

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The *Future Gas Strategy* must avoid polices that focus on reducing gas demand, rather than providing least-cost energy security and emissions reductions or promoting the substitution of natural gas with alternatives that are costly and not demonstrated at scale. Optimal energy and climate policies in Australia should be based on a least-cost, technology neutral approach to achieving key energy, climate and economic outcomes. Policies that aim only to decrease gas demand or intervene in the market to favour one technology over another are likely to create inefficiencies that result in decreased energy security, increased energy costs, increased costs of emissions reductions, and decreased economic outcomes across Australia and the region.

For the *Future Gas Strategy* to deliver in in the best interests of all Australian households and business and for our regional partners, it must:

- Prioritise addressing forecast structural gas shortfalls in the near- to medium-term by bringing on the new gas supply needed to power Australian homes and businesses securely and affordably.
- Focus solely on optimising energy security, energy affordability, emissions reductions and economic outcomes, and not on any preferred trajectory of future gas demand.
- Clearly articulate the ongoing importance of natural gas in Australia based on the range of contributions natural gas makes to reaching net zero, including:
    - partnering with renewable energy to decarbonise electricity and energy generation
    - processing critical minerals and powering manufacturing
    - as a feedstock for a range of chemical processes
    - in the roll-out of low-carbon hydrogen and CCUS.
- Consider the role of gas across a range of scenarios, reflecting a number of possible pathways to achieve net zero and inherent uncertainty relating to future technology development, energy demand and global developments.
- Consider all gas supply opportunities, including existing and greenfield developments, to meet future gas needs in Australia and abroad.
- Ensure Australia's continued support for our regional energy trading partners in their transformation to net zero.
- Ensure the scale and urgency of meeting energy needs is reflected in Australia's permitting approaches and processes.
- Consider Net Zero Zones as an integrated technological and sectoral framework for reaching net zero in the quickest, least disruptive and least-cost pathway possible.

Australian Energy Producers welcomes the opportunity to provide input into the development of the Future Gas Strategy and look forward to inputting further as the strategy develops.

Contents

1. Natural gas demand will continue to net zero and beyond

Natural gas plays an essential role across the economy | Natural gas is one of Australia's main sources of energy, providing 27 per cent[1] of Australia's total energy demand.[2] Natural gas-based electricity produces around one fifth of the electricity Australians use each year.[3] Gas power generation is particularly important as it can quickly respond to changes in electricity demand as well as change in supply, such as when variable renewables output reduces when the sun isn't shining and the wind isn't blowing or due to unexpected outages. Natural gas is a key source of energy for heating and cooking for over five million homes. Natural gas is particularly important for industry, where it contributes 42 per cent of all the energy used by Australian manufacturing. This includes providing highly controllable heat to manufacturers of construction essentials like bricks or manufacturing glass as well as providing high-temperature heat for metal smelting, minerals processing and refining. Natural gas is also used as a feedstock for manufacturing a wide range of products including plastics, chemicals, fertilisers and pharmaceuticals. Without natural gas we couldn't have many of the everyday essentials we need.

Natural gas plays a critical role in all credible net zero scenarios, globally and in Australia (Question 1)

The Australian oil and gas sector has a central role to play in reaching net zero across Australia and the region | The Australian oil and gas industry is committed to net zero across the economy by 2050. Natural gas supports the transition away from coal, provides the firm dispatchable energy required to unlock large-scale renewable energy deployment, and powers Australian industries across the economy including those processing the critical minerals necessary for net zero. The Australian oil and gas industry is central to delivering key step-change emissions reductions technologies such as carbon capture, utilisation and storage (CCUS) and low-carbon hydrogen – noting natural gas with CCUS is the lowest-cost, most advanced pathway to low-carbon hydrogen today.

Natural gas will be needed for energy and as a feedstock for industry in 2050 and beyond | A range of net zero scenarios – globally from organizations such as the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC), and domestically in studies such as the Net Zero Australia study – show a role for gas in 2050 and thereafter. Globally, the IEA and IPCC present a range of net zero and Paris-aligned scenarios, that see demand for gas in 2050 range from 115 per cent of 2022 levels[4] to 22 per cent.[5,6] At the 22 per cent level, this still represents a global demand for natural gas of over

[1] DCCEEW, *Australian Energy Update 2022*, 2022
[2] DCCEEW, *Australian Energy Update 2022*, 2022
[3] DCCEEW, *Australian Energy Update 2022*, 2022
[4] IPCC figures are relative to 2021 gas supply; IEA figures are relative to 2022 gas supply
[5] IEA, *World Energy Outlook 2023*, 2023
[6] IPCC, *6th Assessment Report Working Group III Technical Summary*, 2022

32,000 PJ in 2050 – compared to around 6,100 PJ produced annually in Australia – representing a significant ongoing opportunity for Australian natural gas exports.

Similarly, the Net Zero Australia study[7] – led by the University of Queensland, University of Melbourne and Princeton University in the United States – finds that natural gas will be needed in 2050 across all net zero scenarios for Australia. Further, it finds that if renewable deployment is "*constrained*" such that it can only reach sixty times the current deployment levels – adding Australia's total current renewable capacity every five to six months from now to 2050 – gas demand will need to more than double from today's levels to reach net zero in Australia and to deliver net-zero energy exports to the region.

Energy and climate policy must keep as many pathways open as possible and focus on outcomes: energy security, energy affordability and emissions reductions

Energy and climate policy in Australia, including natural gas policy, must keep as many net zero pathways viable for as long as possible | The range of net zero scenarios – globally, regionally and nationally – are each based on a range of assumptions and possible circumstances, including technological development and cost permutations. These scenarios must be considered as the range of possible future states and not as a shopping list of possible pathways that can be chosen.

Given the uncertainties and assumptions that define any scenario, energy and climate policy in Australia must be developed to allow for as many net zero pathways to remain viable for as long as possible. Should energy and climate policy prioritise one scenario over others, and the assumptions associated with that scenario not eventuate, there is a real risk energy security, energy affordability, and emissions reductions targets will be compromised.

Polices that aim to reduce gas demand rather than to provide least-cost energy security and emissions reductions will result in decreased energy security, increased energy prices and increased costs of emissions reductions | The outcomes of any well considered energy and climate policy should be access to secure and affordable energy that aligns the Australian economy with net zero and other environmental and social ambitions and commitments. Energy and climate policy should seek to encourage the optimal portfolio of fuels and technologies that can deliver these outcomes. Government policies and strategies that focus on pre-selecting the balance of fuels and technologies rather than on the desired outcomes, inject inefficiencies that will likely result in poorer outcomes for Australians. This means that should policies be put in place that aim to reduce gas demand rather than to provide least-cost energy security and emissions reductions, it risks compromising energy security, increasing energy costs and exacerbating cost-of-living pressures, and/or undermining emissions reduction targets.

[7] Pascale, D. et al, *Net Zero Australia Modelling Summary Report*, April 2023

2. Independent analysis confirms new gas supply is needed in all net zero pathways

EY was commissioned[8] by Australian Energy Producers to provide an independent assessment of the future role of natural gas in Australia and the region[9] | EY was engaged to undertake an assessment of the current state of the Australian natural gas sector, the role of gas in global, regional and national net zero scenarios and energy and climate planning, and a bottom-up technical assessment of the current status of key technologies that may compete or complement the role of natural gas in a net zero future. Building on this broad evidence base, EY was tasked with identifying the key determinants of demand for Australian natural gas and developing three plausible scenarios, representing the "*possibility space*" for gas demand to 2050.

Three plausible gas demand pathways for reaching net zero in Australia

New gas supply is needed in all Australian net zero pathways | The EY analysis established three emissions-equivalent net zero scenario for Australia, all of which showed significant demand for Australia gas and the need for investment in new gas supply to 2050 and beyond:

Scenario 1: Electrify | Premised on strengthened global cooperation and a very rapid renewable deployment rate – with renewable energy capacity in 2050 over 20 times larger than today. The *Electrify* scenario sees domestic and regional demand for Australian natural gas decline to 56 per cent of today's levels by 2050, with the largest proportion of demand decline coming domestically. LNG demand reaches around 3,000 PJ per year in 2050 – 75 per cent of current levels or roughly equivalent to 2017-18 exports.

Scenario 2: Blended | Rapid renewable deployment is tempered by less global coordination on energy and climate change mitigation. Renewable energy capacity reaches 13 times current levels in 2050, with demand for Australian natural gas increasing to 2040 – peaking at around 115 per cent of today's levels – before decreasing to 86 per cent of Australia's current production levels in 2050.

Scenario 3: Capture | The *Capture* scenario also sees a massive expansion of renewable energy deployment in Australia, reaching 10 times current capacity in 2050. However, renewable deployment is slowed relative to the other scenarios by global supply chain constraints and plateauing technology costs in Australia and the region. Natural gas demand – domestically and in the region – increases to 130 per cent of today's levels in 2050. Growth

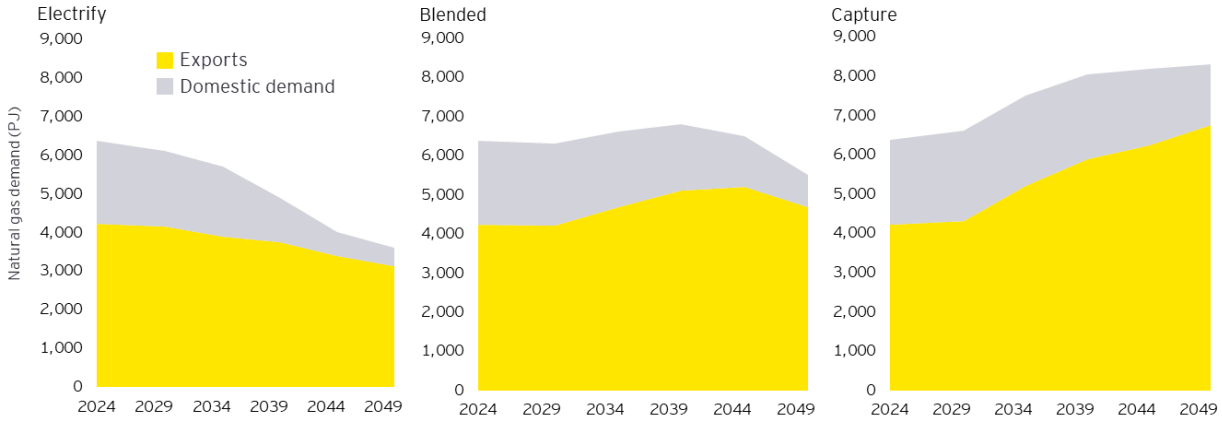
[8] EY was engaged to provide an independent assessment of the future role of natural gas in Australia and the region. All references to the report must be considered in the context of the full report available on the Australian Energy Producers' website http://energyproducers.au/wp-content/uploads/2023/11/231127-EY-report-The-future-of-natural-gas-in-Australia-FINAL.pdf

[9] EY, *The future role for natural gas in Australia and the Region*, 2023

in demand for Australian natural gas is led by demand for Australian LNG - reaching 170 per cent of today's levels in 2050 – as countries in the region transition to net zero.

The gas demand profile to 2050 for each of the scenarios can be seen in Figure 1.

Figure 1: Natural gas demand to 2050 across three net zero scenarios



Source: EY, *The future role for natural gas in Australia and the Region*, 2023

Key findings from an independent assessment of the future role of natural gas in Australia and the region

"Australian natural gas will continue to have an important role powering the economy of Australia and the region to 2050 and beyond and is a crucial tool for the path to net zero" | Emphasising that Australia's net zero pathway will likely look very different to the global picture – reflecting Australia's unique natural resources and key role in the region – the report highlighted a number of key findings for consideration in the development of the *Future Gas Strategy*.

"A portfolio of technologies will be needed to reach net zero while ensuring secure, affordable energy to Australia and the region" | All pathways to net zero will require significant deployment of renewable energy, natural gas, CCUS and a range of low-carbon hydrogen technologies, including natural gas with CCUS. These findings align with global, regional and national level net zero analysis. The study recommended that Australia should focus on a technology-neutral approach to energy and net zero planning.

"Ongoing investment in gas supply is required" | The analysis established that across all plausible pathways to net zero, natural gas will be needed to support emissions reductions while keeping energy supplies secure and affordable. Ongoing investment in new gas supply will be required in existing fields and new fields, across all scenarios, to maintain production and meet all levels of projected demand. The report highlighted that without this investment national and regional energy security and affordability, and climate outcomes, risk being undermined.

"Ensuring the long-term sustainability of the gas sector will be pivotal to managing risks to energy security, cost-of-living, and emissions reductions targets in Australia and the region" | Natural gas must be a key tenet of Australia's energy and climate plans, providing a complement to fast-tracked renewable rollout and coal phase-out and a safety net should other energy and climate technologies face challenges or delays. The analysis found that underinvestment in new gas capacity in Australia risks narrowing the energy security options and increasing the costs of energy and of reaching net zero in Australia and the region.

"Natural gas presents an opportunity to establish a critical minerals processing sector" | The assessment established that the role of natural gas in providing reliable and dispatchable power, high temperature heat, and feedstocks to manufacturing and hard-to-abate industry is expected to continue to 2050, given the technical and economic limitations of alternative energy and emissions reductions technologies. Similarly, the analysis found that the establishment of a critical minerals processing and upgrading industry in Australia will likely require an increase in natural gas supply.

"Natural gas represents an ongoing economic opportunity for Australia" | LNG demand in the region is expected to grow as countries transform their economies to net zero. Australia is perfectly placed geographically, as well as in terms of natural resources, skills and experience, and strong trade links to make the most of this ongoing opportunity. By supporting this energy and emissions reduction demand for LNG, Australia can secure ongoing investment, tax revenue and jobs for Australians. However, the study highlighted that these opportunities should not be taken for granted with competition growing for LNG supply to the region from countries such as the US and Qatar.

"All plausible net zero pathways involve CCUS and hydrogen" | Following an assessment of key decarbonisation technologies, the report found CCUS will be a particularly crucial early opportunity, given it is demonstrated at scale and lower cost to deploy today compared to the potential alternatives. CCUS will be particularly important for addressing Australia's hard-to-abate industry emissions as well as for supporting decarbonisation in the region through the import of CO_2 for permanent storage in Australian geology. Over the medium- to long-term, the assessment found that scaling up and reducing the costs of low-carbon hydrogen production technology could complement renewable electricity and natural gas use.

"A robust energy and climate policy framework is needed to ensure Australia can thrive irrespective of future geopolitical and technological developments" | The scenarios defined in the analysis represent a plausible *"possibility space"* for how energy and emissions reduction technologies and demand could evolve over the period to 2050, with the range in scenarios reflecting the uncertainty of future eventualities. The report stressed that to manage the risks associated with the transition to net zero Australia's energy and climate mitigation policy needs to prepare for all future scenarios, with policy and regulatory actions taken that keep as many pathways to net zero viable for as long as possible. Preparing for only one pathway leaves Australia extremely vulnerable to development that are outside Australia's control.

"Government attention to address forecast near term gas supply shortfalls and promote an open and competitive gas market could be warranted" | The study concluded that the cost and performance of Australia's electricity and gas systems have become significant energy security and cost-of-living risks for Australian households and businesses. The analysis found that for Australia to establish the pipeline of gas supply needed out to 2050 and beyond, all levels of government will need to be involved in delivering a long-term price signal and investment certainty, lower costs, and enhance project commerciality, as well as a robust and lasting project approvals framework.

3. Natural gas provides a significant economic contribution including in regional Australia

The natural gas industry is a key contributor to the Australian economy

Investment by the Australia gas industry puts money in the pockets of Australian households and businesses | The Australian oil and gas industry has invested well over $400 billion in the Australian economy undertaking exploration and developing natural gas production, transport, liquefaction and export facilities over the last decade. This investment will deliver returns for Australia for decades to come, through increased gas supply for Australian customers, export revenue, jobs, and in payments to governments in royalties and taxes. In addition to this investment, the sector spent over $45 billion with Australian businesses in the last financial year in a massive stimulus to national, state and regional economies.

A strong oil and gas industry provides significant revenue in taxes and royalties to Australian governments | LNG is now Australia's second largest export commodity after iron ore, with export revenue of more than $93 billion in 2022-23.[10] As well as providing a significant return to the Australian economy, the LNG export industry is also a key enabler of domestic gas supply, unlocking significant investment in gas exploration and production that would not have occurred without access to global markets. Oil and gas industry earnings translated to an estimated $16 billion in revenues being paid to state and federal governments in the last financial year to help the funding of public services and infrastructure such as roads, schools and hospitals. The sector has contributed over $65 billion[11,12] in payments to government over the last decade and Wood Mackenzie estimates a further $100 billion of remaining government take is due from LNG projects over the next two decades.[13] Looking forward, independent analysis from EY found that *"the natural gas sector represents an ongoing economic opportunity for Australia."*[14]

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[10] DISR, *Resources and Energy Quarterly – September 2022*, 2022

[11] Australian Energy Producers, *Media Release: Oil and gas industry helps bankroll public services despite pandemic challenge*, 2021

[12] Australian Energy Producers, *Historical-Summary-2019-20*, 2021

[13] Wood Mackenzie, *APPEA – LNG Taxation Estimates and Review*, 2023

[14] EY, *The future role for natural gas in Australia and the Region*, 2023

The natural gas industry is a key job creator across Australia, in particular in regional communities

The Australian gas industry is a key creator of well-paid Australian jobs | The oil and gas industry supports 80,000 highly-skilled jobs directly and indirectly in Australia and hundreds of thousands more in manufacturing. The 22,000 direct sector Australian jobs occur primarily in Queensland, Western Australia, and the Northern Territory, including in regional communities in these states.[15]

4. Natural gas provides secure, affordable energy with few viable alternatives available today.

Natural gas power generation underpins the roll-out of renewables and the transition away from coal (Questions 2-5)

Natural gas will continue to be a key element of a secure, affordable decarbonised power system | Variable renewables, including wind and solar photovoltaics (PV) will provide the majority of electricity in a net zero economy. In the IEA Net Zero Emissions (NZE) scenario, wind and solar alone provide 72 per cent of total electricity generated in 2050.[16] However, given the variability of renewable power, dispatchable generation capacity is necessary to keep the grid stable and to ensure power is available whenever it is needed. In the IEA NZE, this dispatchable power is provided by hydro, biomass including biomass with carbon capture and storage, nuclear, hydrogen power as well as natural gas. Over 700 GW of natural gas power generation is required to be in place in 2050 globally in the IEA NZE, although it is only required to generate for limited, but critical, amounts of time.

In the Australian Energy Market Operators (AEMO) Integrated Systems Plan (ISP) Step Change scenario which outlines a vision for the National Electricity Market (NEM) to 2050 finds a similar optimised portfolio for Australia. The Step Change scenario indicates that 10 GW of gas power generation – around double what is in place today – will be required in 2050.[17] AEMO states that this gas power capacity plays a "*crucial role*" in 2050, providing peak loads and firming to support renewable power generation. A further 7 GW of peaking gas and liquids power generation is also required. In Australia, the provision of gas power generation is critical to support the deployment of variable renewables as well as the phase-out of coal power. In the Step-Change scenario, AEMO sees brown coal leaving the network by 2032-33 and all coal generation gone by 2042-43. Without natural gas-based power generation, it is likely that coal would remain in the system for longer and/or the penetration of renewables would be limited.

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[15] ACIL ALLEN, *The economic contribution of the Australian gas economy in 2021-22*, 2023
[16] IEA, *World Energy Outlook 2023*, 2023
[17] AEMO, *2022 Integrated Systems Plan*, 2022

Electricity storage, including batteries and pumped hydro, will increase in importance but natural gas power generation will remain essential | The 10 GW of gas power generation in the AEMO Step-Change scenario is in addition to around 53 GW of energy storage capacity, including utility-scale and home battery systems as well as pumped hydro. Natural gas power generation is required to "*complement battery and pumped hydro generation in periods of peak demand, particularly during long 'dark and still' weather periods*" as well as helping "*cover for planned maintenance of existing generation and transmission.*"[18] AEMO further notes that natural gas power generation will be needed to provide "*essential power system services to maintain grid security and stability, particularly following unexpected outages or earlier than expected generation withdrawal.*"

Natural gas power generation should be integrated into any state or national capacity mechanisms | Traditionally, electricity generators are paid based on the amount of electricity they provide to the grid. With increased penetration of variable renewables, there will be a range of power generation plants that will be required for limited periods. For these projects, it can be challenging to secure the necessary investment in an energy-only market such as the NEM, given in such markets, generators need to recover their fixed costs from an uncertain and infrequent number of higher priced periods. A capacity mechanism, such as the Capacity Investment Scheme,[19] can assist with this by providing longer term revenue certainty for these projects.

As outlined above, gas power generation will play this role in the energy system – providing significant capacity to the system to support the rollout of renewable energy. This was recently emphasised by the Minister for Climate Change and Energy who stated,[20] in the context of Australia's 82 per cent renewable target by 2030, that "*as aging coal-fired power stations leave the grid, that 18 per cent will increasingly be focused on gas*" highlighting that "*Gas is a flexible fuel necessary for peaking and firming as we undertake this transformation.*" To provide the necessary investment certainty for the construction, operation and maintenance of the gas power generation needed for net zero – 10 GW in the AEMO Step-Change scenario – gas power generation should be incorporated into any national or state capacity mechanisms, including the Capacity Incentive Scheme.

Natural gas is a pre-requisite for Australian manufacturing and industry, including for critical mineral processing (Questions 6)

Natural gas underpins manufacturing and industrial production in Australia | Natural gas provides 42 per cent of all the energy used by Australian manufacturing and industry – including both heat and electricity – with additional gas needed as a feedstock for some processes. Across the range of industrial and manufacturing processes, natural gas provides a number of critical contributions. This includes providing a high-temperature and highly controllable heat source which is essential for firing of bricks and glass as well as for smelting

[18] AEMO, *2022 Integrated Systems Plan*, 2022

[19] DCCEEW, *Capacity Investment Scheme (website)*, November 2023 (checked Nov 2023)

[20] Minister for Climate Change and Energy, *Speech to CEDA WA Energy Transition Summit (website)*, November 2023, (checked Nov 2023)

and mineral processing, including iron and steel production. In iron production, natural gas also has a chemical role to play as a reductant. Natural gas is also used as a feedstock in other processes including in plastics, chemicals and pharmaceuticals.

Australia's food supply chain is dependent on fertilisers produced from natural gas | Natural gas is also essential for modern fertilisers that underpin today's food supply chain. Most modern fertilisers today are produced from ammonia, which is almost exclusively produced from natural gas. Globally ammonia production represents around 4 per cent of total gas demand with around half of all ammonia produced being converted to urea an in-turn fertilisers.[21] Without natural gas-based fertilisers, agricultural output globally and in Australia would be severely impacted.

Critical mineral processing in Australia cannot proceed without natural gas | Independent analysis from EY found that if Australia were to *"focus on onshore processing of critical minerals, it will be expected to increase the need for reliable, affordable, low-carbon power, heat, and chemical feedstocks in Australia from natural gas with and without CCUS."*[22]

Critical mineral processing, like other manufacturing and industrial processes, needs significant volumes of affordable, reliable energy both in the form of electricity and heat. Where heat is necessary, natural gas – or coal – are currently the most viable energy sources available. Alternative heat sources such as low-carbon hydrogen may become viable in the medium- to long-term but currently they are not available at the scale required, and the costs per unit energy for low-carbon hydrogen is currently significantly more expensive than natural gas (*see below*).

Where critical mineral processing requires significant electrical power, natural gas may still be the most viable energy source in the near- to medium-term. This is due to the very large volumes of electricity that can be needed in often remote locations. Such volumes of renewable generation require vast tracts of land along with significant firming capacity to facilitate running facilities 24 hours a day, 7 days a week, which in many cases may increase the cost of operation and/or slow the project development process. Deploying large scale renewable projects in industry will also need to compete with renewable projects that are being developed for the power network, which may raise supply chain challenges.

Natural gas alternatives are unlikely to make a meaningful contribution to energy demand in Australia or the region in the near- to medium-term (Question 7)

The oil and gas sector is at the forefront of renewable- and gas-based low-carbon hydrogen development but both will take time to scale and reduce costs | The oil and gas sector is one of the primary producers and users of hydrogen today and will be a critical demand centre for low-carbon hydrogen going forward. The oil and gas sector also has the technical and commercial skills and experience necessary to scale up and commercialise low-carbon hydrogen production. The IEA highlights that 80 per cent of all large-scale

[21] IEA, *How the energy crisis is exacerbating the food crisis (website)*, June 2022 (checked 5 Nov 2023)
[22] EY, *The future role for natural gas in Australia and the Region*, 2023

renewable-based hydrogen projects today are being developed by the oil and gas industry or with the oil and gas industry as the off-taker.[23] The oil and gas sector is also central to the development of low-carbon hydrogen from natural gas with CCUS, both from a gas production perspective as well as being the industry with the experience in developing and deploying CCUS.

Low-carbon hydrogen produced from natural gas with CCUS is the lowest cost and most technologically advanced pathway to low-carbon hydrogen and should be considered as part of the *Future Gas Strategy* | Low-carbon hydrogen from natural gas coupled with CCUS is expected to be two- to six- times cheaper than renewable-based hydrogen per kilogram of low-carbon hydrogen produced today[24,25] – meaning up to six times more emissions reductions per dollar today depending on the emissions intensity of the low-carbon hydrogen produced. Further, natural gas with CCUS is the most technologically advanced and widely deployed pathway to low-carbon hydrogen, meaning it has the ability to scale up faster, to facilitate other low-carbon hydrogen pathways as they scale up and costs come down. The IEA estimates around 650,000 tonnes of low-carbon hydrogen is currently produced each year of which 81 per cent is produced from natural gas with CCUS, 5 per cent is produced from bioenergy, with the remaining 14 per cent produced from renewables, including wind and solar.[26]

The energy contained in the world's annual renewable hydrogen production today would meet Australia's natural gas demand for less than three days | While renewable hydrogen has gained significant attention in recent years as an alternative energy source and feedstock to natural gas use across the economy, including in hard-to-abate industry, global renewable hydrogen production is still embryonic. According to the IEA, in 2022 around 220,000 tonnes of renewable-based hydrogen was produced.[27] This represents less than one per cent of total global hydrogen demand, which itself is a relatively niche energy source compared with natural gas. To further put the current scale of global renewable-based hydrogen into perspective, 200,000 tonnes of hydrogen has an energy content of around 12 PJ, whereas Australia uses 1,560 PJ of natural gas annually[28] – meaning the world total renewable hydrogen capacity could replace natural gas use in Australia for just under three days. Alternatively, this equals the energy content of less than half a per cent of Australia's annual LNG exports.[29]

The lowest-cost low-carbon hydrogen – from natural gas with CCUS – still has a substantial cost gap to natural gas | In addition to needing to scale significantly, the cost of low-carbon hydrogen needs to decrease to be a viable alternative to natural gas. As mentioned previously, renewable-based hydrogen is two- to six- times more expensive per

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[23] IEA World Energy Outlook 2022
[24] CSIRO National Hydrogen Roadmap
[25] IEA CCUS in Clean Energy Transitions
[26] IEA, *World Energy Outlook 2023*, 2023
[27] IEA, *World Energy Outlook 2023*, 2023
[28] DCCEEW, *energy.gov.au Australian Energy consumption – fuel type (website)*, accessed Nov 2023
[29] DISR, *Resources and Energy Quarterly – September 2023*, 2023

kilogram of low-carbon hydrogen produced today than low-carbon hydrogen from natural gas with CCUS.[30,31] However low-carbon hydrogen from natural gas with CCUS – at a current cost of $2.27 – 2.77/kg[32] – is still significantly more expensive than natural gas, which has a thermal cost parity of approximately $1.1/kg.[33] Further, low-carbon hydrogen costs are not expected to decrease below this level before 2050.[34]

Biomethane may complement natural gas but is challenging to scale and requires the sustainable supply of significant volumes of biomass | Global biomethane production currently equates to around 145 PJ[35] of energy, or the energy equivalent of around 10 per cent of Australia's total gas demand. Biomethane production is currently concentrated in Europe which produces around 91 PJ per year, compared with the Asia Pacific region that produces around 9 PJ annually. The majority of biomethane today (92 per cent) is produced through the upgrading of biogas, which is produced from biodigesters, landfill gas recovery systems and wastewater treatment plants. The remaining 8 per cent of biomethane is produced from gasification of solid biomass. The IEA highlight that "*biogas and biomethane are the smallest part of the bioenergy supply chain, but there is growing interest in biomethane in particular as a source of low-emissions domestic gas supply, especially in Europe.*"[36]

The Australian Renewable Energy Agency (ARENA) estimates Australia's total biogas potential – which would have to be refined to biomethane before being used in the natural gas network or in many industrial applications – is around 371 PJ per year.[37] ARENA estimates that reaching this capacity would require 90,000 units.[38] The very small project size and distributed nature of suitable project locations points to challenges with scalability of biomethane as a viable alternative to natural gas. Further, it is critical that feedstocks for biomethane and bioenergy of all types are sourced sustainably so as not to negatively impact other agricultural supply chains.

Electrification cannot address emissions from hard-to-abate industry where natural gas provides a feedstock or high-temperature heat; even where electrification is technically viable, it is dependant vast quantities of firmed renewable energy | Electrification using renewable energy is commonly cited as an alternative to natural gas use across the economy, including in industry. As mentioned previously, the role of natural gas in industry is often associated with providing high-temperature or precision heat or as a chemical feedstock. In these instances, electrification is not an alternative to natural gas use. Further, where significant power is required, natural gas may still be the most viable energy source in the near- to medium-term, due to the scale, reliability and dispatchability natural gas power

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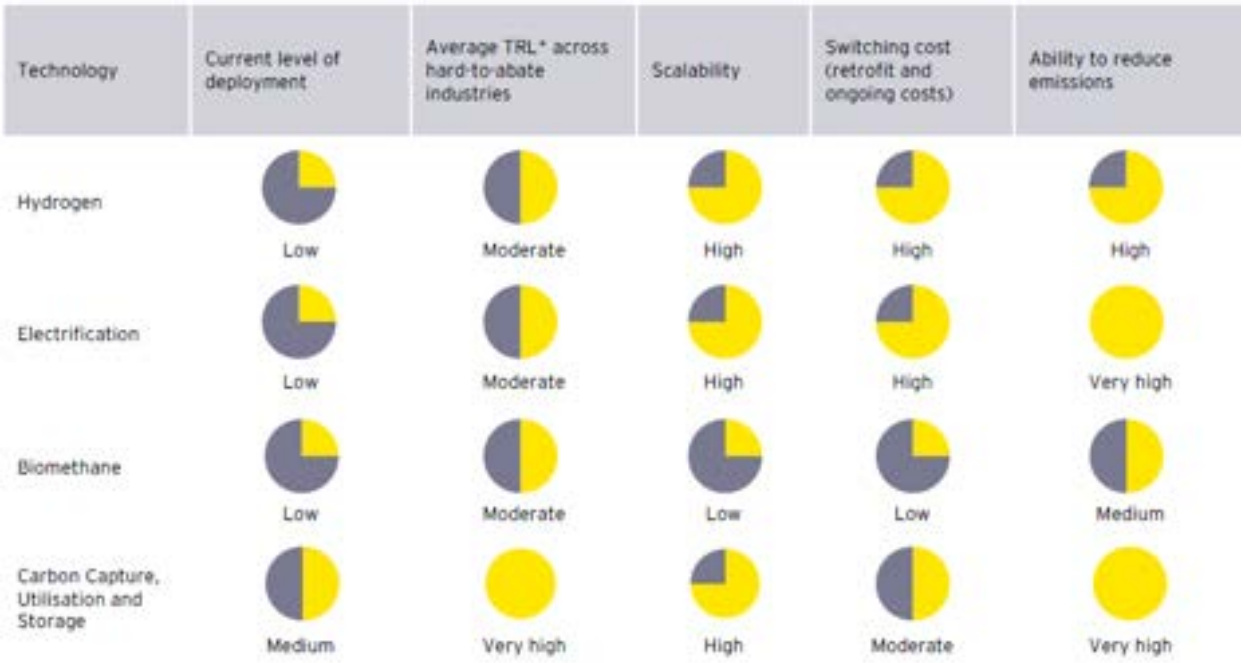
[30] CSIRO, *National Hydrogen Roadmap*, 2018
[31] IEA, *CCUS in Clean Energy Transitions*, 2020
[32] CSIRO, *National Hydrogen Roadmap*, 2018
[33] Advisian, *Australian Hydrogen Market Study*, 2021
[34] Advisian, *Australian Hydrogen Market Study*, 2021
[35] IEA, *An introduction to biogas and biomethane (website)*, accessed Nov 2023
[36] IEA, *An introduction to biogas and biomethane (website)*, accessed Nov 2023
[37] ARENA, *Biogas opportunities for Australia*, 2019
[38] Based on the average annual biogas production per type of biogas unit, as indicated by ARENA

generation provides. This is particularly the case in remote, off-grid locations. Large-scale renewable projects in the industrial sector may also encounter supply chain challenges given the pace of renewable roll-out also required in the electricity sector.

Figure 2 shows the current technical and economic status of a selection of key technologies that may compete and/or complement natural gas demand over time.

Figure 2: The status of key technologies that relate to natural gas demand



Source: EY, *The future role for natural gas in Australia and the Region*, 2023

Polices that promote the substitution of natural gas with alternatives that are costly and not demonstrated at scale, risk pushing up the costs of doing business for Australian industry or leaving it without the energy it needs | Policies that intervene in the market to favour one technology over another are likely to create inefficiencies in the market that risk resulting in increased energy costs to consumers and in some instances, energy insecurity and increased emissions. Rather, energy and climate policies should be technology neutral and focus on the desired outcomes, primarily least-cost secure energy and emissions reductions.

Prioritising the removal of natural gas use from Australian homes places significant burden and costs on to Australians households with limited environmental benefit (Questions 10-11)

Government should prioritise least-cost energy and emissions policies that decrease the burden and cost-of-living pressures on Australian households and businesses | The highest emissions sources of energy are brown coal, black coal and oil, followed by natural gas. Australia's primary energy consumption is dominated by coal, providing 40 per cent of

total primary energy consumption in 2022, followed by oil at 34 per cent and gas at 22 per cent.[39] In electricity generation, coal is even more dominant, providing 47 per cent of Australia's national annual electricity generation, with this figure increasing to 63 per cent, 62 per cent and 58 per cent in NSW, Queensland and Victoria respectively. With the roll-out of renewable energy, the priority should be first and foremost to get coal out of the energy system, including replacing the generation capacity that will leave the system when the oldest coal plants retire.[40] In contrast, the mandated removal of natural gas use and electrification of homes, at best will result in renewable power replacing the natural gas – which has approximately half the CO_2 emissions of coal in power generation[41] – and at worst will result in more coal power staying in the grid longer to deliver on increased electricity demand.

This is particularly true in Victoria given the extensive use of brown coal for power generation. In Victoria it is estimated that electrifying homes will result in an increase in overall CO_2 emissions today.[42] Electrification of homes will also result in additional pressure on the electricity system which already has significantly increased risk of inadequate and unreliable electricity compared to 2022.[43,44]

Further, electric appliances cost more to buy than gas appliances[45] and will be more expensive to run in some states and climates, including existing cold-climate homes.[46] Electrifying homes also shifts the burden of climate mitigation squarely onto the shoulders of Australian households and businesses who are already suffering under cost-of-living pressures.

CCUS in combination with natural gas is critical to reaching net zero in Australia and the region (Question 9, 28, 29)

CCUS is a proven technology with decades of large-scale operational experience globally | There are currently more than 40 commercial CCUS projects in operation today around the world, which together store 49 million tonnes of CO_2 ($MtCO_2$) per year[47] - equivalent to over 10 per cent of Australia's annual emissions. The Sleipner project in Norway has been storing 1 $MtCO_2$ per year, in geology deep below the North Sea, continuously since 1996. Recent years have delivered unprecedented momentum in CCUS development globally, with around 350 commercial projects currently under development. Almost two-thirds of planned investments are in the United States, Canada and Europe, where governments have recognised the critical role of CCUS and introduced strong policy incentives to fast-track

[39] Geoscience Australia, *Energy Overview (website)*, 2023, accessed Nov 2023
[40] BCG, *The role of gas infrastructure in Australia's energy transition*, 2023
[41] IEA, *The Role of Gas in Today's Energy Transitions*, 2019
[42] Grattan Institute, *Getting off gas: Why, how, and who should pay?*, 2023
[43] AEMO, 2023 Electricity Statement of Opportunities, 2023
[44] AEMO, 2022 Electricity Statement of Opportunities, 2022
[45] Grattan Institute, *Getting off gas: Why, how, and who should pay?*, 2023
[46] BCG, *The role of gas infrastructure in Australia's energy transition*, 2023
[47] Global CCS Institute, *Global Status of CCS 2023*, November 2023

investment. In the United States, this includes a tax credit of USD 85/t for CO_2 captured and stored from industrial or power generation facilities.

The Australian oil and gas sector are among the world-leaders in CCUS deployment, representing a comparative advantage for Australia | Chevron's Gorgon CO_2 Injection Project,[48] that commenced operation in 2019, and Santos's Moomba CCUS Project,[49] which is due to commence in 2024, are among the largest CO_2 storage projects globally. World-class CO_2 storage resources along with a wealth of CCUS skills and experience within the industry, give Australia a comparative advantage on the roll-out of CCUS. This comparative advantage can deliver large-scale emissions reductions across the Australian economy and the region, while attracting investment in Australia to the benefit of all Australians. A national CCUS strategy, CCUS policy certainty and a stable regulatory and investment environment are required to build on this strong foundation and to realise Australia's CCUS opportunity.

Reaching net zero will be "virtually impossible" without CCUS[50] | CCUS plays a unique role among a portfolio of emissions reduction technologies as it can address emissions from existing facilities, mitigate emissions from hard-to-abate industry and underpin large-scale carbon removal. Natural gas combined with CCUS is also currently by far the most affordable pathway to low-carbon hydrogen production. The IEA's NZE scenario requires 1 billion tonnes of CO_2 ($GtCO_2$) to be captured annually in 2030, increasing to 6.1 $GtCO_2$ in 2050. Similarly, findings from the Net Zero Australia study show CCUS to be an integral part of the least-cost pathway to net zero in Australia – no scenario can achieve net zero without CCUS. Across the five scenarios in the Net Zero Australia study, the lowest demand for CCUS in 2050 is over 80 $MtCO_2$ stored per year – almost double the current CCUS capacity globally.

CCUS combined with natural gas will be the least-cost, most technically viable emissions reduction pathway for many hard-to-abate industries, including cement, iron and steel, chemical and fertiliser production and more | As outlined above, CCUS has been deployed at commercial scales for over a quarter of a century and as such, is significantly more technically advanced than many of the natural gas alternatives that are discussed. In many instances natural gas with CCUS may also be one of the few, and in some cases only, viable technology for decarbonising. In particular, where natural gas is used for high-temperature or controllable heat or where it is used as a feedstock, such as in cement, iron and steel, chemical and fertiliser production. Independent analysis from EY found that *"proven and deployable CCUS technologies will be essential to addressing Australia's hard-to-abate industry emissions."*[51]

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[48] The Chevron-operated Gorgon Project is a joint venture of Chevron (47.3%), ExxonMobil (25%), Shell (25%), Osaka Gas (1.25%), Tokyo Gas (1%) and JERA (0.417%).

[49] The Santos-operated Moomba Project is a joint venture of Santos (66.6%) and Beach Energy (33.4%).

[50] IEA, *The Role of Gas in Today's Energy Transitions*, 2019

[51] EY, *The future role for natural gas in Australia and the Region*, 2023

CCUS-based carbon removals, including direct air carbon capture and storage (DACCS) and bioenergy with CCUS (BECCS), are the most permanent and scalable pathways to negative emissions and can leverage natural gas and CCUS infrastructure | Carbon dioxide removal (CDR) is required by the overwhelming majority of net zero scenarios to address residual emissions across the economy that are technically challenging or are very expensive to abate. DACCS and BECCS are commonly included as two of the largest potential CDR technologies, despite DACCS in particular being very expensive to deploy. The IEA NZE sees DACCS needing to be scaled from very small, pilot scale deployment today to over 650 Mt CO_2 drawn out of the atmosphere and stored per year in 2050. Similarly, although BECCS has been deployed at the million tonnes scale today, it still requires significant scaling to reach the IEA NZE deployment levels of around 300 $MtCO_2$ stored in 2050. If there are delays in the NZE scenario, the need for carbon removals in the latter half of the century increases massively in order to return total temperature rises to 1.5°C by the 2100.[52] Specifically, the scenario sees DACCS removing 3.3 $GtCO_2$ from the atmosphere in 2100 with BECCS removing a further 2 billion tonnes per year.

Given the costs of DACCS and BECCS technologies and the need to scale up from a low base today, the roll-out of CCUS infrastructure to support gas-based industry and low-carbon hydrogen production in the near-term would help facilitate these technologies in the longer term. Further, a CSIRO review of CDR technologies in Australia,[53] also known as carbon sequestration technologies, highlights that "*CDR and CCUS technologies, if deployed using the best available science, could offer environmental and economic benefits, particularly for Australia's regions and First Nations peoples*". They go on to highlight that "*Government should prioritise the development of long-lived geological and mineral storage technologies*" and that they should "*risk-sharing approaches for investments in sequestration technologies with high up-front costs, including co-investing in subsurface basin analyses for geological sequestration and keystone storage and transport infrastructure.*"

Importing CO_2 for permanent storage in Australian geology is a key emissions reductions pathway for many countries in the region, including in conjunction with natural gas use | For countries with limited CO_2 storage potential, the use of natural gas in conjunction with the export of CO_2 for storage may be the only viable pathway to reduce emissions from existing facilities and from hard-to-abate industry. As with many energy and climate mitigation opportunities, CO_2 storage endowments are not evenly distributed around the world. For countries without significant CO_2 storage potential, such as Japan, South Korea, Singapore and the Philippines, emissions reductions from existing facilities and from hard-to-abate industry will be a significant challenge if the export of CO_2 to countries with large-scale CO_2 storage opportunities is not permitted and widely adopted. Australia has the geology, CCUS project experience and robust legal and regulatory frameworks necessary to become a key

[52] IEA, *Net Zero by 2050*, 2023

[53] CSIRO, *Reduce, remove and storage – the role of carbon sequestration in accelerating Australia's decarbonisation*, 2023

CO_2 storage destination for the region and to take advantage of the economic and emissions reductions opportunities this presents.

Net Zero Zones provide a framework to fast-track emissions reduction across Australia, including using natural gas

Net Zero Zones can leverage the synergies between renewables, natural gas, CCUS, and low-carbon hydrogen to fast-track and minimize the costs of the transformation to net zero | Nine energy and industrial regions around Australia comprise 92 per cent of all Safeguard Mechanism emissions as well as 98 per cent of all large power generation emissions. The majority of emissions sources in these regions and across Australia require the same four net zero technology building blocks to reduce their emissions: natural gas, renewable energy, low-carbon hydrogen and CCUS. In many instances, manufacturing and industrial facilities are going to need to rely on shared emissions reduction infrastructure to meet their climate mitigation targets and Net Zero Energy and Industrial Zones (NZZs) are a framework for considering and prioritising this infrastructure.

The establishment of NZZs based around the four net zero building blocks and shared infrastructure could provide a range of benefits to support the equitable and efficient transformation to a net zero economy:

- reducing the costs and timelines for reaching net zero
- powering regional manufacturing and industry – creating and protecting regional jobs
- underpinning net zero critical mineral production and processing
- leveraging existing infrastructure
- creating a magnet for regional net zero investment
- providing focal points for streamlined government approvals and environmental permitting
- establishing the foundations for net zero energy and industrial exports and imports.

5. Australian natural gas is the foundation of energy security in the region and is central our neighbours' pathways to net zero

Regional LNG demand is expected to increase significantly under current energy and climate policies (Question 18)

LNG is essential to help countries in the region maintain energy security and roll-out renewable energy, shift away from coal, and power industry | In the same way that natural gas plays a key energy security and net zero role in Australia, natural gas is central to energy and climate planning in the region. Countries that have constrained renewable energy potential due to factors such as geography, climate or population density, and decreasing domestic natural gas supply are likely to rely heavily on natural gas, in particular from LNG

imports going forward. The Australian Government estimate that Australian LNG has the potential to reduce global emissions by up to 166 million tonnes per year by displacing the use of coal and other more emissions-intensive fuels in the region.[54] The IEA NZE scenario sees LNG becoming the key mechanism of natural gas trade globally, with a particularly important role in the near-term.[55] In 2022, 59 per cent of international gas trade was via LNG. By 2030, the IEA NZE sees this increasing to 71 per cent, with a further increase to 82 per cent by 2050. In the near-term, the NZE sees absolute volumes of global LNG trade increasing also, from 479 billion cubic metres (bcm) of natural gas in 2022 to 507 bcm in 2030.

Significant natural gas demand is projected in the region under current energy and climate policies | Many of the counties in the Asia region are facing the challenge of meeting net zero against the backdrop of constrained renewables – Japan, Korea, Singapore – and/or decreasing domestic gas production – Indonesia, Malaysia, Thailand, Myanmar, Vietnam, Bangladesh. Others, such as the Philippines and India are heavily reliant on coal and oil for energy and are looking to natural gas and LNG as their means to achieve deep emissions reductions while ensuring energy security and energy affordability. Across this region, the IEA finds that current energy and climate policies – from counties that have mostly committed to net zero – will see a 24 per cent increase in natural gas demand between today and 2050 to reduce emissions and to keep their economies running. The IEA's *Roadmap to Net Zero Emissions in Indonesia*[56] found that Indonesia would move from being a net exporter of LNG from 2030 to importing around USD 10 billion of natural gas in 2050 to support its transition away from coal, leading to a significant net reduction in total country emissions.

LNG demand in the Southeast Asian region is forecast to increase 10-fold by 2050 | The IEA has highlighted that in the Southeast Asian region *"Near-term growth in the region's natural gas output falls short of rising demand, increasing the call on LNG markets"*.[57] This results in the Southeast Asian region – which has historically been an exporter of natural gas – expecting to become a net importer of gas by 2025. Under the IEA's stated policies scenario LNG imports into the region are expected to grow from 13 bcm in 2020 to 128 bcm in 2050. This is an increase in LNG demand of almost 4,500 PJ over the next 27 years, which represents an increase in LNG demand roughly equivalent to Australia's total LNG export capacity today.

Low-emissions, secure natural gas from Australia is critical to energy security and reaching net zero in the region (Question 12, 14, 20)

Partner countries in the region continue to rely on Australian for reliable, affordable and low-emissions LNG exports | In 2020, Australian natural gas provided 39 per cent of Japan's total LNG import needs, and 40 per cent, 25 per cent and 20 per cent of China, Taiwan, and Korea's LNG needs respectively.[58] Together these countries accounted for 81 million tonnes of

[54] Australian Government, *Australia's Long-Term Emissions Reduction Plan 2021*, 2021
[55] IEA, *World Energy Outlook*, 2023
[56] IEA, *Roadmap to Net Zero Emissions in Indonesia*, 2022
[57] IEA, *Southeast Asia Energy Outlook 2022*
[58] DISER, *Global Resources Strategy Commodity Report: Liquified Natural Gas*, 2022

demand for Australian LNG in 2022-23.[59] Each of these countries has invested heavily in Australia's LNG industry, and across the Australian economy, in order to ensure stable, reliable energy and resources to meet their economies' needs. Australia has long represented a reliable partner country with stable political, legal and regulatory systems, as well as geographical advantage over many LNG producing countries globally. Australia's average LNG shipping duration to these key LNG customers is in the order of 8-9 days compared with 12-14 days from Qatar and 21-35 from the US Gulf Coast.[60] Reduced transit times contributes to both the cost competitiveness and environmental performance of Australian LNG.

Australian LNG export projects are integrally linked energy security in the region | The importance of Australian natural gas to the energy security and emission reduction efforts of the region has become clear following recent government interventions in the gas market that have raised concerns from our regional allies that the Australia government may no longer be committed to providing a reliable supply of LNG to the region. Recent remarks from Asian government officials and business leaders highlight the importance of Australian LNG to energy security in the region, including a statement from Tokyo Gas chairman Michiaki Hirose who stressed that *"Tokyo Gas currently has 12 million users mainly in the Tokyo metropolitan area, and more than half of them are supplied by LNG import from Australia".*[61] Further details on the implications of Australia's recent gas market interventions on LNG customers is outlined below. Independent analysis from EY found that all net zero pathways will involve significant demand for Australian LNG, ranging from 75 per cent of current levels to 170 per cent, depending on a range of factors.[62]

An Australian LNG Producer-Consumer Taskforce would assist in ensuring LNG supply and demand requirements are met going forward | Australian Energy Producers would be willing to work with government to establish a forum for key Australian LNG stakeholders, including representatives from LNG consumer countries as well as Australian LNG consumers and producers, to discuss key supply and demand requirements that should be considered in developing and implementing the *Future Gas Strategy.*

Emissions intensity of Australia's gas is amongst the lowest in the world and will decrease further under the Safeguard Mechanism | Methane emissions from the Australian oil and gas sector represent around 7.5 per cent of Australia's total methane emissions and 1.7 per cent of Australia total CO_2-equivilent emissions.[63] The IEA estimates that Australia's methane emissions levels, per unit of oil and gas produced, puts Australia amongst the lowest emitting oil and gas producing countries in the world.[64] It estimates that Australia's methane emissions from upstream gas production are half that of the US and Qatar and up to three times lower

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[59] DISR, *Resources and Energy Quarterly: September 2023*, 2023

[60] DISR, *Resources and Energy Quarterly: September 2023*, 2023

[61] Australian Financial Review, *Labour gas policy raises supply fears from Japan (website)*, 2023, accessed Nov 2023

[62] EY, *The future role for natural gas in Australia and the Region*, 2023

[63] Australian Gas Industry Trust, *The Australian Natural Gas Industry: Monitoring, reporting, and reducing methane emissions*, 2021

[64] IEA, *Global Methane Tracker 2023 Version*, 2023

than countries in the region such as Indonesia. Further while the IEA estimates emissions using national and sector-specific scaling factors relative to US methane emissions, more detailed, facility-specific reporting as part of the Australian National Greenhouse and Energy Reporting (NGER) scheme suggest Australia's oil and gas methane emission could be lower still. Australia is also at the forefront of deploying CCUS to address CO_2 emissions associated with LNG production. Looking forward, the Australian LNG sector falls under the Safeguard Mechanism so, like all Safeguard Mechanism facilities, existing and new LNG facilities will be required to see a significant downward trend in net emissions – in the order of 4.9 per cent per year – toward net zero by 2050.

Australian energy exports must be aligned with the needs of our energy partners

Partner governments in the region are best placed to determine their optimum approach to energy security and emissions reductions | Domestic energy and climate policy is complex for Australia, as it is for every country globally and in the region. All energy and climate policies have priorities, constraints, and trade-offs. Australia's partners and allies in the region are best placed to plot their course to net zero. Accordingly, for Australia to continue to be a key energy partner in the region, it is incumbent on us to be responsive to the needs of our partner counties and not assume or dictate to them the best path forward. In the same way that it is the responsibility and prerogative for the Australian government, guided by the Australian people, to plan and implement our transformation to net zero.

The balance and nature of energy exports to the region will change over time but must align with demand | Australian energy exports to the region are currently dominated by coal and natural gas. Over time, it is expected that this will be complemented by low-carbon hydrogen exports, potentially electricity exports as well as by CO_2 imports. It will be critical that the supply of these new energy carriers and services aligns with the corresponding demand in the region. Low-carbon hydrogen is a key example of this. Critical to low-carbon hydrogen exports will be an alignment of low-carbon hydrogen production, the resolution of technical challenges associated with the transport and storage of hydrogen and hydrogen-derivatives such as ammonia, as well as the growth of hydrogen demand in importing countries. If any of these three elements lag, the establishment of regional low-carbon hydrogen trade will be a non-starter. The *Future Gas Strategy* must therefore align with the energy demands of the region, as defined by the governments of the region, and not unilaterally plan for a shift in the nature and balance of energy exports.

LNG may play an important role in growing hydrogen demand in the region | Part of this alignment may be working with partner countries to leverage LNG imports to assist in the development of low-carbon hydrogen demand in the region. The development of hydrogen or ammonia export and import infrastructure will be capital intensive and dependent on scale to achieve viability. This presents a major hurdle for a nascent industry. In order to smooth the uptake of hydrogen demand in the region, consideration is being given to utilising LNG imports to seed hydrogen demand. Through the import of LNG and the in-country production of low-carbon hydrogen from natural gas, low-carbon hydrogen production volumes can be better aligned with growing demand. As demand increases, a greater share of LNG imports

can be converted to low-carbon hydrogen. Once demand increases sufficiently and technical barriers to hydrogen transport and storage are overcome, consideration can then move to the establishment of international hydrogen transport. In parallel, CO_2 exports from the region to Australia for permanent storage can be developed to serve in-country low-carbon hydrogen production, given there is already a significant need for CO_2 exports and the process is far less technically challenging than the international transport of hydrogen. If insufficient Australian LNG is available countries are likely to turn coal or higher-emission intensity LNG suppliers.

Competition to supply LNG to the region is increasing, led by the US and Qatar – higher emissions-intensity producers | The US and Qatar are ramping up their LNG export capacity significantly and looking to grow their market share amongst Asian importers. US LNG export capacity in particular is growing at a rapid rate. It is expected to increase from a current annual capacity of around 82 million tonnes per year in 2022[65] – on par with Australia – to as much as 169 million tonnes per year by 2027.[66] Given the higher emissions intensity of US and Qatari natural gas and the increased shipping distances to the region, an increase in Asian LNG market share from these suppliers will increase the emissions intensity of natural gas use in the region.

If countries in the region are unable to access the LNG imports they require, they will most likely use coal to deliver the energy they need to run their economies, suggesting an energy hierarchy of needs | In the immediate aftermath of the Russian invasion of the Ukraine, Russian gas was pushed from the market and Europe turned to LNG imports (along with domestic and imported coal) to meet their energy needs. This had the effect of drawing LNG cargos from around the world to Europe, where countries were willing to pay higher prices in order to ensure energy security. Many of these cargos were diverted from Asia,[67] leaving Asian economies to increase their reliance on coal. In 2023, China, India and Southeast Asian countries together represented 75 per cent of global coal demand.[68] This in-turn has contributed to global coal demand – and global emissions – reaching an all-time high in 2022.

This points to an energy hierarchy of needs, demonstrated in both in Europe and the region. In contrast to the traditional *"energy trilemma"* , recent events suggest a merit order in the way countries look to address their energy needs, with the number one priority being energy security, then energy affordability, then environmental performance. In both Europe and Asia, when energy security was at risk both regions had to compromise on environmental performance to keep the lights on, with an increased use of coal, and to pay what was required to get the energy they needed. This highlights that energy security must be front and centre in planning the transformation to net zero.

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[65] DISR, *Resources and Energy Quarterly: September 2023*, 2023

[66] Bloomberg New Energy Finance, *US to See Dramatic Growth in LNG Export Capacity (website)*, 2023, accessed Nov 2023

[67] Reuters, *LNG cargoes diverted toward Europe from Asia as gas prices soar (website)*, 2021, accessed Nov 2023

[68] IEA, *Global coal demand set to remain at record levels in 2023 (website)*, 2023, accessed Nov 2023

If Australia were to step away from its role as a key LNG partner, regional emissions are likely to increase | Australia is one of the lowest emissions LNG producers globally and benefits from being in close proximity to one of the world's fastest growing LNG demand centres – the Southeast Asian region. This has allowed Australia to be the primary LNG partner in the region. However, if Australia were to allow LNG exports to slow – with increased barriers to sustaining current LNG capacity and developing new capacity – energy security in the region would be placed at risk. As a consequence, traditional energy partners would likely substitute Australian LNG with LNG from higher emissions intensity producers or from coal, ultimately increasing emissions in the region. Given the global nature of climate change, if emissions reductions in Australia decrease at the expense of larger emissions increases elsewhere, the net effect is that the world will move further from achieving net zero globally.

LNG projects are critical to unlocking domestic gas supply in Australia | LNG projects around Australia play an important role in developing gas resources for the domestic gas market. In Western Australia and on the East Coast, large LNG producers provide critical gas supply into the domestic market. Further, in many instances the cost of developing Australia's gas reserves would not be economically viable only to serve the domestic market, meaning if the future revenues from LNG developments can't be leveraged by project developers, significant portions of Australian gas would stay in the ground. Without the LNG projects that have been developed in Australia, domestic supply constraints would likely be more severe than they currently are.

Government action is required to improve confidence in Australian LNG supply (Question 19)

The government has committed Australia to continuing to be a reliable LNG supplier to our regional energy and security partners, but action is required to fulfil this commitment | As part of the recent *Australia-Japan Ministerial Economic Dialogue*, a *Joint Ministerial Statement* was released highlighting that *"Australia has committed to remaining a reliable supplier of resources and energy to Japan and the region now and into the future"*.[69] The statement went on to note *"the importance of LNG along with renewables and energy storage technologies in the energy transition"*. While the commitment to our key energy partner, and all energy partners in the region, is welcome, government actions are required to fulfil this commitment. Specifically, government should prioritise the release of new offshore acreage, should look to address lengthy and uncertain permitting processes, as well as ensuring government approvals processes are robust to legal challenge. Further, the government should fast-track the establishment of a legal and regulatory framework for the import of CO_2 for geological storage in Australian waters as well as the development of a national CCUS strategy and low-carbon hydrogen strategy – the latter of which should take a technology neutral approach focussing only on least-cost emissions abatement. It is these actions that will ensure we can deliver on Australia's commitment to the region.

[69] Minister for Trade and Tourism, *Australian-Japan Ministerial Economic Dialogue Joint Ministerial Statement (website)*, 2023, accessed Nov 2023

6. New natural gas supply is urgently needed to meet energy demand and to reduce emissions in Australia and abroad

New gas supply is urgently needed to address forecast shortfalls in gas demand (Question 24, 39-40, 45)

Australia has vast quantities of natural gas still in place, which present a huge opportunity to provide secure, affordable energy and to support the Australian economy and create jobs | Geoscience Australia highlights that Australia has "*substantial gas resources*" including in conventional reservoirs, coal seams and in shale gas formations.[70] Australia's estimated gas resources amount to nearly 250,000 PJ of reserves (2P) and resources (2C) – 190,000 PJ of conventional reserves and resources with a further 57,000 PJ of unconventional reserves and resources.[71] To put this into perspective, Australia produces approximately 6,100 PJ of natural gas per year – for domestic consumption and LNG exports – with around 84,000 PJ of cumulative natural gas having been produced in Australia since the commencement of the industry in the 1950s.[72] Further undiscovered resources are expected pending further exploration and development. In summary, there is no shortage of gas in the ground in Australia.

Despite the wealth of gas resources in Australia, the Australian Competition and Consumer Commission (ACCC) and AEMO continue to forecast structural shortfalls in the gas market as early as 2027 | The ACCC in its *Gas Inquiry 2017-2030 Interim Reports* has repeatedly highlighted that structural gas shortfalls could occur as early as 2026-27, with potential shortfalls in peak periods as early as this summer. Should shortfalls be allowed to eventuate they will have a significant impact on the economy, including risking energy security and exacerbating cost-of-living pressures for all Australia households and businesses. The ACCC states that shortfalls "*would place continued upward pressure on prices in the domestic gas market, as well as pressure on the electricity market.*"

Independent analysis from EY has highlighted the need for ongoing investment in existing and new gas supply[73] | Based on a comprehensive review of the current Australian gas sector, along with the technical realities of gas production, the analysis from EY found "*Ongoing investment in gas supply is required to maintain production levels from operating fields. As these fields begin to decline, investment in new supply options will be required to meet projected demand. Investment in supply is also required to meet current long-term LNG commitments with the current committed and anticipated production also declining over time to below contracted levels in the medium-term.*"

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[70] Geoscience Australia, *Gas (website)*, accessed Nov 2023
[71] Geoscience Australia, *Gas (website)*, accessed Nov 2023
[72] Geoscience Australia, *Gas (website)*, accessed Nov 2023
[73] EY, *The future role for natural gas in Australia and the Region*, 2023

Government must now establish a policy and regulatory regime that supports new gas supply (Questions 22-23, 41-42)

Government must prioritise removing barriers and putting in place the policy drivers necessary to facilitate investment in new gas supply | Barriers to new gas supply persist, including constraints on gas exploration and development in southern states, lengthy and uncertain permitting processes, as well as government approvals that are at risk of appeal. Further, a stable investment environment must be created that gives long-term confidence that investments in new gas production can make a satisfactory return on their investment over the lifetime of the project.

It is unclear how the market will behave under the Mandatory Code of Conduct, which mutes the normal market price signal to bring on new supply and limits the confidence of producers to invest | The Mandatory Code of Conduct (Code) puts the government at the centre of the gas market. The Code entered into force in July 2023 and is based around a capped wholesale prices combined with automatic exemptions for small domestic-only producers and negotiated conditional exemptions for all other producers. The structure of the Code establishes a facilitated gas market that mutes the normal market price signal to bring on new supply and limits the confidence of producers to invest in capital intensive, long-payback period projects.

Initial indications are that indicative supply agreements from producers have focused on near-term supply with "*indicative domestic supply commitments under the new framework of at least 260 PJ to 2027*".[74] It is unclear how these indicative supply commitments will translate into enforceable commitments under the Code, or if/how the Code will create the conditions for investment in new production to address the forecast medium- to long-term shortfalls. This uncertainty is exacerbated by the range of gas market interventions and relates policies over the past eight months, all of which may affect reliability and supply adequacy, including Stage 1 of the Reliability and Supply Adequacy Framework, the Australian Domestic Gas Security Mechanism (ADGSM), new disclosure obligations under Part 18 and 27 of the National Gas Rules (NGR), as well as the reforms to the Safeguard Mechanism.

The variability of gas demand, combined with the long-lead time nature of bringing on new material volumes of gas supply make the task of matching supply and demand and ensuring adequacy of supply particularly challenging outside of a competitive market | Demand for gas, in particular for gas power generation as it is increasingly called on to firm renewable generation, is heavily dependent on a range of factors exogenous to the gas market. These include weather, renewable roll-out, renewable output, and coal power output. It is therefore inherently difficult to accurately forecast the demand for gas in advance. Even at a month or quarter ahead period this can be difficult, as seen with the AEMO underestimate of gas power generation requirements for 2022 and overestimate to date for winter 2023. At the same time new gas supply is long-lead time, requiring well in excess of three years to bring on new material volumes of gas supply. This is even more so

[74] Hon Jim Chalmers MP et al., *New Gas Code secures supply at reasonable prices for Australian users*, 2023

when considering the medium- to long-term need to bring on supply from new, greenfield developments which will require multiple phases of permitting, fund raising, comprehensive community engagement, exploration and characterisation, site development, infrastructure development, etc. and all during a period of investment uncertainty created by ongoing and fragmented regulatory intervention measures.

In an open competitive gas market, supply and demand modelling and price forecasting, combined with broader market and environmental assessments together underpin private sector investment in new supply. However, in a heavily regulated market, producers are less able to rely on these underlying market fundamentals to provide the signal and confidence for new investment.

The permitting regime for offshore gas projects is not fit-for-purpose and needs urgent reform | Industry cannot operate and investment cannot occur based on a regulatory regime where approvals are unable to withstand legal scrutiny. Further, processing time for Environmental Plans (EP) for offshore oil and gas projects, and CCUS projects, has increased from an average of 180 days 18 months ago, to 562 days on average for exploration and 400 days on average for development. The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) have indicated that there are currently 42 EPs before it with 5 approvals having been made since the Tipakalippa vs NOPSEMA decision came down in September 2022. Governments must ensure robust and timely approvals or risk shortages and upward pressure on energy prices. Regulations that provide clarity and certainty for industry while maintaining comprehensive and meaningful consultation with stakeholders are urgently needed.

New offshore acreage releases are long overdue and should be progressed as a matter of priority | The release of new offshore oil and gas acreage is long overdue. The development of offshore gas projects – for domestic supply and LNG export – are capital intensive and have long lead-time. For Australia to maintain domestic supply as well as its commitments to energy partners in the region, a pipeline of new acreage release, exploration, field and project development is required. Acreage and exploration are key leading indicators of future gas production. With delays in new acreage releases and exploration expenditure at an all-time low – falling a further 21 per cent from $1.1 billion in 2021-22 to just $907 million in 2022-23[75] – the front end of Australia's gas project pipeline is stalling. Given the lead-time of project developments this will manifest itself in 5-10 years by which time there will be few solutions to address shortfalls.

Conditions need to be created to support new gas exploration | In addition to new acreage releases, the government should work to establish the conditions necessary to allow for new gas exploration, both onshore under state frameworks as well as offshore in Federal waters. This includes giving clear policy direction on the importance of gas to Australia's economy and to the region going forward – including through the *Future Gas Strategy* – as well as encouraging state government to remove constraints on gas exploration and

[75] DISR, *Resources and Energy Quarterly: September 2023*, 2023

development, in particular in southern states, as well as looking to address lengthy and uncertain permitting processes, and government approvals that are at risk of appeal.

LNG import terminals should not be considered as an alternative to new domestic gas supply (Question 32-33)

The need for LNG import terminals shines a spotlight on poor gas policy in Australia | With the ACCC and AEMO forecasting structural shortfalls in the east coast gas market as early as 2026-27, and the long lead-times necessary to bring the necessary gas supply volumes to market, it looks possible that LNG import terminals in southern states may be needed to meet ongoing gas demand. The potential need for import terminals in states with substantial untapped gas reserves highlights a history of energy and gas policy failure. Victoria has by far the largest gas demand of the east coast states at around 200 PJ in 2022 – one third of total east coast gas demand – with Queensland second and NSW third with around 150 PJ and 130 PJ of demand respectively.[76] It is therefore counterintuitive that Victoria and NSW have the most restrictive policy and regulatory approaches to gas exploration and project development and are becoming increasingly reliant on Queensland for gas supply[77] as legacy production in Victoria declines steeply.

LNG imports should not be considered as an alternative to new domestic gas supply | While LNG import terminals may be required to address near-term supply constraints, removing barriers and putting in place the policy drivers necessary to facilitate investment in new domestic gas supply must be the priority, in particular in southern states.

Insufficient gas supply in Australia will lead to energy insecurity, increase energy prices and slow the transition to net zero

Insufficient gas supply in Australia will lead to energy insecurity, increased energy prices and a slowed transition to net zero | The ACCC has made it clear that without expansion in gas production, gas shortfalls would "*place continued upward pressure on prices in the gas market, as well as pressure on the electricity market*"[78]. Energy security and energy affordability – in the context of sustained cost-of-living pressures – are front and centre in the minds of all Australians. Australia urgently needs to bring on new gas supply to avoid exacerbating this situation. Should shortfalls be allowed to eventuate, it will be Australian household and businesses that suffer most. Further, with insufficient gas, coal power generation will be required to stay in the power network longer, renewable power roll-out will be constrained by the availability of firming capacity, and key manufacturers and industry will struggle to get the energy they need. Australia's ambitions for onshore mineral processing, including critical minerals, and to become a low-carbon hydrogen leader will be curtailed. Lack of gas supply will likely push Australia's already challenging emissions reductions and net zero targets out of reach. Independent analysis from EY found that "*underinvestment in*

[76] Australian Energy Regulator, *State of the energy market 2023*, 2023
[77] ACCC, *Gas Inquiry 2017-2030 Interim Report June 2023*, 2023
[78] ACCC, *Gas Inquiry 2017-2030 Interim Report January 2023*, 2023

new gas capacity, especially as mature reserves reach end-of-life, could narrow the energy options available to the country and increase the economic costs of achieving net zero."[79]

If energy security is compromised, it risks undermining the social licence for urgent climate action | The energy hierarchy of needs is built on a secure energy foundation. As recent events have shown, if energy security is at risk governments and consumers ultimately pay more for their energy needs and are willing to compromise the environmental and climate outcomes. We see the governments today softening their stance on coal power generation phase-outs in order to moderate energy security risks.[80] With gas shortfalls forecast during peak periods from today and structurally from 2026-27, the more time elapses before new gas supply is brought online the greater the risks grow of severe energy security impacts. If these risks are allowed to eventuate, there is a real risk that the social licence for urgent climate action is undermined, without which, reaching net zero will be impossible.

The Australian oil and gas industry has a proud history of successful engagement with local communities and First Nation groups (Questions 25-27)

The Australian oil and gas industry has been working constructively and collaboratively with local communities and First Nations groups for decades | Australian Energy Producers' members have long-standing relationships with many First Nations communities, some dating back many decades. Our members engage and work in partnership with traditional owner groups and land councils on matters relating to Native Title, consent and cultural heritage management. In addition, our members work to support economic opportunities including employment, training, education and enterprise opportunities. These include Aboriginal recruitment and job preparation programs to support skills development and long-term employment outcomes; education scholarships to encourage and assist Aboriginal and Torres Strait Islander students to progress to tertiary and vocational education and training; and engaging with First Nations businesses to support local enterprise growth. Building and maintaining mutually beneficial relationships with First Nations peoples means demonstrating our respect and commitment to traditional owners, and their communities, who hold deep connections to the lands and waters where we operate.

7. Fostering the natural gas sector diversifies net zero supply chains and workforce needs

Australia's oil and gas workforce are perfectly placed to deliver the natural gas, low-carbon hydrogen and CCUS needed for net zero (Questions 34-38)

Australia's oil and gas skills and experience are already delivering world class emissions reductions projects | The skills and experience of Australia's oil and gas industry represent a comparative advantage for Australia as we transform the economy, and the economies of the region, to net zero. Australians are already delivering the natural gas needed to reduce

[79] EY, *The future role for natural gas in Australia and the Region*, 2023

[80] Premier of Victoria, *Agreement Secures Transition For Loy Yang A (website)*, 2023, accessed Nov 2023

emissions in Australia and beyond. The Australian oil and gas sector is also delivering world-class, step-change net zero projects such as the Chevron's Gorgon CO_2 Injection Project and Santos's Moomba CCUS Project. These projects are two of the largest climate mitigation-focused CCUS projects anywhere in the world. The workforce of the Australian oil and gas sector will also be critical to advancing and scaling up low-carbon hydrogen production from renewable energy and natural gas with CCUS.

Current energy and climate policy presents major supply chain risks | Looking forward, as the world ramps up the delivery of cleaner energy and emissions reductions projects, skills and experience will become an even scarcer resource. This is particularly the case in the renewable energy sector which will need to do much of the climate mitigation heavy lifting. As this competition increases, there is a risk that skill and experience, and wider supply chain challenges, increasingly constrain the roll-out rate of renewable energy in Australia. This would be exacerbated if energy and climate policy neglect the broader portfolio of emissions reduction and cleaner energy technologies and focuses solely on renewable energy and its derivatives such as renewable-based hydrogen. To mitigate this risk, a broad portfolio of technologies and fuels should be pursued, including natural gas, CCUS, and natural gas and CCUS-based low-carbon hydrogen. By leveraging a broader range of technologies and fuels, Australia can also draw on a wider set of skills and experience – skills and experience Australia is a world leader in – and supply chains to moderate the risks associated with any single technology.

Australian Energy Producers welcomes the opportunity to provide input into the development of the Future Gas Strategy and looks forward to inputting further as the strategy develops.

Yours sincerely,

S McCulloch

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