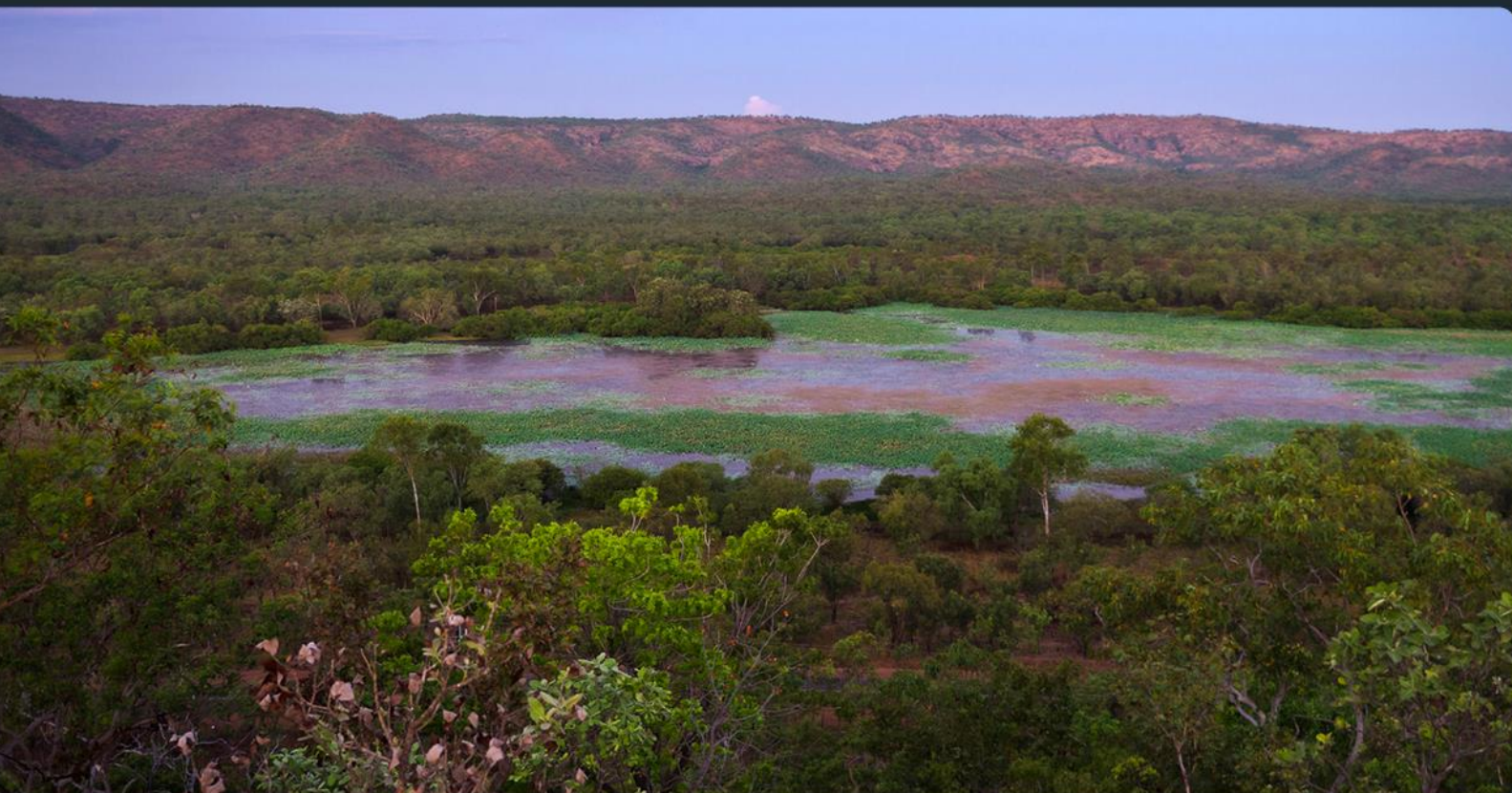


Beetaloo a \$10bn pipe dream for gas producers

Junior explorers left chasing commercial reserves
after major exodus from Basin

Kevin Morrison, Energy Finance Analyst, Australian Gas
Joshua Runciman, Lead Analyst, Australian Gas



Disclaimer

This Analysis has been prepared and issued by the Institute for Energy Economics and Financial Analysis Australia Limited (**IEEFA**). It sets out information and observations about certain statements made by the organisation(s) which is or are the subject of this Analysis (each an **Organisation**) concerning its business operations.

This Analysis is supplied personally to the Recipient on the following conditions, which are expressly accepted and agreed to by the Recipient, in part consideration of the supply of the Analysis, as evidenced by the retention by the Recipient of this Analysis. If these conditions are not acceptable the Analysis is to be returned immediately or closed.

1. This Analysis is neither a prospectus nor a product disclosure statement regulated under the Corporations Act, nor is it required to be. A copy is not required to be, and has not been, lodged with the Australian Securities and Investments Commission (**ASIC**);
2. This Analysis does not purport to contain all or any information that may be required to evaluate any transaction in relation to the Organisation (or would be required if it were a disclosure document which required lodgement with ASIC under the Corporations Act). The Recipient and its advisers should conduct their own independent review, investigations and analysis of the Organisation and of the information contained, or referred to, in this Analysis;
3. This Analysis is for information and educational purposes only. The information provided in this Analysis is derived from publicly available information, and the purpose of publishing this Analysis is to promote action by the Recipient consistent with IEEFA's sustainability objectives. IEEFA does not provide tax, legal, investment, financial product or accounting advice. This Analysis is not intended to provide, and should not be relied on for, tax, legal, investment, financial product or accounting advice, and it does not take into account any personal objectives, circumstances or financial needs of any particular Recipient. Nothing in this Analysis is intended as investment or financial product advice, as an offer or solicitation of an offer to buy or sell, or as a recommendation, opinion, endorsement, or sponsorship of any financial product, class of financial products, security, company, or fund. IEEFA is not responsible for any investment or other decision made by a Recipient and each Recipient is responsible for its own investment research and investment decisions. To the extent that a Recipient is an investor, or is considering investing in the Organisation, the Recipient should obtain its own financial advice in relation to any investment in the Organisation;
4. This Analysis is not meant as a general guide to investing, nor as a source of any specific or general recommendation or opinion in relation to any financial products or the Organisation. Unless attributed to others, any observations or opinions expressed are our current observations or opinions only. Certain information presented may have been provided by third parties. IEEFA believes that such third-party information is reliable, and has checked public records to verify it where possible, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice; and
5. Neither IEEFA, nor its directors, officers, employees, agents, advisers or representatives (referred to collectively as the **Beneficiaries**) makes any representation or warranty, express or implied, as to the accuracy, reliability or completeness of the information contained in this Analysis or previously or subsequently provided to the Recipient by any of the Beneficiaries, and the Beneficiaries shall have no responsibility arising in respect of the information contained in this Analysis or in any other way for errors or omissions (including responsibility to any persons by reason of negligence), except insofar as liability under any law cannot be excluded.

Contents

Disclaimer.....	2
Key Findings.....	4
Executive Summary.....	5
Fracking the Beetaloo fraught with risk.....	11
Producers face lower demand and poor returns	14
Major exodus from Beetaloo.....	21
Tamboran Resources: a case study for the Beetaloo	27
Conclusion	34
Appendix A: Treatment of Beetaloo emissions	37
About IEEFA.....	41
About the Authors.....	41

Figures and Tables

Figure 1: Beetaloo a high-risk venture with questionable rewards.....	8
Figure 2: Oil and gas prospect areas in the Northern Territory	10
Figure 3: The shale gas extraction process.....	12
Figure 4: Future gas demand scenarios 2024-42	16
Figure 5: Gas production cost projections.....	18
Figure 6: Gas exploration permits in the Northern Territory	26
Figure 7: Tamboran’s proposed Shenandoah South pipeline.....	29
Figure 8: Tamboran’s share price performance 2021-2023	32
Figure 9: Tamboran’s capital raisings	32
Table 1: Australian petroleum exploration expenditure (A\$m)	24
Table 2: Tamboran’s exploration permit valuations	30

Key Findings

Gas from the Beetaloo Basin in the NT is unlikely to be competitive. The unprecedented increase in LNG supply under construction means global LNG markets are likely to face a glut in the second half of this decade. Australia's relatively high LNG costs will likely make it uncompetitive with lower-cost Qatar and the US, which are driving new capacity additions.

Three small companies – Tamboran Resources, Empire Energy and Falcon Oil and Gas – are trying to commercialise their interests in the Beetaloo. Each will need significant external funding to realise their plans.

Beetaloo gas is crucial to the development of the Middle Arm Sustainable Development Precinct in Darwin, but it will rely heavily on taxpayer funds, and provide poor returns for public finances.

Tamboran's proposed NTLNG project at Darwin will produce 6.6 million tonnes of fossil gas a year and could cost more than A\$10 billion. It will require significant funding at a time when the International Energy Agency is warning that most LNG projects under construction will not make a return on their cost of capital in a net zero emissions scenario.



Executive Summary

The Beetaloo Basin, in the Northern Territory (NT), has been touted as a promising, world-class shale gas resources.¹ Reflecting this potential, the Australian government announced in January 2021 its intention to support the development of the Beetaloo Basin as part of the Beetaloo Strategic Basin Plan and the National Gas Infrastructure Plan.²

This included the government establishing a A\$50 million fund to support A\$200 million of exploration activity by mid-2022,³ to stimulate the search for commercial gas resources in this remote part of Australia (where roads and other infrastructure are lacking). This is in addition to almost A\$1.5 billion allocated to the Middle Arm Sustainable Development Precinct (MASDP) and related regional logistics hubs in the NT.⁴ Documents released under Freedom of Information (FOI) show the capital costs of Middle Arm of up to A\$3.7 billion.⁵

Our analysis suggests that these projects may have low economic value, with high costs and risks, and uncertain returns.



These projects may have low economic value, with high costs and risks, and uncertain returns.

The precinct plan includes the construction of the 6.6 million tonnes a year (Mtpa) NTLNG production and export terminal, with feed gas slated to come from the Beetaloo Basin.⁶

The Middle Arm precinct could receive taxpayer funding from the Australian and NT governments. Both governments have signed several other agreements over the years to stimulate development of the territory's gas resources. In 2013, they signed a memorandum of understanding to develop the territory's onshore gas resources to supply Rio Tinto's alumina refinery on the Gove peninsula.⁷ Rio Tinto abandoned those plans later that year and closed its refinery in 2014.^{8,9}

Despite hundreds of millions of dollars spent on exploration over more than a decade,¹⁰ the Beetaloo is yet to produce any commercial quantities of gas. There are only three relatively small companies –

¹ Hannah and Partners. Tamboran Resources. [Visiting the Beetaloo](#). September 2023. Page 2.

² Australian government. [Beetaloo Strategic Basin Plan](#). The Plan at a glance. Accessed 9 January 2024.

³ Ibid. Page 5.

⁴ Northern Territory government. [Middle Arm Sustainable Development Precinct](#).

⁵ Northern Territory Department of Infrastructure, Planning and Logistics. 12. Appendices. Page 164 (obtained via email).

⁶ NTLNG. NTLNG: [Fueling a sustainable future](#). 2023.

⁷ Offshore Energy. [Australia: Northern Territory government inks Gas MoU](#). 30 May 2013.

⁸ Sydney Morning Herald. [Rio Tinto shuts off gas plans for its Gove refinery](#). 27 November 2013.

⁹ The Guardian. [Boom and dust: uncertain future for the mining town run by Rio Tinto](#). 11 August 2014.

¹⁰ Northern Territory Geological Survey. [Overview of known conventional and unconventional petroleum potential in the Northern Territory](#). May 2017. Pages 1-2.

Tamboran Resources, Empire Energy and Falcon Oil and gas – actively seeking to commercialise their interests in the area.¹¹

Several large energy and chemical companies were once active in the Beetaloo, including major gas player Origin Energy. However, they have since walked away. The sole exception is Santos, which continues to undertake the work required to maintain its exploration permits.

The remoteness of the Beetaloo, about 500km south-east of the NT capital and port of Darwin,¹² means that significant new infrastructure investment will be required to process gas and transport it to end users, particularly along Australia's east coast. The NTLNG project will require an even larger investment, likely exceeding US\$10 billion, given the high costs associated with greenfield fossil gas projects.

Beetaloo would also likely enter the LNG market at a time when the International Energy Agency (IEA) expects gas demand to peak and LNG markets saturated with unprecedented supply following significant new capacity from Qatar and the US.¹³ LNG projects in Australia has also proved costly – of the 10 existing LNG projects in Australia, seven have destroyed shareholder value due to cost overruns and construction delays.¹⁴

Development of the Beetaloo basin will rely on fracking, a high-risk technology. In the US, fracking has created water and land contamination controversies while investors lost billions. The Beetaloo will require water supply for drilling and fracking, and pose risks of contamination that could affect the primary water source for the region and its agriculture.

Our previous analysis of the Middle Arm found that “a new supply of natural gas is not enough of a financial incentive to offset the costs of new agrichemical and petrochemical facilities, new roads, pipelines, ports, water systems, power plants, housing, schools and community facilities”.¹⁵

There are two main potential demand markets for the Beetaloo gas: the Australian east coast gas market, and in particular the Southern states which face a gas supply gap, and LNG export markets primarily in Asia. Major uncertainties exist on whether those markets will present long-term demand for Beetaloo gas.

Globally, LNG markets face a supply glut at a time when LNG has gained a reputation as an unreliable fuel in key growth markets, raising questions about whether future demand growth

¹¹ Santos also has interests in the Beetaloo, but company reporting suggests it is not a priority.

¹² Northern Territory government. [About the Beetaloo Sub-basin](#).

¹³ International Energy Agency (IEA). [After peak in mature markets, global gas demand is set for slower growth in coming years](#). 10 October 2023.

¹⁴ Australian Centre for Corporate Responsibility (ACCR). [Australia's LNG growth wave – did it wash for shareholders?](#) 27 November 2023. Pages 4 and 7.

¹⁵ IEEFA. [Middle Arm Gas and Petrochemicals Hub: Combination of Problems makes it unprofitable for business and a red flag to the public](#). June 2023. Page 4.

expectations will be realised. While the domestic market faces the prospect of shortfalls,¹⁶ there are downside demand risks from a range of factors, including the growing pace of electrification due to government policy changes in some jurisdictions.¹⁷

Australia's eastern states are setting ambitious emissions reduction targets and increasing their support for electrification – which could eliminate residential gas demand within two decades. The Australian Energy Market Operator (AEMO) expects that gas use for power generation is also likely to decrease, and industrial gas use could also be reduced materially through energy productivity, electrification and demand destruction driven by high gas prices.

This investment will be costly and subject to stranded asset risk given the potential for future gas demand to be lower than anticipated.



This investment will be costly and subject to stranded asset risk given the potential for future gas demand to be lower than anticipated.

Beetaloo gas is unlikely to be competitive. The unprecedented increase in LNG supply under construction means that global LNG markets are likely to face a glut in the second half of this decade. Australia's relatively high LNG costs will likely make it uncompetitive with lower cost Qatar and the US which are driving new capacity additions. There is also great uncertainty about the long-term demand outlook for LNG in emerging Asian markets, which are expected to replace Australia's main markets for LNG exports.

Junior exploration company Tamboran has emerged as a key player in the Beetaloo Basin following several permit acquisitions that culminated in the purchase of Origin Energy's permits in the region.

This report examines Tamboran's financial situation in detail and finds it to be dependent on a handful of deep pocketed shareholders. Tamboran raised more than A\$365 million in six years from investors, but already spent more than A\$300 million on exploration without producing any commercial quantities of gas.

Since Tamboran listed on 1 July 2021, its share price has more than halved, largely due to multiple share issues to raise funds to keep the company operating.

While Tamboran has plans to develop a pilot project, its financial position suggests it will require additional funding to produce Beetaloo gas commercially. Even after Tamboran's latest fundraising in December 2023, it will need further capital to cover its obligations in 2024.

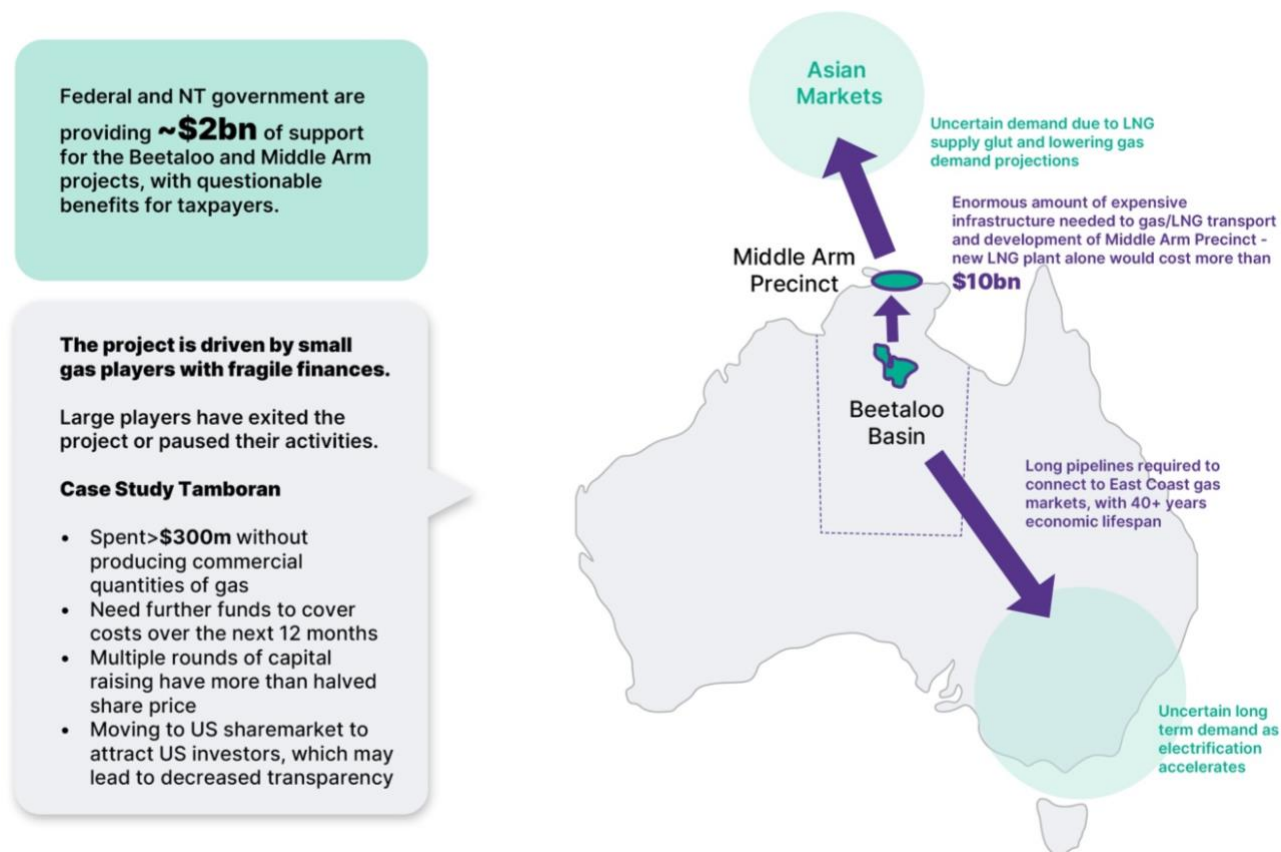
¹⁶ Australian Competition and Consumer Commission (ACCC). [Gas supply sufficient for 2024 but smaller surplus forecast](#). 15 December 2023.

¹⁷ ACCC. [Gas Inquiry 2017-30 December 2023 interim report](#). December 2023. Page 49.

Tamboran has relied on investors in the US shale gas sector for most of its funding. The company announced plans in late 2023 to change its primary sharemarket listing from Australia to the US (incorporated in the state of Delaware) to gain access to a broader pool of investors. While a move to Delaware may help Tamboran raise additional funds, Delaware’s corporate rules of anonymity also raise questions about whether the move will impact on the level of transparency available to investors (at a time when they are likely to want more transparency about the company’s activities). Any decrease in transparency, should that arise, may be a sensitive issue for Australian investors and taxpayers, particularly given the levels of past and proposed taxpayer support for the development of the Beetaloo Basin and Middle Arm Precinct.

There are significant questions on the financial and economic benefits that will be delivered by the development of the Beetaloo Basin, for investors as well as for governments. The proposed public financial support offered to the project and the Middle Arm precinct should be revisited in light of the changing domestic and global outlook for both gas demand and supply.

Figure 1: Beetaloo a high-risk venture with questionable rewards



Source: IEEFA

Introduction

Dead Cow a portent of Beetaloo's prospects

The Beetaloo Basin lies in the Stuart Plateau in the Northern Territory and part of the McArthur Basin, the site of hydrocarbon exploration since the 1960s.¹⁸

Developing the Beetaloo Basin will be challenging due to its remote location and lack of infrastructure, and there is a risk that development of the Beetaloo may not be commercially viable.¹⁹ Despite this, several companies have undertaken exploration activity in the Beetaloo over past decades. However, this has not yet resulted in commercial development of the Beetaloo Basin (or the greater McArthur Basin), although the two-year NT moratorium on gas exploration had an impact on exploration activity.

The development of another shale gas province, Argentina's Vaca Muerta (Spanish for Dead Cow), may provide insights into the challenges associated with developing remote shale gas basins, as highlighted in a Deloitte report for the federal government on the Beetaloo development in 2020: "Located in the sparsely populated and mountainous central-west regions of Argentina, the Vaca Muerta formation shares some geographical similarities with the Beetaloo Sub-basin – a harsh environment with underdeveloped transport infrastructure and a lack of other service companies that are operating at scale. The difference is especially stark when compared to the shale gas developments in the US, where abundant infrastructure and supporting industries were crucial factors that led to the breakneck development of US shale fields.

"With limited pipeline capacity, especially to regional export markets in Chile, Uruguay or Brazil and a lack of liquefaction capacity for gas to enter the lucrative international market, the gas that has been produced from the Vaca Muerta formation has largely only supplied the domestic market. This oversaturation of the domestic market has suppressed the price of domestic gas, reducing demand for additional production in the Vaca Muerta and locking in a cycle that undermines Argentina's ability to accelerate the development of these remote shale fields."²⁰

Despite the remoteness of the Beetaloo Basin and concerns about the use of hydraulic fracturing (fracking), the Australian government has committed A\$1.5 billion to the Middle Arm precinct and a further "A\$440 million to support regional logistics hubs in Katherine, Alice Springs and Tennant Creek to connect these regions to Middle Arm ..."²¹ The potential government spending on Middle

¹⁸ Deloitte. [Report on the Development of the Beetaloo Sub-basin for the Commonwealth Department of Industry, Science, Energy and Resources](#). November 2020. Page 21.

¹⁹ Ibid. Page 9.

²⁰ Ibid. Page 129.

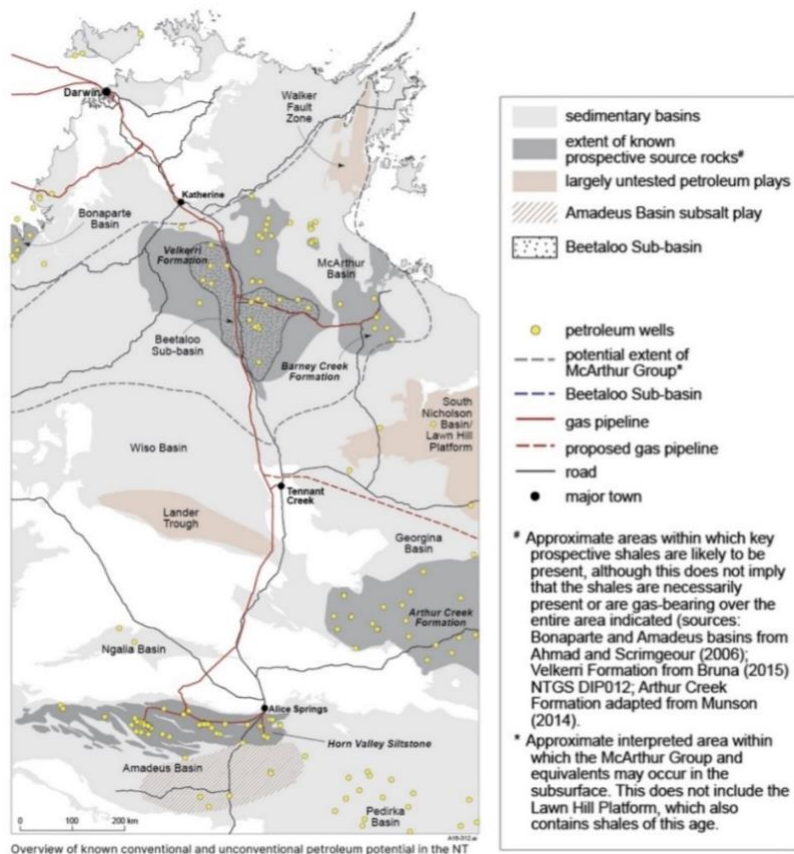
²¹ Australian government Department of Infrastructure, Transport, Regional Development, Communications and the Arts. [Submission to the Senate Inquiry into the Middle Arm Sustainable Development Precinct](#). Submission 4. October 2023. Page 3.

Arm could also be far larger than Canberra has indicated, with internal government documents reportedly showing the government’s financial support for the precinct could exceed A\$3.56 billion.²²

The Beetaloo Basin lies between Katherine and Tennant Creek, underlining the link between it and Middle Arm (Figure 2). This was highlighted in a document on Middle Arm by the federal government’s Infrastructure Australia body that the “development of Beetaloo Sub-Basin ... oil and gas resources present a significant National opportunity to generate economic activity and enhance energy security”.²³

Despite the challenges, Tamboran and Empire aim to sanction their respective pilot gas projects in the Beetaloo and McArthur basins in 2024 as a key step towards a commercial gas project in the region. Falcon Oil and Gas is Tamboran’s partner in the Shenandoah South pilot gas project.^{24,25}

Figure 2: Oil and gas prospect areas in the Northern Territory



Source: NT Geological Survey

²² ABC News. [Darwin Harbour Middle Arm expansion plan slammed by critics as 'extraordinary fossil fuel subsidy'](#). 15 December 2023.

²³ Australian Government. Infrastructure Australia. Assessment Framework. Obtained under Freedom of Information. Page 2.

²⁴ Tamboran Resources. [Second quarter activities report for period ended 31 December 2023](#). 31 January 2024. Page 2.

²⁵ Empire Energy. [Q4 2023 Quarterly report](#). 23 January 2024. Page 6.

Fracking the Beetaloo fraught with risk

Development of the Beetaloo Basin will rely on fracking technology. This involves “... the injection of fluid (comprising about 99.5% water and a proppant (sand) and about 0.5% chemical additives)²⁶ of fractures that unlock gas and allow it to flow into the well and up to the surface” (Figure 3).²⁷

While fracking is credited with increasing US oil and gas production, it has come at a financial cost to many investors.²⁸ It has contaminated water and land, resulting in civil penalties and criminal prosecutions.²⁹ Water quality in particular “... is a primary concern because the hydraulic fracturing fluids used to fracture rock formations have chemicals that could harm human health and the environment, especially if they enter drinking water supplies.”³⁰

Fracking has been a contentious issue in the NT, in part due to its potential impact on the territory’s water resources. The Beetaloo Basin lies beneath the Cambrian Limestone Aquifer, the main freshwater source for the region, primarily used for agriculture and the pastoral industry.³¹ The water required for development of the Beetaloo could affect other users and any future expansion of more intensive forms of agriculture.³²

Concerns about the impact of fracking on local water sources and the effect this would have on local communities and agricultural sectors prompted several inquiries in the NT.

- The 2011 Hunter review assessed whether the NT’s legal framework could regulate the development of shale gas, and recommended new environmental regulations be implemented.^{33,34}
- The Report of the Independent Inquiry into Hydraulic Fracturing in the Northern Territory, also known as the 2014 Hawke report, recommended a review of the territory’s environmental and approval process.³⁵
- A second Hawke report a year later informed the NT government on how to effectively regulate activities (such as fracking) that may have environmental impacts.³⁶

²⁶ Chemical additives used in fracking can include caustic soda, magnesium oxide, methanol, silica gel and bentonite.

²⁷ NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Background and issues paper.](#) 20 February 2017. Page 7.

²⁸ Australian Financial Review (AFR). [After blowing \\$397bn, US shale finally makes money.](#) 18 June 2021.

²⁹ IEEFA. Middle Arm Gas and Petroleum Hub: [Combination of problems makes it unprofitable for business and a red flag to the public.](#) June 2023. Page 41.

³⁰ US National Institute of Environmental Health Sciences. [Hydraulic fracturing and health.](#) Accessed 31 January 2024.

³¹ Hydrogeology Journal. [Constraining probabilistic chloride mass-balance recharge estimates using baseflow and remotely sensed evapotranspiration: the Cambrian Limestone Aquifer in northern Australia.](#) March 2021. Page 1401.

³² Ibid.

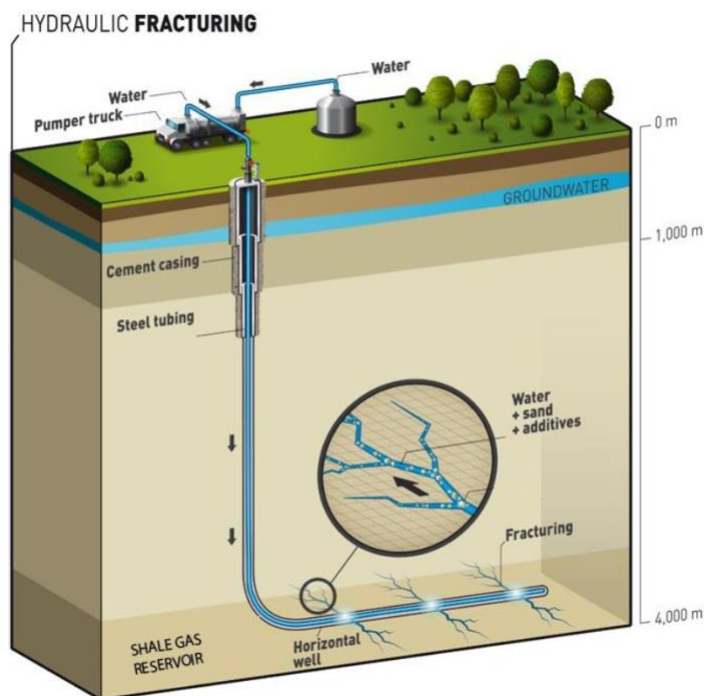
³³ NT government. [Scientific Inquiry into Hydraulic Fracturing in the Northern Territory. Background and Issues Paper.](#) 20 February 2017. Page 11.

³⁴ Ibid.

³⁵ Ibid.

³⁶ Ibid.

Figure 3: The shale gas extraction process



Source: NT government

- The 2017 Pepper Inquiry (the most comprehensive review into fracking in the NT) identified a range of risks associated with fracking, but noted that these could be managed if all 135 report recommendations were fully implemented by government.³⁷
 - One of the recommendations (9.8) was that “the NT and Australian governments seek to ensure that there is no net increase in the life cycle GHG [greenhouse gas] emissions emitted in Australia from any onshore shale gas produced in the NT”.³⁸ Following the recommendation, this would mean that all emissions occurring as a result of the Beetaloo development would have to be avoided or offset.
 - In response to the inquiry, the Australian Safeguard Mechanism³⁹ was applied “to facilities that emit more than 100,000 tonnes of carbon dioxide equivalent (CO₂e) in a year.” However, the Safeguard Mechanism is not capable of covering the full extent of this recommendation, as the following analysis shows.
 - Residual emissions emitted overseas from Australian gas exports should be offset overseas.⁴⁰ However, fully offsetting these emissions “... may require strengthening

³⁷ NT government. [Remarks upon delivery of Final report. Scientific Inquiry into Hydraulic Fracturing in the Northern Territory.](#) 27 March 2018.

³⁸ NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Final Report.](#) 27 March 2018. Page 239.

³⁹ Australian government. [Safeguard Mechanism Reforms.](#) May 2023. Page 1.

⁴⁰ NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Final Report.](#) 27 March 2018. Page 239.

existing policies and/or the introduction of new policies and initiatives to meet Australia's international obligations."⁴¹ There is no explicit policy in Australia to address Scope 3 emissions from Australia's fossil fuel exports. (Scope 3 emissions are those created by end users of the gas sold by producers.) However, a coal project was rejected on the grounds of the impact of the Scope 3 emissions when Chief Judge Preston of the NSW Land and Environment Court found that the mine's Scope 3 emissions "... were a relevant matter to be considered in assessing the proposal despite being indirect, downstream emissions ... and that both the direct and indirect GHG emissions of the mine project would contribute cumulatively to the global total GHG emissions."⁴²

The Pepper report noted that a field producing 365 petajoules (PJ) of gas a year represents 26.5Mtpa of carbon dioxide equivalent (CO₂e).⁴³ This volume of gas would provide sufficient feedstock for the proposed 6.6Mtpa NTLNG project at Middle Arm.

The NT and Australian governments' response to offsetting emissions from Beetaloo gas extraction was questioned by a key figure in the implementation of the Pepper Inquiry's 135 recommendations.⁴⁴ Independent observer Dr David Ritchie wrote in a letter following the release of his Scientific Inquiry into Hydraulic Fracturing Final implementation report that, "the Inquiry found that life cycle GHG [greenhouse gas] emissions from the Beetaloo sub-basin would create 'unacceptable risk levels', and recommended that this could be reduced to a 'low' risk by fully offsetting the life cycle GHG emissions, namely, that there is no net increase in life cycle GHG emissions in Australia from any onshore shale gas produced in the NT."⁴⁵ See [Appendix A](#) for more information on the treatment of emissions from the development of the Beetaloo Basin.

The risks of hydraulic fracturing are extensive, including "... groundwater contamination from leaky wells due to poor design, construction, operation or abandonment, or as a result of degradation over the life of the well".⁴⁶

There are also risks to surface water quality from spills from the transportation of chemicals used in fracking, and additional risks to surface water and groundwater flow processes as a result of possible seismic activity caused by fracking.⁴⁷ There is also a risk" ... that chemicals could come into contact with humans or livestock via groundwater or atmospheric pathways. While the overall concentration of harmful chemicals in the water is low, the actual amount can be significant and may pose a threat

⁴¹ NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Final Report](#). 27 March 2018. Page 239.

⁴² Report for the Climate Council. [Legal opinion – gaps in the Environment Protection and Biodiversity Conservation Act and other federal laws for protection of the climate](#). 13 October 2023. Page 22.

⁴³ Ibid. Page 239.

⁴⁴ ABC. [Fracking regulator disputes NT government's claim it met all Pepper Inquiry promises](#) 4 May 2023.

⁴⁵ Dr David Ritchie. [Letter to NT chief minister Natasha Fyles RE: Progress on the implementation of recommendations from the final report of the hydraulic fracturing inquiry - final considerations 2023](#). 10 March 2023. Page 8.

⁴⁶ NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Background and issues paper](#). 20 February 2017. Page 16.

⁴⁷ Ibid.

to the environment if not properly managed.”⁴⁸ There may also be a risk that the chemicals used in the drilling and hydraulic fracturing process will have an adverse impact on soil health as a result of spills of flowback water.⁴⁹

Contamination of water sources could in turn affect aquatic ecosystems and biodiversity, with adverse flow-on effects for human and livestock health. This in turn could affect industries that may coexist with the onshore unconventional gas industry, such as agriculture, pastoralism and tourism.⁵⁰

Fracking also poses risks for terrestrial ecosystems and biodiversity through the potential “... loss and/or fragmentation of regional fauna habitats as a result of road and pipeline construction and operation.”⁵¹ The Pepper report noted that there was a lack of pre-shale development assessment of environmental baselines to measure the impact of any shale gas development on the local terrestrial and water ecosystems and on biodiversity. The report recommended that environmental data be collected,⁵² which was undertaken in the Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin (SREBA).⁵³ The impact on the local ecosystems will require ongoing monitoring once a gas project starts producing.

Producers face lower demand and poor returns

Developing the Beetaloo basin will be complex and costly, requiring significant expenditure on development and infrastructure. Successful development of the Beetaloo will rely on sufficient demand to recoup costs given the scale of investment required. Should the basin be developed, Beetaloo gas would enter the market at a time when there is uncertainty about future gas demand, both in Australia and overseas, potentially exposing developers, infrastructure providers and investors to risks stemming from lower than anticipated demand (which would lower expected returns on capital).

Eastern Australia gas market outlook uncertain

In the domestic market, the Australian Competition and Consumer Commission (ACCC) suggests that fossil gas will have an ongoing role in supporting the transition to net zero GHG emissions, and forecasts that the east coast may experience gas shortfalls from 2027.⁵⁴ However, the ACCC also notes the uncertainty surrounding future gas demand, which is sensitive to several factors, including

⁴⁸ NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Background and issues paper](#). 20 February 2017. Page 19.

⁴⁹ Ibid. Page 16.

⁵⁰ Ibid.

⁵¹ Ibid. Page 17.

⁵² NT government. [Scientific inquiry into hydraulic fracturing in the Northern Territory. Final Report](#), 27 March 2018. Page 440.

⁵³ NT government. [Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin \(SREBA\)](#). Page 147.

⁵⁴ ACCC. [Gas Inquiry 2017-30 December 2023. Interim update](#) on east coast gas market. December 2023. Page 9.

weather, the pace of electrification, development of alternative fuels, as well as the use of gas for electricity generation.⁵⁵

The ACCC further notes that the Australian government’s “... Future Gas Strategy suggests gas consumption will decline, due in large part to policies promoting clean energy and energy efficiency”, including the Victorian government’s ban on gas connections for new residential developments.⁵⁶ These types of measures could have a significant impact on gas demand – IEEFA’s research has found that further measures targeting residential and industrial gas users could reduce demand in the southern states by 42% by 2030.⁵⁷

AEMO has also acknowledged the uncertainty around future gas demand on the east coast. In its annual Gas Statement of Opportunities (GSOO) reports, AEMO models a range of scenarios to account for “uncertainties in the speed and extent of gas sector transformation” (Figure 4).⁵⁸ AEMO noted that gas consumption on the east coast is forecast to decline under all of the scenarios in the 2023 GSOO as consumers seek low or zero emission alternatives to gas (AEMO also notes that declining supply may be a factor).⁵⁹ Notably, AEMO’s estimates of future demand declined further in 2023 compared with 2022. (The 2023 GSOO forecasts do not include the update to Victoria’s gas substitution roadmap released in December 2023 when the state government unveiled more incentives to move users off gas.⁶⁰ Nor does it include the impact of the NSW government’s net zero future bill in December 2023 to halve the state’s GHG emissions by 2030.⁶¹)

Greater than anticipated uptake in electrification and energy efficiency (in households and industry) could reduce demand faster than expected, creating downside risks for east coast gas producers.

There is also potential for demand destruction on the east coast due to high gas prices and other factors. The ACCC’s December 2023 gas report notes that some commercial and industrial users said they might have to close their operations if high gas prices persisted on the east coast.⁶² Incitec Pivot, which was the largest industrial gas user on the east coast, closed one of its facilities due to an inability to secure long-term, affordable gas supply.^{63,64} More industrial closures could further lower gas demand on the east coast.

Gas use in power generation in eastern Australian has also fallen over the past decade, a trend that may continue as more and larger batteries are built to provide back-up power to renewable energy. Gas accounted for 4.8% of the fuel source for electricity generation in eastern Australia in the year to 14 March 2024, down from about 13% in 2014 (the share of renewables increased from 13.6% to

⁵⁵ ACCC. [Gas Inquiry 2017-30 December 2023. Interim update](#) on east coast gas market. December 2023. Page 49.

⁵⁶ Ibid.

⁵⁷ IEEFA. [Reducing demand: A better way to bridge the gas supply gap](#). 16 November 2023.

⁵⁸ AEMO. [2023 Gas Statement of Opportunities](#). March 2023. Page 18.

⁵⁹ Ibid. Page 25.

⁶⁰ Victoria government. [Victoria’s Gas Substitution Roadmap Update](#).

⁶¹ Parliament of NSW. [Bills. Climate Change \(Net Zero Future\) Bill 2023](#). 11 December 2023.

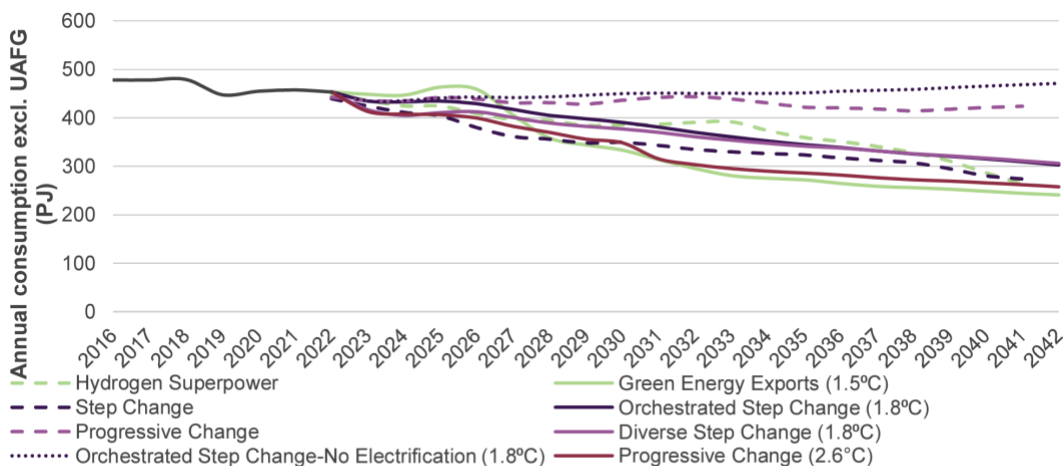
⁶² ACCC. [Gas Inquiry 2017-30 December 2023 Interim Report. December 2023. Page 110](#).

⁶³ Incitec Pivot. [Gibson Island manufacturing operations to cease at end of 2022. November 2021](#).

⁶⁴ Incitec Pivot. [Submission to ACCC LNG netback review](#). April 2021. Page 2.

38.8% over the same period).⁶⁵ That said, AEMO's 2023 modelling anticipates continued gas demand for energy generation in coming years (albeit below historical levels).⁶⁶

Figure 4: Future gas demand scenarios 2024-42



Notes:

- The 2022 GSOO scenarios are dashed lines, the 2023 GSOO scenarios are solid lines, and the 2023 sensitivities are dotted lines.
- The 2022 GSOO did not include the Northern Territory as a participating GSOO jurisdiction. The Northern Territory is included in actual gas consumption from 2020 onwards and in the 2023 forecasts.

Source: AEMO 2023 Gas Statement of Opportunities

Eastern Australia has significant gas reserves and resources without the Beetaloo Basin. The ACCC estimates 2P (proved and probable) reserves in the east coast and onshore NT of 33,403PJ, with additional 2C (best estimate) resources estimated at 32,465PJ (excluding the contingent resources identified in the Beetaloo Basin).⁶⁷ While not all of these reserves and resources will be commercially recoverable, it is possible there could be sufficient quantities to meet demand for decades even without Beetaloo gas.

Beetaloo unlikely to be competitive in global gas glut

As part of its plans to develop the Beetaloo, Tamboran Resources intends to develop a new 6.6mtpa LNG export facility at the Middle Arm Precinct in Darwin (about 350PJpa).⁶⁸ Tamboran's Managing Director and Chief Executive Officer Joel Riddle described the initial NTLNG plan as just the "first phase" of a much larger 20mtpa LNG development.⁶⁹

⁶⁵ [OpenNEM website](#). Accessed 22 February 2024.

⁶⁶ AEMO. [2023 Gas Statement of Opportunities](#). March 2023. Page 37.

⁶⁷ ACCC. [Gas Inquiry 2017-30 January 2023 Interim Report](#). January 2023. Page 145.

⁶⁸ NTLNG. [NTLNG: Fuelling a Sustainable Future](#). Accessed 30 January 2024.

⁶⁹ X (formerly Twitter). [Tamboran Resources AusbizTV interview](#). 14 June 2023.

Tamboran has already signed up offtakers for the proposed NTLNG projects with two non-binding memoranda of understanding (MOUs) with BP and Shell to purchase up to 2.2Mtpa of gas each over 20 years (about two-thirds of the proposed initial capacity of 6.6Mtpa).⁷⁰

Global LNG markets are unlikely to require any additional LNG capacity, with the IEA noting in its 2023 World Energy Outlook that no new additional investment in gas is required under its Stated Policies (STEPS) scenario, aligned with about 2.4°C of global warming.⁷¹ “In the NZE Scenario, the sharp decrease in natural gas demand globally means that the majority of projects currently under construction are no longer necessary. If they do go ahead, aggregate capacity utilisation would fall to 65% in 2030 and several plants that are unable to compete in a supply glut would likely end up closing or being repurposed.”⁷²

The IEA also warned that existing investment in oil and gas is almost double the level required in the NZE Scenario in 2030, signalling a clear risk of protracted fossil fuel use that would put the 1.5°C goal out of reach.⁷³

This represents a shift in the IEA’s outlook, as it was previously anticipated that additional investment in gas would be required to meet demand under the STEPS scenario.⁷⁴ It also follows a longer trend of the IEA reducing its annual demand forecasts.⁷⁵

The unprecedented surge in LNG supply under construction, equal to almost 40% of current LNG capacity,⁷⁶ means that LNG markets face a glut from 2025.⁷⁷ Australian LNG exporters face increasing competition from new, low-cost supply, particularly from Qatar and the US, which will add significant capacity.⁷⁸ Australia’s relatively high LNG costs (Figure 5) mean any new LNG liquefaction capacity in Australia will have a higher cost base than both Qatar and the US.

This expansion in capacity combined with the risk of a glut could result in an overbuild of LNG export and import infrastructure. IEEFA research has found that the increase in US LNG capacity associated with projects under construction may already represent an overbuild in US LNG capacity, which has the potential to prolong a looming LNG supply glut.⁷⁹ In January 2024, the US government paused pending LNG approval decisions, awaiting a review of the environmental and economic impacts of additional LNG exports.⁸⁰

⁷⁰ Reuters. [Australia’s Tamboran signs deals to supply LNG to BP and Shell](#). June 2023. Accessed 13 March 2024.

⁷¹ IEA. [World Energy Outlook 2023](#). October 2023. Page 201.

⁷² IEA. [The Oil and Gas Industry In Net Zero Transitions](#). Page 46.

⁷³ IEA. [World Energy Outlook 2023](#). October 2023. Page 202.

⁷⁴ Ibid. Page 19.

⁷⁵ Based on gas demand forecasts in the Stated Policies Scenarios in the IEA World Energy Outlooks: 2019. Table A.1. Page 674; 2020. Table A.1. Page 338; 2021. Table A.11. Page 317; 2022. Table A.12. Page 453; 2023. Table A.13. Page 285.

⁷⁶ IEA. [World Energy Outlook 2023. Executive summary](#).

⁷⁷ IEEFA. [Global LNG Outlook 2023-27](#). February 2023. Page 3.

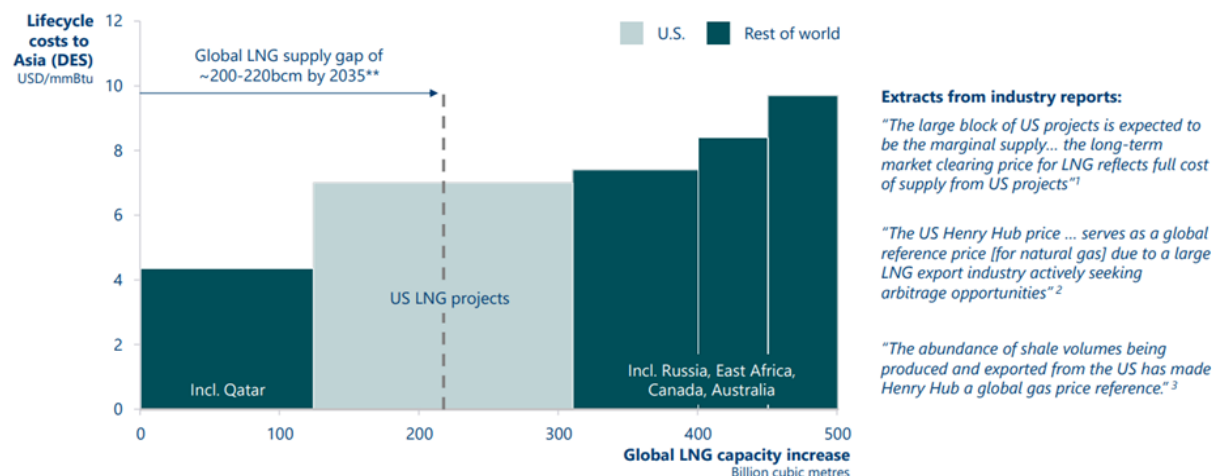
⁷⁸ Ibid. Pages 8 and 11.

⁷⁹ IEEFA. [US LNG Exports: Risky, dirty, and bad for US consumers](#). January 2024.

⁸⁰ The White House. [Fact Sheet: Biden-Harris Administration Announces Temporary Pause on Pending Approvals of Liquefied Natural Gas Exports](#). 26 January 2024.

Figure 5: Gas production cost projections

GLOBAL LNG COST CURVE OF THE FUTURE*

Source: Port Jackson Partners⁸¹

*Includes only pre-FID projects; Based on nameplate capacity halved in year one of operations and x 95% thereafter.

**Based on expected demand minus available post-FID and existing LNG capacity in 2035 (reference case +/-5%).

While LNG has been viewed by many as a necessary for the transition to net zero, it has also acquired a reputation as an expensive and unreliable energy source, particularly in countries seen as the key drivers of future LNG demand growth.⁸² Global LNG demand growth is shifting to poorer countries in Asia that are more price sensitive than Australia's traditional buyers in Japan and South Korea. Long-term demand is expected to fall in those countries, particularly in Japan as more nuclear power plants come back online.⁸³ A recent report by IEEFA showed that Japanese utilities that were once considered purely consumers of LNG are increasingly focused on marketing and reselling the chilled gas abroad, putting them more in competition with global LNG suppliers. Rather than absorbing more LNG volumes from global markets, Japanese companies are aiming to resell LNG, and this may add to a looming global glut later this decade.⁸⁴

Similarly, an IEEFA report found that South Korean investment in new LNG import terminals was creating a risk of overbuild (despite already low rates of utilisation of existing terminals) in light of declining demand amid the transition to net zero.⁸⁵

⁸¹ Port Jackson Partners. [Developing a robust domestic gas price marker](#). Chemistry Australia submission (attachment) to ACCC LNG netback price series review. May 2021. Page 4.

⁸² IEEFA. [Global LNG Outlook 2023-27](#). February 2023. Page 3.

⁸³ S&P Global Commodity Insights. [Commodities 2024: Japan to begin key energy policy review in 2024 with focus on 2035 targets](#). December 2023.

⁸⁴ IEEFA. [Japan's Largest LNG Buyers Have a Surplus Problem](#). March 2024. Page 5.

⁸⁵ IEEFA. [South Korea's LNG overbuild](#). November 2023. Page 4.

Beetaloo infrastructure needs could outweigh returns

Supplying Beetaloo gas to users in eastern Australia or export markets will require significant investment in infrastructure to extract and transport the gas.

Tamboran Resources and Empire Energy announced deals with APA Group to develop and build infrastructure to connect:

- Empire Energy’s Carpentaria pilot project to the McArthur River Mine Pipeline, which connects to the Amadeus Gas Pipeline. APA has committed to pre-engineering studies, progressing to a longer-term deal in which it would spend “... up to A\$5 million on engineering work and potentially early land access approvals in the 2023-24 fiscal year”, and;⁸⁶
- Tamboran Resource’s proposed Shenandoah South Pilot Project in the Beetaloo to the Amadeus Gas Pipeline (AGP). APA has pledged up to A\$10 million for early works, conditional on Tamboran achieving agreed milestones.⁸⁷

There are also proposals for APA to develop new, long-distance pipelines to transport Beetaloo gas to the east coast either via the APA Carpentaria Gas Pipeline or directly to Wallumbilla in Queensland,⁸⁸ and potentially a new pipeline to Darwin to supply feed gas for the NTLNG project.⁸⁹

While IEEFA is not aware of APA releasing cost estimates for any of the proposed projects, a comparison with similar projects in Australia suggests the costs of the pipelines and any gas processing facilities could be significant. For example, Jemena’s 622km Northern Gas Pipeline (connecting the Amadeus and Carpentaria gas pipelines) had an estimated capital cost of A\$775 million (for a daily capacity of about 90 terajoules).⁹⁰

Similarly, Tamboran has not yet released any cost estimates for its NTLNG project (which may be because a study by engineering contractor John Wood on the project is not due to be completed until mid-2024).⁹¹ However, the project is likely to cost more than A\$10 billion. Using other Australian LNG projects as a guide,⁹² a new 20Mtpa LNG liquefaction plant (excluding upstream or pipeline costs) would be US\$6.96-10.44 billion (A\$10.38-15.57 billion).

The NTLNG proposal is a key part of the Middle Arm project at Darwin. In a previous report, IEEFA concluded: “The Middle Arm Sustainable Development Precinct plan, which promises new industry and substantial infrastructure investment, is flawed. Its market assumptions are overly optimistic;

⁸⁶ APA Group. [APA signs initial agreement to commence work to connect Empire Energy’s Beetaloo Basin assets](#). 8 August 2023. Page 1.

⁸⁷ Tamboran Resources. [Tamboran progresses key pipeline agreements with APA Group](#). ASX Announcement.

⁸⁸ Ibid.

⁸⁹ The Australian Pipeliner. [APA to develop pipeline connecting Tamboran’s Beetaloo Basin assets](#). 26 June 2023.

⁹⁰ Jemena. [Northern Gas Pipeline. Supplement to the Draft Environmental Impact Statement](#). November 2016.

⁹¹ Tamboran Resources. [Wood, awarded contract for proposed NTLNG concept select](#). 25 July 2023.

⁹² Zou et al. [Global LNG market: supply-demand and economic analysis](#). 2022. Page 5.

infrastructure needs will stress federal and local budgets; and the plan is misaligned with global efforts to curtail greenhouse gas emissions. The plans for exports, new technologies and new industries face a series of market, infrastructure and technological challenges. Because the Northern Territory is undeveloped, it would take a level of support that the combined balance sheets of Australia's federal government and several corporations cannot afford. A new supply of natural gas is not enough of a financial incentive to offset the costs of new agrichemical and petrochemical facilities, new roads, pipelines, ports, water systems, power plants, housing, schools and community facilities. The remote location puts the hub far away from businesses that can manufacture and service new product lines."⁹³

There are also financial risks associated with the development of new LNG infrastructure in Australia. Despite Australia becoming the world's largest LNG exporter (a title it lost to the US last year) due to eight new LNG projects since 2012, this title "does not appear to have generated value for shareholders". Returns on seven of these projects do not meet the required cost of capital, according to a report published by The Australasian Centre for Corporate Responsibility (ACCR).⁹⁴ Each of these projects had delays and higher than anticipated capital costs, which lowered returns.⁹⁵ Notably, Australian LNG projects perform well below those in other major LNG exporters, such as Qatar and the US.⁹⁶ This is despite the fact that "Australia's LNG growth wave was started during what the IEA termed the golden age of gas", and was based on an assumption of rapid Asian gas demand.⁹⁷ In 2022, the IEA said Asian demand was greater than it had expected, but also noted that gas would be outcompeted by wind and solar generation in the long term.⁹⁸

The IEA also said that about "... 70% of LNG export projects currently under construction would struggle to recover their invested capital under the NZE Scenario." In the announced pledges scenario (APS), the IEA estimates that 40% of the LNG export projects under construction would not fully recover their invested capital.⁹⁹

The scale of investment required to develop Beetaloo is large, and it will take decades to see any return. Gas pipelines have an asset life of up to 70 years, although some operators have sought to reduce the lifetime due to the impact of renewables on gas demand.¹⁰⁰ Declines in demand beyond those anticipated in global and domestic markets could result in underutilisation and risk the infrastructure becoming stranded, potentially undermining the returns anticipated by developers and investors.

⁹³ IEEFA. [Middle Arm Gas and Petroleum Hub: Combination of problems makes it unprofitable for business and a red flag to the public](#). June 2023. Page 4.

⁹⁴ ACCR. [Australia's LNG growth wave – did it wash for shareholders?](#) November 2023. Page 3.

⁹⁵ Ibid. Page 4.

⁹⁶ Ibid. Page 13.

⁹⁷ Ibid. Page 16.

⁹⁸ IEA. [World Energy Outlook 2022](#). Pages 407-408.

⁹⁹ IEA. [The Oil and Gas Industry in Net Zero Transitions](#). Page 47.

¹⁰⁰ Economic Regulation Authority of Western Australia. [Dampier Bunbury Pipeline, Final Plan Attachment 9.2 – Assessment of the Economic Life of the DBNGP](#). January 2020. Page 1.

Major exodus from Beetaloo

The McArthur Basin, and the Beetaloo sub-basin, have been known to exploration companies for more than 50 years, but it is only in the past two decades that Beetaloo has been touted as Australia's next major gas-producing province. Yet the region has not been able to sustain interest from larger exploration and production companies, and most of the work under way is by smaller exploration firms with limited financial capacity.

All but one of the medium to large players who have investigated the Beetaloo and McArthur Basin since the 1960s have sold their stakes in the fields, including Rio Tinto, Origin and Hess Energy.

Exploration in the McArthur Basin, which largely encompasses the Beetaloo sub-basin, intensified from the 1980s, with the discovery of oil in the Velkerri Formation.¹⁰¹ This was followed by further activity from 1984 to the mid-1990s, with increasing focus on the Beetaloo from the mid-2000s.^{102,103}

Based on the seismic database acquired by Hess, the US investor signalled intent to drill five exploration wells in 2011.¹⁰⁴ However, this did not eventuate and Hess' interests lapsed in 2013 (marking its departure from the basin and the end of its joint venture with Falcon after spending US\$80 million).¹⁰⁵

Within a year, Falcon had found two big partners: Australian gas and utility group Origin Energy and South African energy and chemicals group Sasol. Each agreed to take a 35% stake in Falcon's Beetaloo permits, and pledged to drill nine exploration wells over five years at a cost of about A\$165 million.¹⁰⁶ Both Origin Energy and Sasol have since walked away from in the basin.

Meanwhile, Australian gas explorer Pangaea Resources completed seismic surveys and drilled seven exploration wells over 2014 and 2015 in the basin,¹⁰⁷ and subsequently sold its interests to Australian-listed gas explorer Empire Energy in April 2021.¹⁰⁸

This leaves only a few players with interests in the Beetaloo and McArthur basins, namely Santos, Tamboran Resources, Empire Energy and Falcon Oil and Gas.

¹⁰¹ Nature. [Hydrocarbon shows and petroleum source rocks in sediments as old as 1.7x10⁹ years](#). Volume 322-21. August 1986. Pages 727-729.

¹⁰² Australian government. Geoscience Australia. [Petroleum prospectivity of the Beetaloo Sub-basin](#). 2020. Page 11.

¹⁰³ Deloitte. [Report on the Development of the Beetaloo Sub-basin](#). November 2020. Page 21.

¹⁰⁴ Falcon Oil and Gas. [Announces the closing of the Beetaloo Basin transaction with Hess](#). 13 July 2011.

¹⁰⁵ Falcon Oil and Gas. [Hess request to defer drilling decision rejected by Falcon board](#). 1 July 2013.

¹⁰⁶ Falcon Oil and Gas. [Transformational farm-out of Beetaloo unconventional acreage](#). 2 May 2014.

¹⁰⁷ Australian government. Department of Agriculture, Water and the Environment. [Petroleum Prospectivity of the Beetaloo Sub-basin](#). Technical appendix for the Geological and Bioregional Assessment: Stage 2. 2020. Page 11.

¹⁰⁸ Empire Energy. [Transformational Acquisition of Pangaea Resources](#) April 2021.

A low priority for the last big player

While Santos has retained its interests in the Beetaloo/McArthur basins, its focus has shifted over the past decade following the acquisition of interests offshore Western Australia¹⁰⁹ and the merger in December 2021 with fellow Australian gas producer Oil Search.¹¹⁰

The McArthur Basin was not discussed at Santos's strategy days in 2022¹¹¹ and 2023.¹¹² Nor did it rate a mention in its December 2023 quarterly report.¹¹³ Nor did Santos refer to the McArthur Basin in its 2023 financial results on 21st February 2024.¹¹⁴ Santos has had other issues to contend with in the Northern Territory, with its much-publicised delays in obtaining approvals for development of the offshore Barossa field,¹¹⁵ which forced Darwin LNG offline, and a delay to the Narrabri gas field in northern NSW.¹¹⁶

That said, Santos undertook flow tests at the Tanumbirini 2 and 3 wells in early 2023, and is still undertaking some activities in the area (within Exploration Permit 161). Tamboran, which partners Santos in these wells, said at the time of the drill results that the flow tests "... demonstrated a 20-year estimated ultimate recovery (EUR) of 16.8-18.5 billion cubic feet (BCF) or 476-523 million m³ respectively, for a proposed 3,000 metre development scale well. These results are in-line with the most productive regions of the Marcellus Basin, USA, one of the world's most prolific shale gas basins," Tamboran said.¹¹⁷

Santos disclosed on 13 February 2024 that it had revised up its estimate of the 2C contingent resource of the Tanumbirini field by 108 million barrels of oil equivalent (boe), which equates to 16.77 billion m³.¹¹⁸ In an email to IEEFA, Santos subsequently said that the increase represented less than half of the total contingent resources for Tanumbirini.

Media reports said the Tanumbirini flow tests were lower than anticipated,¹¹⁹ and Santos now appears to be looking at drilling further wells within EP 161, at Jibera South, 15km from the Tanumbirini wells and just to the north of Tamboran's Maverick well. Tamboran said in a presentation in June 2022 that drilling at Jibera South was earmarked for 2023.¹²⁰ There has been no update from either Santos or Tamboran on Jibera South, although Santos' partner in EP 161, Tamboran Resources, said Santos submitted an environmental management plan to undertake a seismic survey

¹⁰⁹ Santos. [Santos completes acquisition of Quadrant Energy](#). 27 November 2018.

¹¹⁰ Santos. [Santos and Oil Search merger becomes effective](#). 10 December 2021.

¹¹¹ Santos. [2022 Investor Briefing Day](#). 8 November 2022.

¹¹² Santos. [2023 Investor Day](#). 22 November 2023.

¹¹³ Santos. [2023 fourth quarter report](#). 25 January 2024.

¹¹⁴ Santos. [Santos announces record cash dividend](#). 21 February 2024.

¹¹⁵ Reuters. [Australia court halts Santos' A\\$3.6 billion Barossa gas pipeline works](#). 3 November 2023.

¹¹⁶ Petroleum Australia. [Santos delays FID for Narrabri gas project until 2025](#). 23 November 2023.

¹¹⁷ Tamboran Resources. [EP 161 Update: Flow test analysis of Tanumbirini wells](#). 23 June 2023.

¹¹⁸ Santos. [2023 Annual reserves and resources statement](#). 13th February 2024.

¹¹⁹ The Australian. [Underwhelming Beetaloo drilling results but Tamboran pushes on](#). 23 June 2023.

¹²⁰ Tamboran Resources. [Gold Coast Investment showcase](#). June 2022.

in two areas over northern EP 161 during the final quarter of 2023.¹²¹ Santos said in the email to IEEFA that: “Santos has outstanding commitment to drill a number of wells in EP161. Timing is being firmed-up [and] will be announced when there is certainty.”

The Beetaloo and McArthur basins may remain a low priority for Santos in the future, even if a proposed merger with Woodside, which has since stalled, were to proceed in future.¹²² Following such a merger, Woodside would be the major partner. Woodside’s main focus has been offshore oil and gas production, and it has showed little interest in onshore oil and gas exploration and production. Woodside’s map of operations shows no onshore oil and gas extraction activity.¹²³

Exploration expenditure reflects waning interest

Expenditure on petroleum exploration in the NT has fallen over the past decade. By FY2022-23, total petroleum exploration spending in the NT had fallen to A\$125.50 million, about a quarter of the peak annual spending of A\$510 million in 2013-14 (Table 1).¹²⁴ This decline in total exploration spending is despite federal government efforts to stimulate exploration activity in the Beetaloo through the A\$50 million funding announced in December 2020.

There is no breakdown in the ABS exploration spending data on expenditure on regions within the NT or any other Australian jurisdiction. But an NT government publication in 2017 provided some context on drilling activity in the Beetaloo between 2010 and 2016 resulted in the drilling of “... 46 wells and more than 10,000km of 2D seismic surveys”, with about A\$250 million spent on exploration activity in the Beetaloo sub-basin.¹²⁵

This decline in exploration and development expenditure may reflect a number of factors, including more prospective and competing priorities in Australia or overseas for gas producers, and regulatory interventions by governments, but may also provide some insights into the prospectivity of known resources in the NT.

¹²¹ Tamboran Resources. [Second quarter activities report for period to 31 December 2023](#). 31 January 2024.

¹²² Woodside Energy. Full year 2023 [Results Briefing transcript](#). Page 12.

¹²³ Woodside. [Our areas of activity](#). 2024.

¹²⁴ ABS. [Mineral and Petroleum Exploration, Australia, September 2023 quarter, Table 7](#). 4 December 2023.

¹²⁵ Northern Territory Geological Survey. [Overview of known conventional and unconventional petroleum potential in the Northern Territory](#). 2017 Page 1.

Table 1: Australian petroleum exploration expenditure (A\$m)

Period	Offshore	Onshore	Seasonally adj.	Qld	SA	WA	NT
2012-13	3,425.70	1,364.90	4,790.60	652.90	382.20	3,297.20	7.70
2013-14	3,523.00	1,316.20	4,839.20	613.00	535.00	3,017.10	510.00
2014-15	2,546.60	1,240.40	3,787.00	741.20	384.90	2,070.70	441.50
2015-16	1,285.70	489.30	1,775.00	201.70	137.60	1,319.70	97.90
2016-17	946.00	435.00	1,381.00	156.30	159.50	643.90	360.40
2017-18	672.80	350.90	1,023.70	163.20	109.10	549.00	161.50
2018-19	811.70	439.80	1,251.50	194.70	108.30	712.50	181.60
2019-20	587.00	669.20	1,256.20	232.70	133.20	594.40	185.80
2020-21	370.00	629.90	999.90	297.60	111.10	439.30	91.30
2021-22	465.90	683.10	1,149.00	226.30	91.00	579.10	185.20
2022-23	315.80	597.70	913.50	202.00	49.90	361.80	125.50

Source: Australian Bureau of Statistics

Only small players still exploring McArthur Basin

After losing Hess, Sasol and Origin Energy, Falcon's remaining joint venture partner is Tamboran Resources, a company of similar size. This means that neither Tamboran nor Falcon has sufficient cash on hand to fund the challenging drilling program the Beetaloo presents.

Nor does Empire Energy have significant cash reserves to fully develop its Beetaloo interests. It had A\$17.3 million in cash at 31 December 2023 following a A\$15.6 million research and development (R&D) tax offset,¹²⁶ and a further A\$5.4 million of unused credit facilities.¹²⁷ It also has a US\$7.5 million loan maturing in September 2024, which is supported by its operations in the US. It has a further A\$7.25 million credit facility maturing at the end of 2025, secured against its NT assets.¹²⁸ Empire received a total of A\$28.7 million¹²⁹ in R&D tax offsets in three separate payments between 2021¹³⁰ and 2023.

However, the issue of these R&D tax offsets to gas exploration companies will be investigated by the Department of Industry, Science and Resources as part of a compliance process.¹³¹ The tax rules governing R&D activities state that “prospecting, exploring or drilling for minerals or petroleum ... for discovering deposits or determining the size or quality of deposits” are not core R&D activities.¹³²

¹²⁶ Empire Energy. [Empire Energy receives \\$15.6 million R&D tax offset](#). 24 October 2023.

¹²⁷ Empire Energy. [Appendix 5B oil and gas entity quarterly cash flow statement to 31 December 2023](#). January 2024. Page 4.

¹²⁸ Ibid.

¹²⁹ Empire Energy. [Beetaloo Operations Update](#). 17 November 2022.

¹³⁰ Empire Energy. [Beetaloo Operations Update](#). 27 September 2021.

¹³¹ Lock the Gate. [Questions raised over federal tax handouts to fracking company for NT project](#). February 20, 2024.

¹³² Commonwealth Consolidated Acts. [Income Tax Assessment Act 1997 – Sect 355.25](#).

Empire has also received up to A\$19.4 million in grants under the Australian government's Beetaloo Cooperative Drilling Program, which Empire said would finance a quarter of the costs for seismic survey acquisition, drilling, fracking and testing of three wells within its EP 187 permit,¹³³ which contains its Carpentaria gas pilot project. The grants to Empire were reissued after the original grants were ruled invalid by the Federal Court.¹³⁴

The government grants and R&D tax offset income have however provided Empire with sufficient financing that it has been able to take its proposed 25TJ/day Carpentaria gas pilot project in the McArthur Basin to the brink of a final investment decision. Construction on proposed project would start in the second half of 2024, with first gas sales anticipated in 2025.¹³⁵ If this were to go ahead, it would be the first pilot gas project to be developed in either the McArthur Basin or Beetaloo Sub-basin.

There are several other small explorers in the greater McArthur Basin, which covers much of the north-east Northern Territory.¹³⁶ Exploration permits that cover the largest areas in the McArthur Basin are held by McArthur Oil and Gas (Figure 6), a wholly owned subsidiary of Armour Energy, which went into administration on 10 November 2023.¹³⁷ The appointment of administrators to Armour Energy came in spite of the company raising A\$32 million through a share and convertible note issue in March 2023¹³⁸ and having a cornerstone investor in Australian mining and energy firm DGR Global.¹³⁹ Armour also had made the Glyde gas discovery in the southern McArthur Basin and signed a 14-year gas supply agreement with the Merlin Diamond project.¹⁴⁰

Other exploration firms in the McArthur Basin are Minerals Australia, a subsidiary of Hancock Prospecting, owned by Australian mining billionaire Gina Rinehart and Empire Energy.¹⁴¹ So far Minerals Australia has not embarked on any major activity in the NT.

Together, the companies active in the McArthur Basin and Beetaloo sub-basin appear to be behind the timing of gas development that the Australian government outlined in The Beetaloo Strategic Basin plan in January 2021. The plan was accompanied by financial and policy assistance for the Beetaloo that was intended to stimulate an accelerated development of the basin. The drilling of 20 to 40 wells in the basin were targeted within the first two- to three-year (2023-24) appraisal period, followed by a development period after four years (2025) when 200 to 300 wells would be drilled, leading to 20 to 40 years of gas production.¹⁴²

¹³³ Empire Energy. [Replacement Beetaloo drilling grant agreements executed](#). 23 February 2022.

¹³⁴ The Guardian. [Court rules Morrison government grant to develop gas field in Beetaloo basin invalid](#). 23 December 2021.

¹³⁵ Empire Energy. [Q4 2023 Quarterly Report](#). 23 January 2024. Page 1.

¹³⁶ Australian government. Department of Industry, Science and Resources. [The Beetaloo Sub-basin](#).

¹³⁷ Armour Energy. [Appointment of receivers and managers and administrators](#). 10 November 2023.

¹³⁸ Armour Energy. [Armour announces launch of A\\$32m capital raising program](#). 23 March 2023.

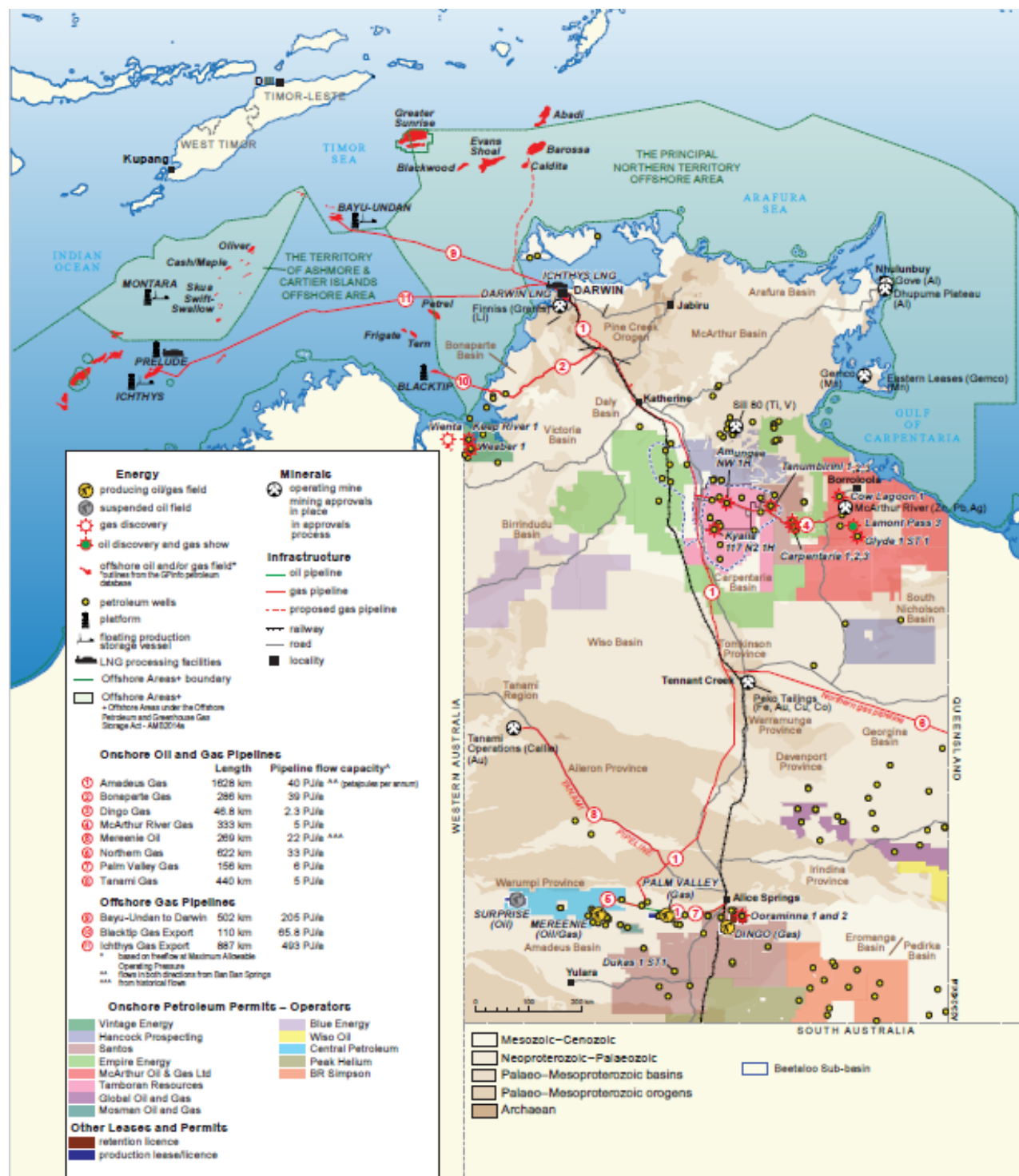
¹³⁹ DGR Global. [Armour Energy Acknowledgement](#). 13 November 2023.

¹⁴⁰ Armour Energy. [Armour signs gas supply heads of agreement](#). 20 February 2023.

¹⁴¹ Resourcing The Territory. [Onshore exploration activity, 31 October 2023](#).

¹⁴² Australian government. [Unlocking the Beetaloo. The Beetaloo Strategic Basin Plan](#). 2021. Page 13.

Figure 6: Gas exploration permits in the Northern Territory



Source: *Resourcing the Territory Onshore exploration activity.*

Tamboran Resources: a case study for the Beetaloo

The promise of vast gas resources in the Beetaloo and government-backed plans to turn Darwin into a gas exporting and petrochemical hub largely rely on Tamboran Resources, which has emerged as the key player in the Beetaloo, alongside Empire Energy. They hold the majority of Beetaloo exploration permits (either wholly or through joint ventures).

Tamboran, with JV partner Falcon Oil and Gas, intends to reach final investment decision (FID) for its Shenandoah South Pilot Project in mid-2024 and first gas delivered in 2026, after it reported in February flow rates from the Shenandoah South test well of 6.4 million cubic feet (M ft³)/day (181,000 metres³/day).¹⁴³ A pilot project is an important phase to test technical issues with the gas well, but Tamboran would have to produce far more gas if it is looking at providing feedstock to a 6.6Mtpa LNG plant. Woodside's Pluto LNG train in Western Australia, which has a nameplate capacity of 4.3Mtpa (almost two-thirds of the proposed NTLNG plant) produced an average of 119,000boe/day in the October to December quarter 2023, which equates to 652.66M ft³/day.¹⁴⁴

Tamboran will need more funding to develop Beetaloo

Tamboran has raised funds from several sources over the past decade to fund its exploration activities, but will require additional funding to develop its interests in the Beetaloo.

It has raised more than A\$365 million in the past six years, mainly from US investors with experience in the shale gas sector. It has since spent more than A\$300 million of this, with A\$227.1 million spent on exploration – about A\$117 million of this was spent in FY2022-23.¹⁴⁵ A further A\$42.5 million was spent on exploration between July and December 2023.¹⁴⁶

Tamboran has pointed to the high costs of exploration and construction in Australia, stating: “The cost of drilling an onshore exploration well is more than two-and-a-half times that in the US.”¹⁴⁷ The company has also acknowledged the high cost of construction and cost overruns at several other multibillion-dollar projects in recent years.¹⁴⁸

However, Tamboran has also spent funds on more than just exploration. Since FY 2017-18, about A\$35 million was spent on property, plant and equipment, and A\$35 million on consultancy, legal and professional fees. A further A\$21.26 million has been paid on director fees since FY2017-18,

¹⁴³ Tamboran Resources. [Shenandoah South IP30 Flow Test Results presentation 26 February 2024](#). Page 3 [program, preparing to commence flow back and IP30 testing](#). ASX Announcement. December 2023. Page 1.

¹⁴⁴ Woodside Energy. [Fourth quarter report for period ended 31 December 2023](#). Page 15.

¹⁴⁵ [Tamboran Resources. Annual Report 2023](#), September 2023. Page 50.

¹⁴⁶ [Tamboran Resources. December Quarterly Cashflow Report. January 2024](#).

¹⁴⁷ Tamboran Resources. [Prospectus](#). 1 July 2021. Page 44.

¹⁴⁸ *Ibid.* Page 44.

and almost A\$13.5 million in administration costs. Finance costs and share-based payments together have consumed a further A\$30 million in funds over the past six years.¹⁴⁹

Tamboran's financial position means it will require significant additional funding if it is to continue to invest in exploration to shore up its resource estimates and successfully develop the Shenandoah South pilot project.

Tamboran had A\$47.82 million in cash at the end of 2023.¹⁵⁰ It had spent A\$42.5 million on exploration in the six months to December 2023, and if continued to spend at the same rate in the six months to June 2024, it could be looking for more funds to finance its work programme for the rest of 2024. Tamboran will require additional funding to fully develop the Beetaloo, which its Board of Directors acknowledged in the 2022-23 annual report, stating that, "existing cash on hand, is not sufficient to meet the company's obligations as they come due over the next twelve months. The Directors and Management are confident that as further funding is required it can be raised through an equity raise and/or debt funding. While expected, there is uncertainty that sufficient incremental funds can be raised to meet these obligations. This indicates the existence of a material uncertainty, which casts significant doubt over the Group's ability to continue as a going concern and, therefore, it may be unable to realise its assets and discharge its liabilities in the normal course of business."¹⁵¹

Tamboran's directors also noted in the annual report that, "the financial statements do not include adjustments that would result if the Group was unable to continue as a going concern. Having given due consideration to the cash requirements of the Group, the Board of Directors has a reasonable expectation that the Group will have adequate resources to continue in operational existence for the foreseeable future. For this reason, the Board continues to adopt the going concern basis in preparing these consolidated financial statements which assumes the Group will be able to meet its liabilities as they fall due for the next 12 months."¹⁵²

While Tamboran successfully raised funds in early 2024, it noted at the time that, "the funding is expected to support our activities and purchase of long lead items until the sanctioning of the proposed Shenandoah Pilot Project".¹⁵³ Given Tamboran's cash on hand at the end of 2023, it will require additional funding to further develop their interests in the Beetaloo.

Tamboran will also face significant infrastructure costs to transport any commercial gas to end users, including costs associated with gas processing and pipelines. As noted earlier, in June 2023, Tamboran announced a strategic partnership with APA that includes the construction of a pipeline to Tamboran's proposed pilot development at the Shenandoah South site by 2026 (Figure 7), and

¹⁴⁹ Tamboran Resources. [Annual Reports, 2019, 2020, 2021, 2022 and 2023. Tamboran Resources Prospectus 2021. Tamboran Resources December Quarterly Cashflow Report, January 2024.](#)

¹⁵⁰ Tamboran Resources. December 2023 [Quarterly Cashflow Report](#), Pages 2-3.

¹⁵¹ [Tamboran Resources, Annual Report 2023](#), September 2023, Page 51.

¹⁵² *Ibid.*

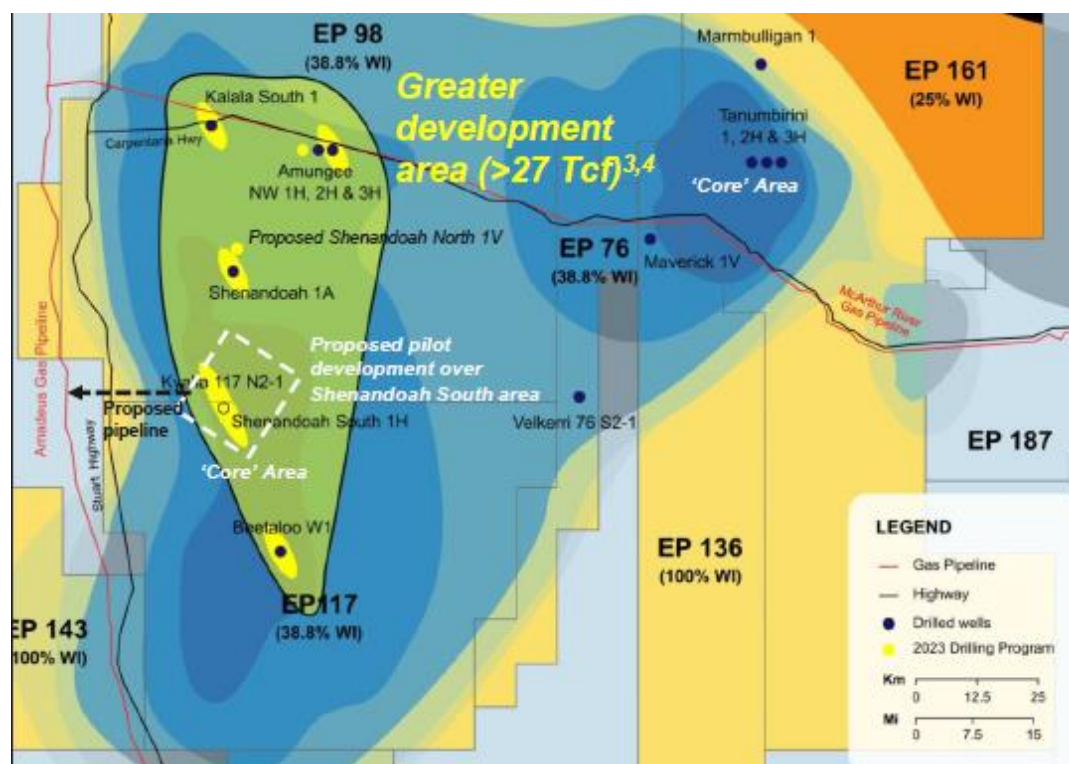
¹⁵³ Tamboran Resources. [Second quarter activities report for period ended 31 December 2023](#), January 2024, Page 2.

potential future pipelines to Australia’s east coast and Middle Arm NTLNG project at Darwin.¹⁵⁴ The partnership with APA was elevated to binding agreements in December 2023 (although these are subject to Tamboran achieving project milestones and executing further agreements). Tamboran is targeting a start-up date for its pilot project in the second half of 2025.

While Tamboran may not be required to fund the upfront capital investment for the pipelines, it may be required to enter into long-term capacity agreements to underpin APA Group’s investment. Tamboran may also be required to meet credit support requirements (as is standard practice for APA Group’s pipeline transportation agreements).¹⁵⁵

The capital costs faced by Tamboran will be even larger if it reaches FID on the proposed greenfield NTLNG project, with capital costs potentially to exceed AUD\$10 billion. These expansion plans, if realised, will be costly and subject to demand risk, as noted earlier in this report.

Figure 7: Tamboran’s proposed Shenandoah South pipeline



Source: Tamboran Resources

¹⁵⁴ APA Group. [APA signs initial agreement to commence work to connect Tamboran’s Beetaloo basin assets](#). 23 June 2023.

¹⁵⁵ APA Group. [Credit support requirements](#). Page 1. Accessed 1 February 2024.

Tamboran doubles down on Beetaloo permits

Tamboran has had interests in the Beetaloo since 2011. However, its focus on the basin over the past 13 years has yielded very little exploration success.

In 2022, it purchased Origin Energy's Beetaloo permits and, as part of the transaction, committed to funding the remaining Origin stage three farm-in commitments, including drilling two horizontal wells at an estimated cost of A\$80 million.¹⁵⁶

Following the purchase, Tamboran shifted its focus to the newly acquired permits, with its proposed Shenandoah South Pilot Project centred on the development of gas from two of these permits.

This has coincided with Tamboran seeking to reduce spending on another permit (EP 136) over the coming years (despite revising up the value of that permit) – the value of the permit has more than tripled in the two years to 30 June 2023. Table 2 shows the revaluation of Tamboran's permits in the past two years.

Table 2: Tamboran's exploration permit valuations

	<i>Exploration and evaluation</i> EP 161 \$	<i>Exploration and evaluation</i> EP 136 \$	<i>Exploration and evaluation</i> EP 76, EP 98 and EP 117 \$	<i>Total</i> \$
Balance at 1 July 2021	21,777,765	24,823,456	-	46,601,221
Additions	16,766,461	24,174,450	-	40,940,911
Government grant	-	(2,592,175)	-	(2,592,175)
Balance at 30 June 2022	38,544,226	46,405,731	-	84,949,957
Additions through asset acquisition	-	-	49,640,626	49,640,626
Additions	2,718,645	35,624,758	67,000,223	105,343,626
Restoration assets	1,774,713	5,661,163	5,580,145	13,016,021
Royalty payments	(1,891,757)	(2,562,499)	(18,652,479)	(23,106,735)
Government grant	-	(3,829,911)	-	(3,829,911)
Balance at 30 June 2023	<u>41,145,827</u>	<u>81,299,242</u>	<u>103,568,515</u>	<u>226,013,584</u>

Source Tamboran Resources Annual Report 2023

A material carbon offset liability

Environmental management plans submitted by Tamboran to the NT government indicate that the emissions associated with the drilling and appraisal gas production would exceed

¹⁵⁶ Tamboran Resources. [Tamboran announces acquisition of Origin Energy's Beetaloo assets, funded through a placement and strategic partnerships to raise up to ~\\$195 million](#). 20 September 2022.

the 100,000 tonnes a year (tpa) of CO₂ threshold under the Australian government's Safeguard Mechanism in FY2024-25.¹⁵⁷ This means Tamboran will be likely face a material carbon offset liability if it is required to cover all of its emissions.

Tamboran says it will meet its Safeguard Mechanism obligations through its carbon offset portfolio,¹⁵⁸ and noted it "has been progressively buying carbon offsets since 2021. As of December 2023, Tamboran has over 51,000 carbon offsets in its portfolio and has contracted 60,000 more carbon offsets to be delivered from 2024 to 2025. All of the carbon offsets in our portfolio meet the requirements of the Safeguard Mechanism ... Over the next 12 months, Tamboran plans to grow its carbon offset portfolio and is keen to invest in local offset projects in the Northern Territory and the broader Australian market."¹⁵⁹

While Tamboran has not provided detail on the specific carbon offset it has purchased, we note that, for example, if Tamboran were to buy Australian carbon credit units (ACCUs), issued by the Australian government under its emissions reduction fund (ERF), it would face costs of about A\$2.1 million for the 60,000 carbon offsets it plans to buy over 2024 and 2025 (based on the quoted price of A\$35/tonne CO₂e).¹⁶⁰

Tamboran shares underperform amid multiple raisings

Tamboran's shares never got the start its backers would have hoped, closing at a 12.5% discount to the issue price of \$0.40 on debut on 1 July 2021.¹⁶¹ The shares momentarily touched the issue price in November 2021, but investors in the company's initial public offering (IPO) don't look like recouping their investment. Since Tamboran listed on 1 July 2021, its share price has more than halved (Figure 8), largely due to multiple share issues to raise funds to keep the company operating diluting their value (Figure 9).

There were several more capital raisings from FY2018-23 (Figure 9), some of which involved shares issued to key investors at discounts to the IPO price.¹⁶²

¹⁵⁷ Tamboran Resources. [Beetaloo Basin Shenandoah South E&A Program. Environment Management Plan \(TAM1-1\) EP 117 and EP 98](#). February 2024. Page 119.

¹⁵⁸ Tamboran Resources. [TCFD Climate Change and Net Zero Report](#). Page 22.

¹⁵⁹ Ibid.

¹⁶⁰ Core Markets. [Carbon and renewable energy market prices](#). Accessed 5 February 2024.

¹⁶¹ AFR. [Tamboran dives in ASX debut](#). 2 July 2023.

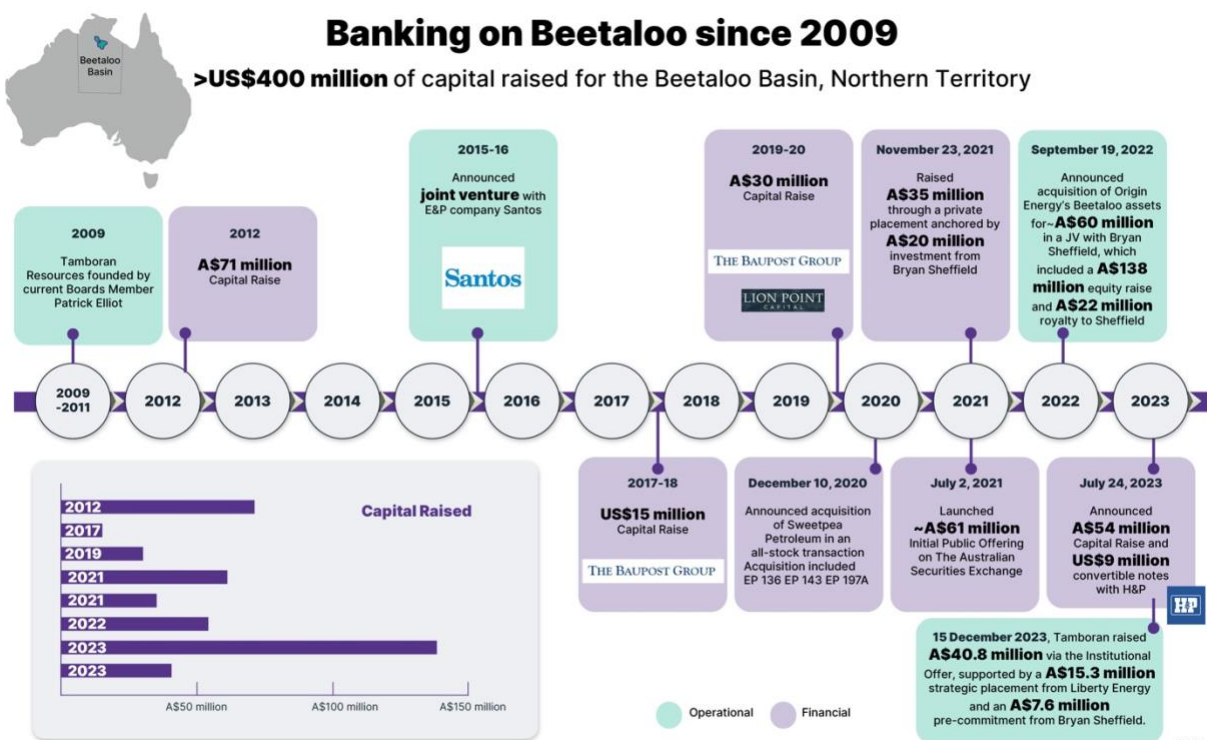
¹⁶² Tamboran Resources. [September Quarterly Cashflow Report. September 2023](#).

Figure 8: Tamboran’s share price performance 2021-2023



Source: Commonwealth Securities

Figure 9: Tamboran’s capital raisings



Source: Tamboran Resources

Tamboran's US move a capital idea

In October 2023, Tamboran announced its intention to shift to the US state of Delaware, a well-trodden path due to that state's favourable taxation regime and corporate rules of anonymity. Tamboran noted that the rationale for its proposed move to the US was to "access to a broader US investor pool, which is more familiar with shale development".¹⁶³

Tamboran's existing investors and directors have a history of involvement in the US onshore shale sector. Chairman Richard Stoneburner was the former president and chief operating officer of US shale gas and oil producer Petrohawk Energy Corporation, which was bought by BHP in 2011.¹⁶⁴

The US could be Tamboran's salvation or its demise, as it follows other Australian energy companies moving there to seek a more favourable investment community. Australian fossil gas company LNG Limited moved to the US in 2017 after it withdrew plans to build the 3.5mtpa Fisherman's Landing LNG project at the port of Gladstone in Queensland to focus on developing the US\$4.35 billion Magnolia LNG project near Lake Charles in Louisiana.¹⁶⁵ LNG Limited sold Magnolia for US\$2.25 million in 2020 after the company went into administration.¹⁶⁶

US move raises questions about transparency requirements

Tamboran's time on the Australian Securities Exchange (ASX) may have been brief, but long enough for it to collect a federal government grant and be allocated free land at Darwin port. However, despite the company receiving taxpayer support, management also failed to appear at a Senate inquiry. The inquiry subsequently moved to refer the company to a parliamentary watchdog to investigate whether it was in contempt of the Senate.¹⁶⁷

The Delaware move may also have implications for the level of transparency available to Tamboran investors. If the move were to lower transparency requirements, it would do so at a time when investors are likely to want more transparency rather than less.¹⁶⁸

Companies listed on the ASX are subject to stringent transparency requirements. As noted by law firm Baker McKenzie, "Public listed companies are required to immediately disclose to ASX information concerning the company that a reasonable person would expect to have a material effect on the price or value of the company's securities as soon as the company is or becomes aware of the information."¹⁶⁹

¹⁶³ Tamboran Resources. [Tamboran announces intention to re-domicile to the United States](#). 12 October 2023.

¹⁶⁴ BHP Billiton. [BHP Billiton and Petrohawk Energy Corporation announce merger agreement](#). 15 July 2011.

¹⁶⁵ Argus Media. [Australia's LNG Limited delays US listing plan](#). 12 October 2017.

¹⁶⁶ Offshore Energy. [LNG Limited completes Magnolia sale](#). 4 June 2020.

¹⁶⁷ The Australian Senate. [Environment and Communications Reference Committee. Oil and gas exploration and production in the Beetaloo Basin. April 2023](#). Page 9 to 13.17 October 2023.

¹⁶⁸ Forbes Advisor. [Why incorporate in Delaware? Benefits and considerations](#). 3 June 2023.

¹⁶⁹ Baker McKenzie. [Listed companies guide, 2023](#). Page 14.

It is not clear whether the move to Delaware would impose similar disclosure obligations on Tamboran. While we have not undertaken a detailed comparison of reporting requirements in Delaware (and the US more broadly) with those required in Australia, in IEEFA's view it is vital that communities and shareholders continue to have access to transparent and accurate information about Tamboran and its activities.

Conclusion

The federal and NT governments have provided or committed financial support to encourage gas extraction in the Beetaloo Basin, including proposed financial support for the development of the Middle Arm Precinct in Darwin.

Despite the federal government promoting the sustainable business aspects of the Middle Arm development, the NT government has been more direct about the central role of gas underpinning the precinct development. "Successful gas industry development in the Northern Territory will unlock private sector investment and cascade benefits throughout Northern Australia and the Territory's economy."¹⁷⁰

However, after more than a decade of exploration, the Beetaloo's prospects remain unclear, with no commercial gas development to date. While 2023 drilling results from Santos indicate the possibility of commercial quantities of gas, the results were described in a media report as disappointing.¹⁷¹

The federal and NT governments should consider the history of Beetaloo exploration and the ability of the remaining companies to develop commercial gas when deciding whether to direct public funds to the Middle Arm Precinct. They should also recognise that market conditions can change, and future demand expectations may evaporate.

The Middle Arm Precinct plan, and the proposed development of the Beetaloo, is inconsistent with Australia's climate commitments. This plan involves development of a new natural gas basin, which contradicts international plans to lower the world's GHG emissions. As previously noted by IEEFA, "it also contradicts the many local and national climate solutions in which Australia – its people and businesses – is now engaged."¹⁷²

Tamboran states in its initial Climate Change and Net Zero Report, "we ... believe the flexibility of natural gas is likely to become even more critical as additional renewable energy is used in the

¹⁷⁰ Australian government. Infrastructure Australia. [Assessment Framework](#). Page 2.

¹⁷¹ The Australian [Underwhelming Beetaloo drilling results but Tamboran pushes on](#). 23 June 2023.

¹⁷² IEEFA. [Middle Arm Gas and Petrochemicals Hub: Combination of Problems Makes It Unprofitable for Business and a Red Flag to the Public](#). June 2023. Page 4.

electrical grid and as companies implement their own decarbonisation strategies by using natural gas instead of coal.”¹⁷³

This is the conventional view of the gas industry on climate change, and is in contrast to the climate science, which according to the IEA means no new long-lead time upstream oil and gas projects are needed in the Net Zero Emissions (NZE) scenario.¹⁷⁴ This scenario is aligned with the Paris Agreement’s central aim to keep global temperature rises this century well below 2°C above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C. In practice, this means that achievement of the Paris Agreement’s central aim could result in any further investment in oil and gas failing to achieve sufficient returns (given this investment will not be needed).

GHG emissions is one of the most contentious issues in the 135 recommendations from the Pepper Inquiry. The NT government has implemented a plan whereby all interest holders applying for onshore gas production approvals are required to prepare a greenhouse gas abatement plan demonstrating how they will contribute towards delivery of the territory’s net zero emissions by 2050 target. At a minimum, the plan must demonstrate that collectively the interest holders’ NT onshore gas production operations will be net zero by 2050.¹⁷⁵

The NT and Australian governments have pledged to work together to seek to ensure that Australia’s GHG emissions don’t increase as a result of onshore shale gas production in the territory and to achieve Australia’s emissions target of net zero by 2050.

However, the abatement plan largely centres on carbon offsets, but there are issues with relying on carbon credits to reduce the emissions associated with new fossil fuel developments. Beyond integrity and permanency concerns of carbon offsets, recent analysis by IEEFA “... shows that using the land sector to offset fossil fuel emissions is risky.”¹⁷⁶ Further analysis by Climate Analytics suggests that “fossil fuel emissions have a very long lifetime in the atmosphere. Each tonne of carbon released into the atmosphere is long-lived, with around 40% remaining after 100 years, 20-25% remaining after 1,000 years, and up to 20% after 10,000 years. Land-based offsets do not and cannot guarantee such long-term sequestration.”¹⁷⁷

“There is a fundamental difference between directly reducing a source of CO₂ emissions by one tonne, and offsetting that same tonne of CO₂ emissions through sequestration in trees or soil. The direct reduction of emissions does so permanently, whereas the CO₂ that is captured and stored in trees or newly sequestered soil carbon will at some point be released back into the atmosphere.”¹⁷⁸

¹⁷³ Tamboran Resources. [TCFD \(The Task Force on Climate-related Financial Documents\) Climate Change and Net Zero Report December 2023](#). Page 4.

¹⁷⁴ IEA. [Net zero roadmap. A global pathway to keep the 1.5 °C goal in reach](#). Page 16.

¹⁷⁵ Northern Territory government. [Onshore Gas In the Northern Territory. Action items 9.8](#).

¹⁷⁶ IEEFA. Submission to the Climate Change Authority. [Setting, tracking and achieving Australia’s emissions reduction targets](#). 13 July 2023. Page 9.

¹⁷⁷ Climate Analytics. [Why offsets are not a viable alternative to cutting emissions](#). February 2023. Page 3.

¹⁷⁸ Ibid. Page 14.

This is particularly concerning given that “... forest and soil carbon impermanence will be exacerbated by climate change”.¹⁷⁹

Further, almost “... 200 countries agreed at the COP28 climate summit to begin reducing global consumption of fossil fuels to avert the worst effects of climate change”.¹⁸⁰

The development of Beetaloo gas is not compatible with Australia’s GHG emissions reduction plans, and creates the risk of environmental impacts stemming from the use of fracking in an important region of the NT.

The premise for gas development in the Beetaloo is based on assumptions about strong future domestic and international gas demand. However, there is downside demand risk in both Australia and key established and emerging export markets. At the same time, the world faces a glut of fossil gas due to a massive ramp-up in supply from lower-cost LNG exporters with access to vast reserves of cheap fossil gas.

In Australia, AEMO’s draft Integrated Systems Plan (ISP), which is a blueprint for eastern Australia’s power system, showed that gas use for power generation will be more for firming a greater volume of renewables as more coal fired plants exit Australia’s power networks. Gas power plants may only operate just 5% of their annual potential. Hence, “gas is a strategic reserve for power system reliability and security, and it is not forecast to run frequently”.¹⁸¹

Given the inherent risks associated with hydrocarbon development, and the potential for lower than anticipated demand to lead to low financial returns, the public finances allocated to Beetaloo and Middle Arm would likely achieve a higher public return if directed to more sustainable energy projects and initiatives, which are bountiful in Australia.

¹⁷⁹ Climate Analytics. [Why offsets are not a viable alternative to cutting emissions](#). February 2023. Page 15.

¹⁸⁰ Reuters. [Nations strike deal at COP28 to transition away from fossil fuels](#). 14 December 2023.

¹⁸¹ AEMO. [Draft 2024 Integrated System Plan \(ISP\) Consultation](#). 15 December 2023. Pages 45 and 65.

Appendix A: Treatment of Beetaloo emissions

In May 2023, the Labor-led NT government said it would allow onshore fracking in the territory as all of the 135 recommendations of the Pepper Inquiry had been met.¹⁸²

The Australian and NT governments aim to use the federal Safeguard Mechanism as the primary tool to meet recommendation 9.8 of the inquiry (that all emissions are fully offset). Unfortunately, this approach will fall short of meeting the full scope of the recommendation, for a range of reasons.

The Safeguard Mechanism does not generally require net zero emissions from facilities, but instead requires facilities to stay beneath an emissions cap (their baseline).¹⁸³ By default, new facilities, such as those that will be created in the Beetaloo Basin, are bound to a baseline that is set in accordance with international best practice,¹⁸⁴ not net zero.

An exception in the rules has been introduced to compel shale gas extraction activity to be net zero from day one.¹⁸⁵ However, this only applies to facilities that solely extract shale gas or extract and process gas in integrated facilities.¹⁸⁶ This creates an incentive for operators to disaggregate their operations to limit the net zero baseline to the extraction operation while receiving a higher, best practice baseline for their processing emissions. There are anti-avoidance provisions in the National Greenhouse and Energy Reporting (NGER) Act,¹⁸⁷ but limits on the regulator's power mean this may not be effective in each circumstance. Processing produces the largest share of GHG emissions.¹⁸⁸

Another gap in the coverage of Scope 1 emissions (those produced directly by a facility) relates to the designated large facility threshold, below which the Safeguard Mechanism does not apply. This threshold is 100,000 tonnes of CO₂e of GHG a year.¹⁸⁹ Companies in the Beetaloo Basin are lodging their territory environmental approvals at a relatively small scale, likely reflecting small-scale development, but it may also indicate that each operational unit (for the purposes of the mechanism) will be small. If they are, such disaggregated operational units would not meet the designated large facility threshold even though the combined development of the Beetaloo Basin would exceed it many times over. If the companies seek to develop small, disaggregated operational units, and can make a convincing case that the disaggregation is not solely for the purpose of avoiding the

¹⁸² ABC. [NT government announces fracking in the Beetaloo basin can go ahead](#). 3 May 2023.

¹⁸³ Australian government. . 15 December 2023.

¹⁸⁴ Australian government. [National Greenhouse and Energy Reporting \(Safeguard Mechanism\) Rule 2015. Division 3 – New facilities](#). 29. 7 October 2023.

¹⁸⁵ *Ibid.* 10(2).

¹⁸⁶ *Ibid.* 54(1).

¹⁸⁷ Australian government. [National Greenhouse and Energy Reporting \(NGER\) Act 2007. Division 7. Subdivision B.54](#). 15 December 2023.

¹⁸⁸ Australian government. [National Greenhouse and Energy Reporting \(Safeguard Mechanism\) Rule 2015](#). Page 81 and Page 83. Compares default emissions intensities for gas extraction and processing in Safeguard Mechanism Rule, Schedule 1, Div 2.26(5) and Div.5.29(3) ie: 376 grams vs 1.59kg of CO₂e per GJ of gas produced.

¹⁸⁹ Australian government. [National Greenhouse and Energy Reporting \(Safeguard Mechanism\) Rule 2015. Part 2.8](#). 7 October 2023.

Safeguard Mechanism, then the regulator's power to force merger for the purposes of that scheme would not apply.¹⁹⁰

The Pepper Inquiry recommendation went further than just emissions from gas extraction and processing. The Safeguard Mechanism is even more incomplete in its coverage of downstream emissions that would occur in Australia from the consumption of Beetaloo gas. Only some emissions would be covered by the Safeguard Mechanism, and none would have to be fully offset under the scheme.

If the gas is burnt or otherwise consumed downstream in large facilities covered by the Safeguard Mechanism, including gas consumed by LNG export terminals to process gas for export, these emissions would only be required to be reduced to the facility's baseline level. Notably, because the Safeguard Mechanism is now an emissions intensity scheme,¹⁹¹ increases in production brought about because of the Beetaloo development would not necessarily require additional offsetting. While baselines decline over time under the revised scheme,¹⁹² the coverage does not meet the requirements of recommendation 9.8 for no net increase in emissions.

If the gas is consumed in places that do not meet the designated large facility threshold, these emissions are not covered. This includes myriad businesses and residences that might be provided with the gas domestically, with the impact likely to be larger if the Tamboran/APA plan to duplicate the territory's link to the east coast gas market is realised.

If the gas is burnt in an Australian power station, emissions increases arising from the Beetaloo development will not be covered. This is because emissions from grid-connected electricity generators are excluded from facility baselines.¹⁹³ The baseline for the grid-supplying electricity sector is set at a historical level of historical emissions, which effectively sets no limit on increases in emissions, with the sectoral baseline being 198mtpa of CO₂e GHG.¹⁹⁴ In FY2023, Australia's total emissions from providing electricity to grids were just 152 million tonnes.¹⁹⁵ There is no realistic prospect of that baseline being exceeded.

Scope 2 emissions (from electricity provided by third parties to extraction and processing facilities) are unlikely to be significant given that most electricity generation is likely to occur onsite. However, this sector is also not covered by the Safeguard Mechanism, which means it cannot be relied on to meet recommendation 9.8.

¹⁹⁰ Australian government. [NGER Act 2007. Part 6. Division 2.54B\(1\)\(d\)](#). 15 December 2023.

¹⁹¹ Australian government. [National Greenhouse and Energy Reporting \(Safeguard Mechanism\) Rule 2015. Division 2. A.11](#). 7 October 2023.

¹⁹² Ibid. Part 3. Div 5.

¹⁹³ Ibid. Part 2.7(1)(c).

¹⁹⁴ Ibid. Part 1.4. sectoral-baseline financial year.

¹⁹⁵ Australian government. Department of Climate Change, Energy, Environment and Water. [Australia's emissions projections 2023](#). November 2023. Page 35.

The Safeguard Mechanism is not capable of delivering on recommendation 9.8 due to significant gaps in coverage, the potential for avoidance, and a lack of binding net zero baselines in many circumstances where coverage cannot be avoided.

Another Pepper Inquiry recommendation was met in December 2023 when the federal government amended its main environmental planning legislation for resource projects, the Environment Protection and Biodiversity Conservation (EPBC) Act 1999, to apply the “water trigger” to onshore shale gas development.¹⁹⁶ This ensures that fracking projects are assessed by the Commonwealth for their impact on water supplies.¹⁹⁷

¹⁹⁶ ABC. [Gas projects to require Commonwealth approval after Labor-Greens deal expands water trigger](#). 6 December 2023.

¹⁹⁷ Ibid.

Timeline: McArthur Basin/Beetaloo Sub-basin



About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Authors

Kevin Morrison

Kevin Morrison is an energy finance analyst, Australia LNG/Gas. Kevin works closely with the global oil and gas team to examine issues facing the Australian LNG and gas sector. Prior to joining IEEFA, Kevin worked for more than 30 years as a financial journalist for Reuters, The Sydney Morning Herald, the Financial Times (FT) and Argus Media. More than 20 years of this working period was covering the energy and resources sector both in Australia and the UK. kmorrison@ieefa.org

Joshua Runciman

Josh Runciman is IEEFA's lead analyst for Australian Gas. His work focuses on key issues in Australia's gas and LNG sector, including gas market policy. Prior to joining IEEFA, Josh was a Director on the Australian Competition and Consumer Commission's Gas Inquiry 2017-2030, where he worked on a range of issues, including supply adequacy, gas commodity and pipeline pricing, LNG netback pricing and retailer behaviour. jrunciman@ieefa.org

This report is for information and educational purposes only. The Institute for Energy Economics and Financial Analysis ("IEEFA") does not provide tax, legal, investment, financial product or accounting advice. This report is not intended to provide, and should not be relied on for, tax, legal, investment, financial product or accounting advice. Nothing in this report is intended as investment or financial product advice, as an offer or solicitation of an offer to buy or sell, or as a recommendation, opinion, endorsement, or sponsorship of any financial product, class of financial products, security, company, or fund. IEEFA is not responsible for any investment or other decision made by you. You are responsible for your own investment research and investment decisions. This report is not meant as a general guide to investing, nor as a source of any specific or general recommendation or opinion in relation to any financial products. Unless attributed to others, any opinions expressed are our current opinions only. Certain information presented may have been provided by third parties. IEEFA believes that such third-party information is reliable, and has checked public records to verify it where possible, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice.

