

EMPIRE ENERGY GROUP (EEG)

RESEARCH INITIATION (FOR PROFESSIONAL INVESTORS ONLY)

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We say

Price

Strategic Target

SPECULATIVE BUY **0.43** **0.85**

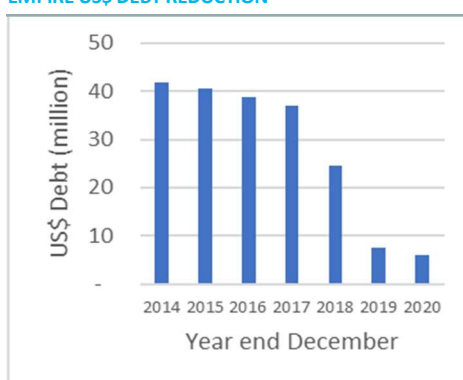
Empire has regained focus on the extensive exploration portfolio in the prospective Beetaloo and McArthur Basins in Northern Territory. Increased activity by Empire and nearby operators (Santos and Origin) will ensure a strong news flow and success will provide upside to this exploration portfolio. Success in Empire's Beetaloo acreage alone could be valued as high as \$430 million.

EMPIRE SHARE PRICE CHART



Source: IRESS

EMPIRE US\$ DEBT REDUCTION



Source: Company Data

COMPANY DATA & RATIOS

Enterprise value	\$157 million
Market cap	\$138 million
Issued capital	321 million (FD)
Free float	85%
12-month price range	\$0.11 – \$0.55
GICS sector	Energy
IMPLIED RETURN	
Implied all in return	98%

STRONG NEWS FLOW EXPECTED

Origin and Santos are undertaking drilling and testing in adjacent permits. These operators are targeting multi-Tcf gas opportunities.

Empire is planning to drill at least one exploration well in mid-2020, following the recent completion of the seismic program.

BALANCE SHEET REPAIRED FOLLOWING US SALE

Empire sold their mid-continent US oil operations in a deal which yielded cash of US\$19.25million. Proceeds were applied to debt reduction which has enabled the focus on the large Northern Australian gas and wet gas opportunities. Appalachian gas assets remain, providing modest positive cash flows.

LARGE ACREAGE HOLDING BRINGS UPSIDE TO SUCCESS

Empire holds 8.3 million acres of prospective permits in the Northern Territory. The region remains underexplored due to the distance to market and government moratoriums. Activity is accelerating now. Empire is the sole small capitalisation Australian entry to the Beetaloo exploration activity.

STRONG LEVERAGE TO REGIONAL SUCCESS

Empire Energy Group holds 100% of a strategic acreage portfolio in the McArthur Basin and the Beetaloo Sub-basin.

Empire is highly levered to exploration success in the Beetaloo Sub-Basin in the Northern Territory.

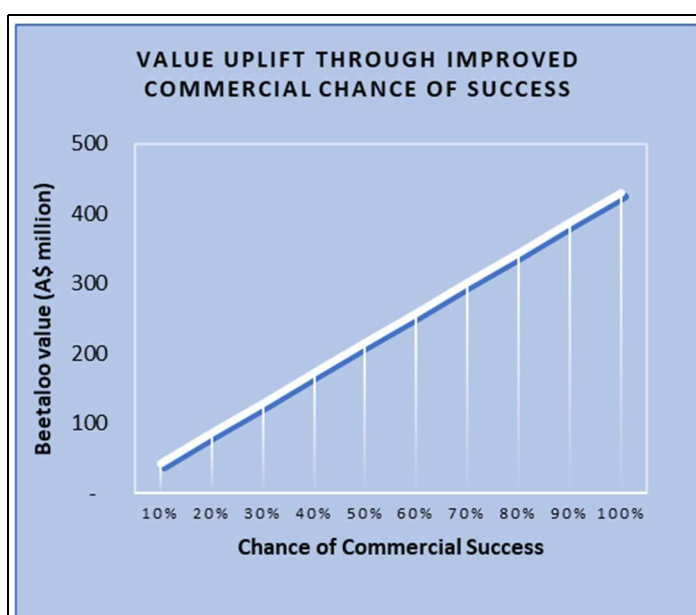
Drilling and testing success by Santos and Origin in the near term will have a material impact on the regional chance of commercial success, with historical results suggesting positive outcomes in the Beetaloo.

In parallel, Empire's exploration plans are progressing with seismic acquisition completed and planning under way for drilling in mid-2020.

Growing pipeline and infrastructure in region will assist with commercial outcomes.

Recent capital raising provides funding for 2020 drilling campaign.

Chance of commercial success	EEG Core value
10%	35 cents
20%	50 cents
50%	85 cents



Key Value Drivers

- Origin drilling and testing programs
- Santos testing underway
- Interpretation of Empire seismic prior to drilling in 2020
- Santos need for added gas following Darwin LNG purchase
- Further developments in pipeline infrastructure through reserve growth

OVERVIEW AND STRATEGY

Empire Energy Group Limited (ASX: EEG) is an Australian listed oil and gas company with active exploration operations in the Northern Territory (NT) and gas production operations in the Appalachian region of the United States.

Following the recent sale of the US production operations in Kansas and the subsequent repayment of most of the debt, EEG has a clear focus on the exploration of the exciting shale opportunities in the Northern Territory.

EEG has held a large acreage position in the undeveloped NT shale plays since 2011. The early mover advantage allowed the business to accumulate this large prospective holding at modest cost. EEG retains 100% of its existing permits, providing substantial flexibility for future options regarding exploration timing and development funding.

Exploration activity in the region has paused over the past 3 years due to the NT government moratorium on unconventional exploration activities. The resolution of this moratorium in early 2019 has resulted in a rapid acceleration in operational activity.

This drilling and testing activity may result in a substantial de-risking of the projects in the McArthur Basin. EEG's Southern permit area, adjacent to the Origin and Santos blocks, will be a major beneficiary of any success with minimal capital exposure.

Accelerated activity in the region is dominated by Origin and Santos. Drilling and testing activity are underway, in advance of the upcoming wet season across Northern Australia with further work programs planned for 2020.

Funding is now in place for drilling in 2020, with multiple options for next phase of activities.

Empire has assembled a strong board and management team with substantial business acumen and a strong technical understanding of the resource sector.

MACRO FACTORS

The natural gas market in Australia has matured and deepened substantially over the past decade. LNG developments at Gladstone (6 trains) and in Darwin (2 added trains) have substantially increased demand for natural gas. The recent development of the Northern Gas Pipeline, linking the Northern Territory to the Queensland, has permitted access to new growth markets for gas discoveries in the Northern Territory.

Mature declines in gas production from assets in South Australia and Victoria, specifically Cooper and Gippsland Basins, has resulted in gas price increases. Forward pricing expectations have remained at premium price points as higher cost replacement production capacity has been developed. The trend for higher-cost production remains in place today.

Added government uncertainty over carbon emissions and restrictions on exploration activity (drilling moratoriums in Victoria and New South Wales??) plus multiple reviews on unconventional gas activity) have not assisted with gas pricing certainty.

Natural gas and its place in electricity generation has also been uncertain, as the role as a transition fuel has been largely ignored in pursuit of a carbon-free world.

Oil prices remain at moderate levels, with the potential for supply shocks likely to cause upside volatility as recently demonstrated by recent issues in Saudi Arabia.

Australia's liquid fuel supply relies increasingly on overseas sources, with low levels of reserve storage being held at present (less than 30 days). Increased domestic liquid supplies could assist in adding to the domestic storage potential and lift storage capacity towards the IEA recommendation of 90 days capacity.

In 2013, the Federal Government initiated a policy to assist with development projects in Northern Australia by provided access to development debt funding from the Northern Australia Infrastructure Facility (NAIF).

Development of the McArthur Basin and Beetaloo Sub-basin gas and liquids projects would clearly benefit from the funding assistance from this fund.

Further recent commentary from the Federal Government indicates a focus on development of coal, and oil and gas in the Northern Australia, including the developments of gas offshore in Western Australia and natural gas in the Beetaloo Basin. The government rhetoric is a clear positive for development of these areas in the event of success.

ASSETS

AUSTRALIA

Empire holds a large acreage position in the prospective McArthur Basin in the Northern Territory of Australia. The area held under exploration permits and applications is in excess of 8.3 million acres (33,590 square km). These assets are held 100% by Empire, allowing for maximum future flexibility. (see fig 1).

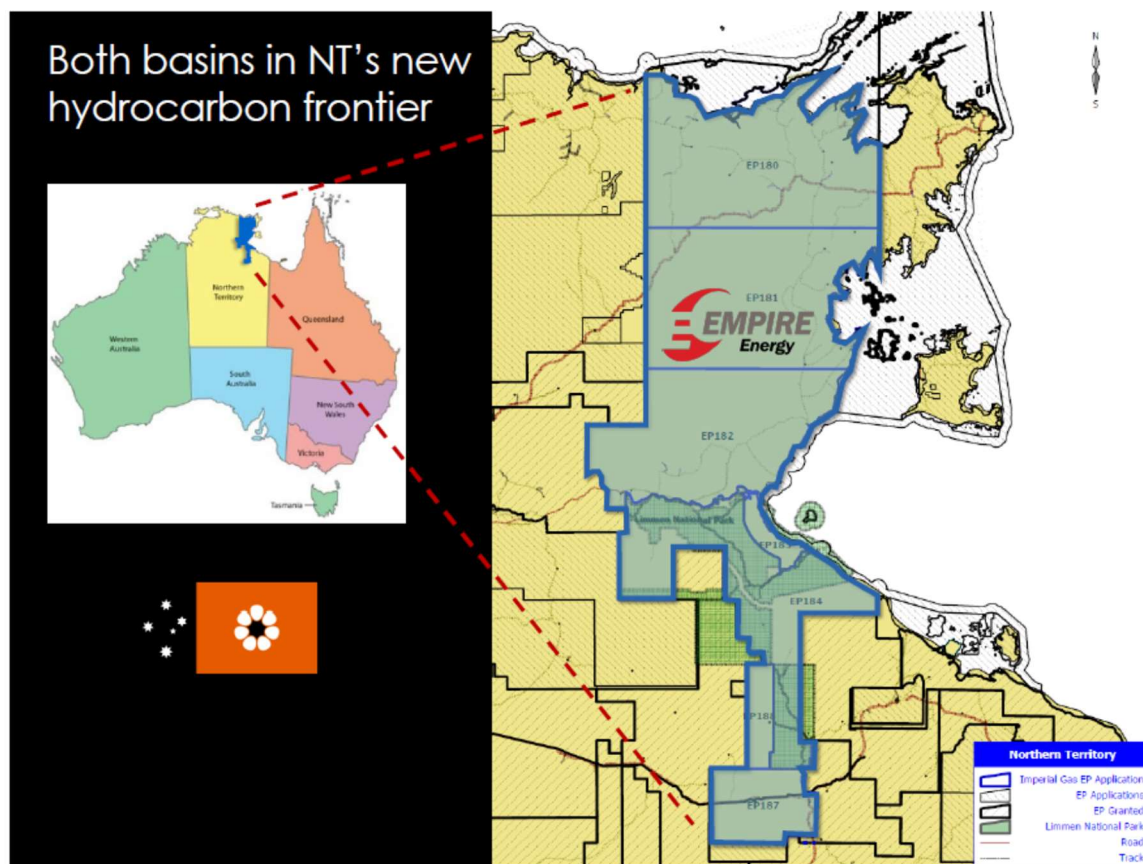


Figure 1; Northern Territory acreage map. (source Company data)

Both Santos and Origin have announced accelerated exploration plans for the current dry season. This work is centred around the southern section of the McArthur Basin, which is also commonly known as the Beetaloo Sub-basin. The immediate work programs by these two major operators are discussed in a later section of this report. Other operators in the region include Armour Energy, The Hancock Group and Pangaea Resources Pty Ltd.

Empire holds prospective interests in both the McArthur Basin and the associated Beetaloo Sub-basin. Both areas are prospective for unconventional oil and gas targets, although the Beetaloo exhibits more exploration history and therefore higher perceived prospectivity at this

early stage of exploration. These areas may also contain hydrocarbons in conventional sandstone and carbonate reservoirs, which were noted in some early drilling campaigns.

Oil and gas exploration activity was focussed on the region following the identification of visible oil and gas shows in shallow minerals core-holes in the 1980s. This discovery was followed by some limited oil exploration in the Beetaloo Sub-basin, where it was recognised that the old rock sequences have generated oil and gas which may be trapped and potentially exploited.

More recently, and with the tailwinds created from the US shale gas boom, a further large-scale exploration focus has been undertaken, with emphasis on the Beetaloo Sub-basin and the Velkerri and Kyalla shale packages. These Proterozoic rocks (circa 1.4 to 1.6 billion years old) have benefited from little or no structural upheaval over geological time. This will assist in a development setting, as predictable geology and a benign stress regime will allow for horizontal drilling which will minimise surface disturbance and development costs.

Empire has reported large contingent resources in its Northern Territory acreage holdings. These are summarised below in Table 1.

Empire has initiated exploration activities in the Beetaloo Sub-basin, with the acquisition of a 231-kilometre 2D seismic survey. This survey is targeting the liquid-rich hydrocarbon-bearing Velkerri and Kyalla shale sequences on the eastern edge of the prospective play.

CONTINGENT RESOURCES

PROJECT	PERMITS	AREA	CONTINGENT RESOURCE (P50)	
			Gas (PJ)	Oil (mm Bbl)
Velkerri/Kyalla Shale	EP 187	628,000 acres (>2,500 sq. km)	1,193	24.0
Barney Creek Shale	EP's 180, 181, 182, 184 and 188	6,200,000 acres (>25,000 sq. km)	8,700	174.0

Table 1; Source: Empire Energy Presentation dated October 2019.

UNITED STATES

Empire held oil and gas production and development assets in two areas in the United States; the eastern or Appalachian gas assets and the Kansas oil assets. (figure 2) The recent sale of the Kansas assets has reduced the footprint and scale of the US business. The Appalachian assets retain exposure to a suite of stable long-term gas conventional producing assets in Pennsylvania, with some leases in the Marcellus and Utica shale region which underlies the existing gas production in New York State.

The sale of the Kansas assets was completed recently, resulting in a cash inflow of approximately USD19.25 million. The cash proceeds were largely used for debt reduction.

EEG is planning to participate in the ongoing upside offered by the Appalachian assets. This upside may be derived from an improvement in the US gas market as economic activity improves or alternate uses of the large contiguous lease position in the region. The assets are secured against a small (US\$7.5m) 5-year debt facility, which was recently refinanced. The details of the US debt facility are summarised in Appendix 2.

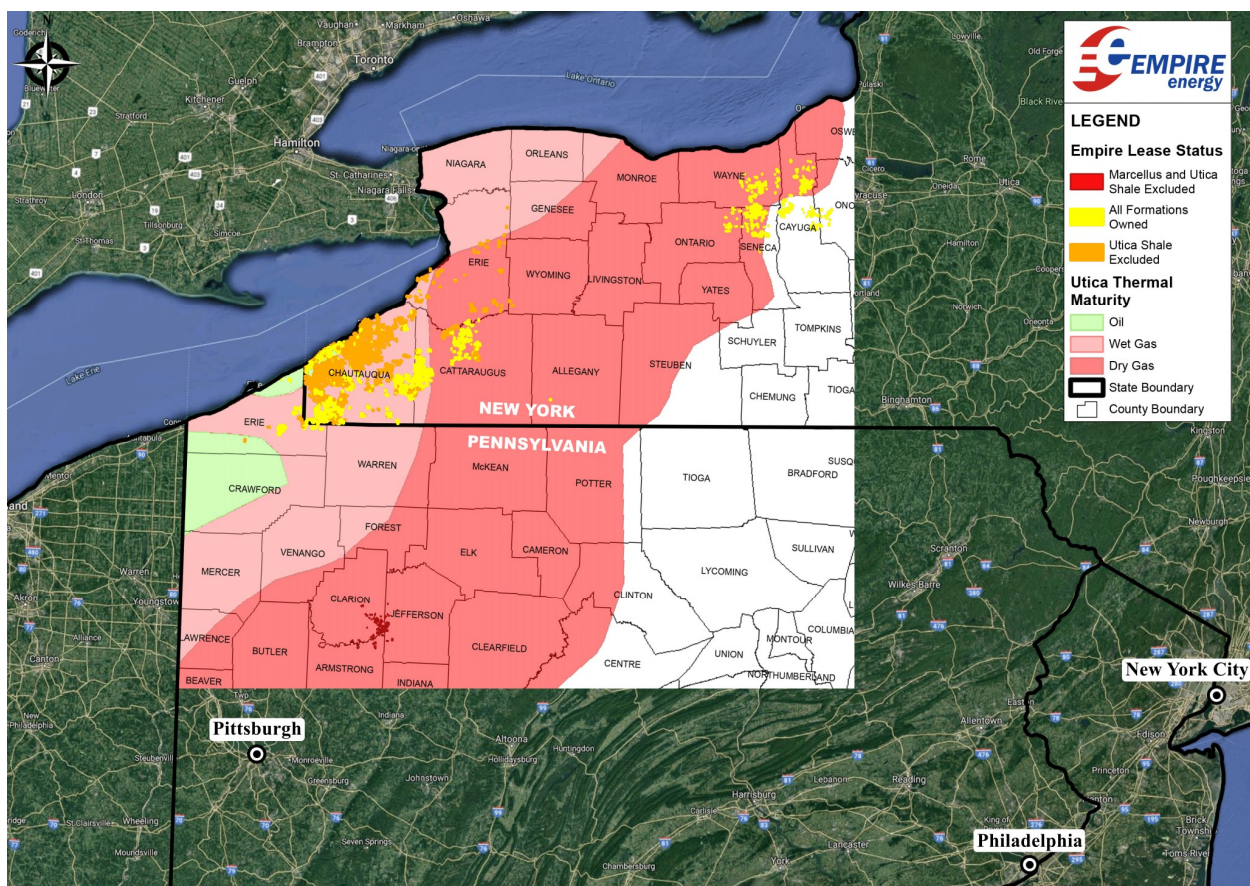


Figure 2; Map of current US operations (Source Company data)

Table 2 below highlights the recent production attributable to the Appalachian assets and the current attributable reserve base.

	FY2017	FY2018	1H2019	FY2019 (E)	YEAR END RESERVES 2018
APPALACHIAN ASSETS					
Gas (mmcfg)	1,843	1,819	863	1,800	50,000(e)
Oil (m BBls)	3	3	1	3	70 (e)
Revenue (USD m)	6	6	2.7	6	

Table 2; US production and reserves (Source Company Data and Blue Ocean estimates)

MCARTHUR BASIN GEOLOGICAL OVERVIEW

The McArthur Basin is an extensive Proterozoic Basin, located in Australia's Northern Territory and western Queensland. The basin extends over 180,000 square kilometres and has a reported sediment thickness of approximately 12,000 metres. The sedimentary sequence has been dated at between 1.2 and 1.8 billion years old. i.e. substantially older than most known hydrocarbon-bearing basins in Australia.

The smaller Beetaloo Sub-basin, located on the southwestern edge of the McArthur Basin, extends for approximately 15,000 square kilometres and reaches a depth in excess of 8,000 metres. Most of the exploration activity to date has centred around the Beetaloo Sub-basin.

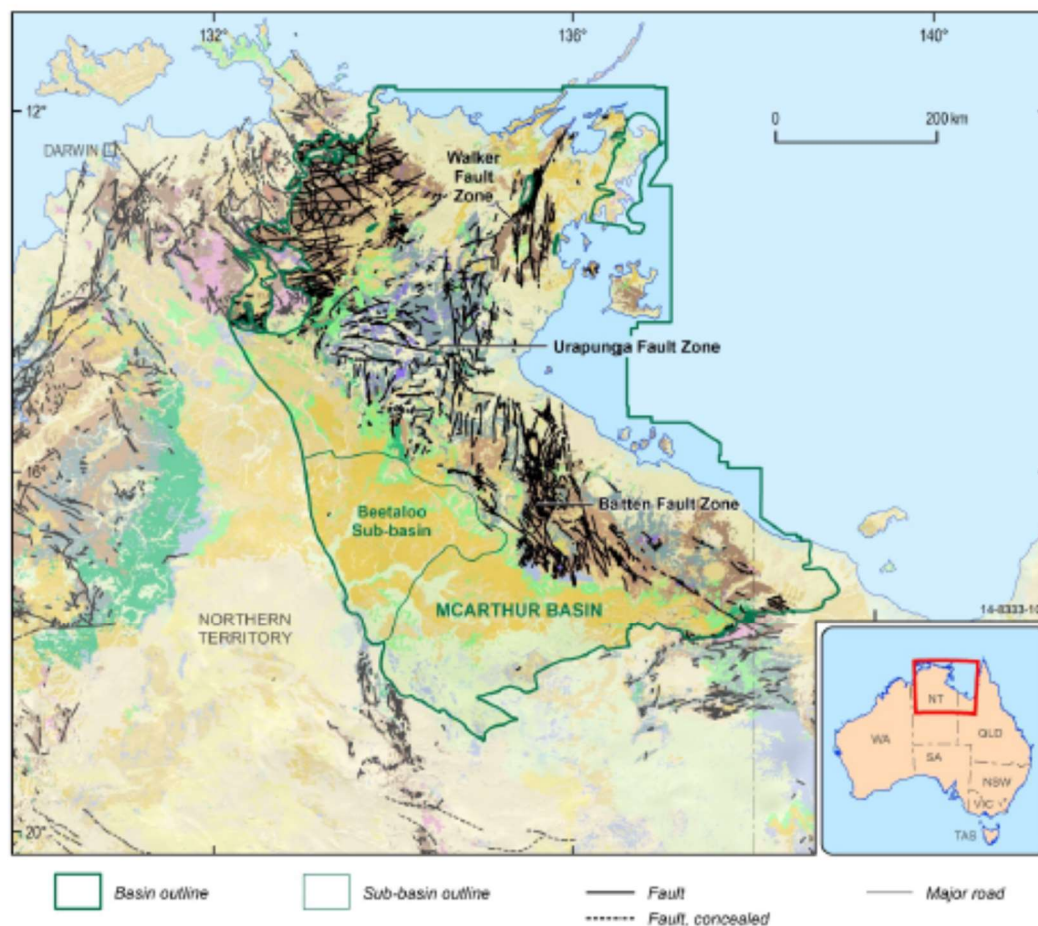


Figure 3: Location map McArthur Basin and Beetaloo Sub-basin (Source Geoscience Australia)

Exploration work to date has highlighted two main source rock sequences that have the potential to produce gas and oil from within the thick shale sequences. These sequences are the Velkerri and Kyalla Formations in the south and the Barney Creek Formation in the north.

The Velkerri Formation is a dark grey to black laminated shale, which was deposited in a shallow to nearshore marine environment. Exploration drilling and seismic has confirmed a thickness of at least 1,600 metres, with Total Organic Carbon (TOC) levels recorded as high as 12.5%. The Velkerri shale exhibits a high Hydrogen Index, indicating the potential for oil and wet gas.

The slightly younger Kyalla Formation exhibits geological similarities to the Velkerri Formation but remains less explored at this stage. The sequence exhibits interbedded sandstones and siltstones, with dark grey to black shales. Cores from the Kyalla Formation have exhibited a strong petroliferous odour with recorded TOC levels of up to 4%.

Both Santos and Origin are targeting these shale sequences in their current exploration programs in the Beetaloo Sub-basin. Empire has gas and wet gas potential in its southern permits in these sequences.

The Barney Creek Formation lies beneath the Velkerri/Kyalla sequence but exhibits similar geological characteristics. It contains a sequence of interbedded shale and dolomites, deposited in a deep-water marine setting. Cores taken within the Barney Creek Formation exhibit bituminous materials and appear to contain some liquid hydrocarbons. Minerals drilling has also encountered extensive gas shows in this sequence.

Empire's large Northern permits host the Barney Creek shales, with potential for large gas accumulations being recognised.

The Kyalla and Velkerri Formations have demonstrated strong attributes for conventional and unconventional oil and gas targets, with both oil and gas shows being recorded across the intervals. Whist primarily targeted as a shale gas target, there is also some evidence of sand and carbonate developments, which may allow for some conventional prospectivity.

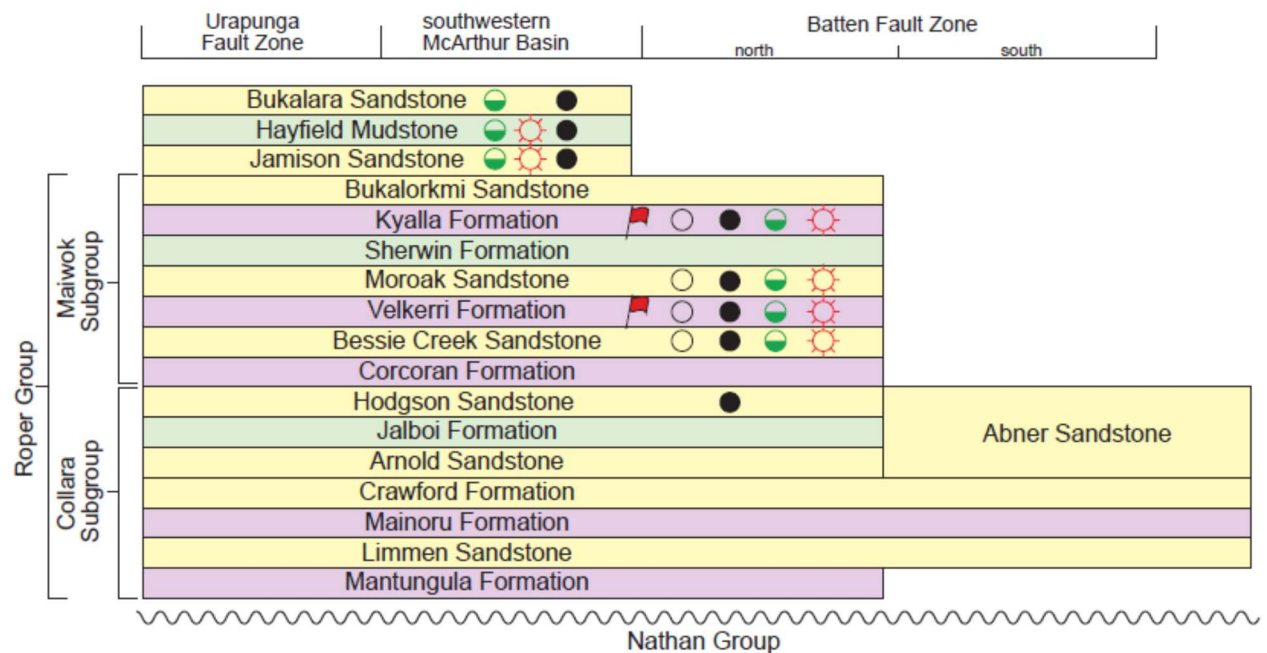


Figure 4; Geological section for the Beetaloo Sub-basin (Source Northern Territory Geological Survey, 2014)

Most of the current exploration has focussed on the Velkerri Formation, due to the greater thickness of the sequence. This sequence compares favourably with two of the better US shale plays, the Marcellus and the Barnett, as shown below in figure 5. Notably, both the Barnett (320-350 million years) and the Marcellus (390 million years) are substantially younger than the McArthur Basin Shale sequences.

Appendix B Middle Velkerri Characterisation - Comparison with US basins



	Marcellus Shale ¹	Barnett Shale ¹	Middle Velkerri Shale
Estimated Basin Area (km ²)	246,050	12,950	17,070 ⁴
Typical Depth (m)	1,220-2,590	1,980-2,590	1,000-2,500
Gross Thickness (m)	60	60-305	45- >420
Net Thickness (m)	15-105 (45)	30-215 (90)	60-86 (73) ²
Reported Gas Contents (scf/ton)	60-150	300-350	100 ²
Porosity (%)	4-12 (6.2)	4-6 (5)	2-8
Gas-filled Porosity (%)	4	5	2.5 ²
Water Saturation (%)	43	38	58 ²
Permeability Range (average) (nD)	0-70 (20)	0-100 (50)	10-100 (50)
Reported Silica Content (%)	37	45	49 (1-77)
% Ro (average range)	1.5 (0.9-5)	1.6(0.85-2.1)	1.5->2.5 ³
TOC present-day (average in wt%)	4.01 (2-13)	3.74 (3-12)	3.74 (1-10)

Source: Close et al. 2016 AGES, "Unconventional gas potential in Proterozoic source rocks: Exploring the Beetaloo Sub-basin"

¹Jarvie DM, 2012. Shale Resource Systems for Oil and Gas: Part 1—Shale-gas Resource Systems: in Breyer JA (editor), 'Shale Reservoirs: Giant Resources for the 21st Century'. AAPG Memoir 97, 69–87

²Origin Energy Ltd estimated average values from C, B, and A shale in Kalala S-1 and Amungee NW-1

³Value represent Equiv. %Ro estimated from alginite reflectance

⁴Based on Beetaloo JV permit area

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Figure 5; Shale comparisons (Source Falcon June 2019 Corporate Presentation)

The Velkerri and Kyalla shale sequences are noted to be prospective in the southern portion of the Empire acreage portfolio. This includes permits EP 187 and a portion of EP 184. The older Barney Creek Formation is seen to be prospective across most of the permits, although it is less defined as an exploration target due to the lesser data points.

BEETALOO AND MCARTHUR BASIN EXPLORATION ACTIVITY

Exploration permits in the basin were initially held by relatively small exploration entities, including subsidiaries of Empire Energy (since 2011), Falcon Oil and Gas (Falcon), Armour Energy Limited (Armour) and Tamboran Resources Limited (Tamboran). These companies originally held 100% of the acreage, with a longer-term view to fund exploration using farmouts.

Farmouts were completed across several permits in the period from 2011 to 2015, where over \$600 million of cash and carried exploration was committed. The key new entrants were Santos Limited (Santos) and Origin Energy Limited (Origin), who have completed the initial stages of their programs, and have continued to pursue further evaluation work following encouraging results.

Santos reported a farm-in to the Tamboran project area in the Beetaloo Sub-basin in late 2012. The deal allows Santos to fund a \$70 million exploration program to earn a 75% interest in four exploration permits across 6.4 million acres. Santos also invested \$10 million in Tamboran. The Santos activity is focussed on the eastern portion of the Beetaloo Sub-basin. Santos has funded a 2D seismic program and one well (Tanumbirini-1) to date, with further testing activity planned for the current dry season.

Origin and Sasol entered into a farmout agreement with Falcon in May 2014. The announced deal entailed a cash and funding commitment of \$185 million to earn a gross 70% interest in the joint venture (35% each) comprising 4.6 million acres across three permits. These permits are in the central and western portion of the Beetaloo Sub-basin. Origin acquired Sasol's share of the venture in May 2017, with Origin assuming the added commitment to expenditure and increasing its joint venture share to 70%.

In late 2015, Armour Energy completed an agreement with American Energy Partners, an experienced player in the US shale gas scene who was founded by Aubrey McClendon, the former Chairman of Chesapeake Energy. The deal reported an exploration spend of approximately \$130 million for a carry of expenditure over a 5-year period to earn a 75% share of the joint venture.

In a similar time frame, Empire also executed an agreement with American Energy Partners for the farmout of 80% of its shale exploration portfolio in the Northern Territory for a cash and carry of US\$68 million plus an option on the funding of additional development work.

Both deals were ultimately halted following the sad passing of Aubrey McClendon and the further delays in exploration activity due to the moratorium on fracking.

In September 2016, the government announced a moratorium on unconventional gas exploration in the Northern Territory. This resulted in a hiatus in activity across the McArthur Basin and other basins prospective for unconventional gas. Later that year, the government announced the formation of an Independent Scientific Inquiry into Hydraulic Fracturing and Unconventional gas exploration. In December 2017, the Independent scientific panel released its draft report into the activity and finalised the report in March 2018 after a series of hearings and community forums across the Territory.

The final report contains 135 recommendations, including over 30 which are to be implemented prior to the recommencement of exploration activity.

Santos has been active recently in the region, with the acquisition of Conoco Philips' Northern Australian assets for a cash consideration of US\$1.39 billion. The purchase comprised the offshore gas assets, plus a further 56.9% share of the Darwin LNG facilities and associated infrastructure. Key for the regional exploration effort, Santos also highlighted the scope for LNG expansion options, with both onshore and offshore gas developments emphasised.

Santos also announced the farmin to part of Armour Energy's Queensland and Northern Territory acreage, with a \$95 million commitment of cash and future exploration to earn a 70% interest in 5 permits across 8.9 million acres in the South Nicholson Basin.

UPCOMING ACTIVITY IN MCARTHUR BASIN

Following the lifting of the moratorium, there has been an acceleration of activity in the McArthur Basin, and the Beetaloo, in particular. Both Origin and Santos have approved Environment Management Plans for drilling and testing programs in the basin, as well as additional seismic acquisition. To the east, Empire has also completed their 2D seismic acquisition plans. In discussion with other operators in the region, further activity is planned after the wet season, which will see a further acceleration in plans from April 2020.

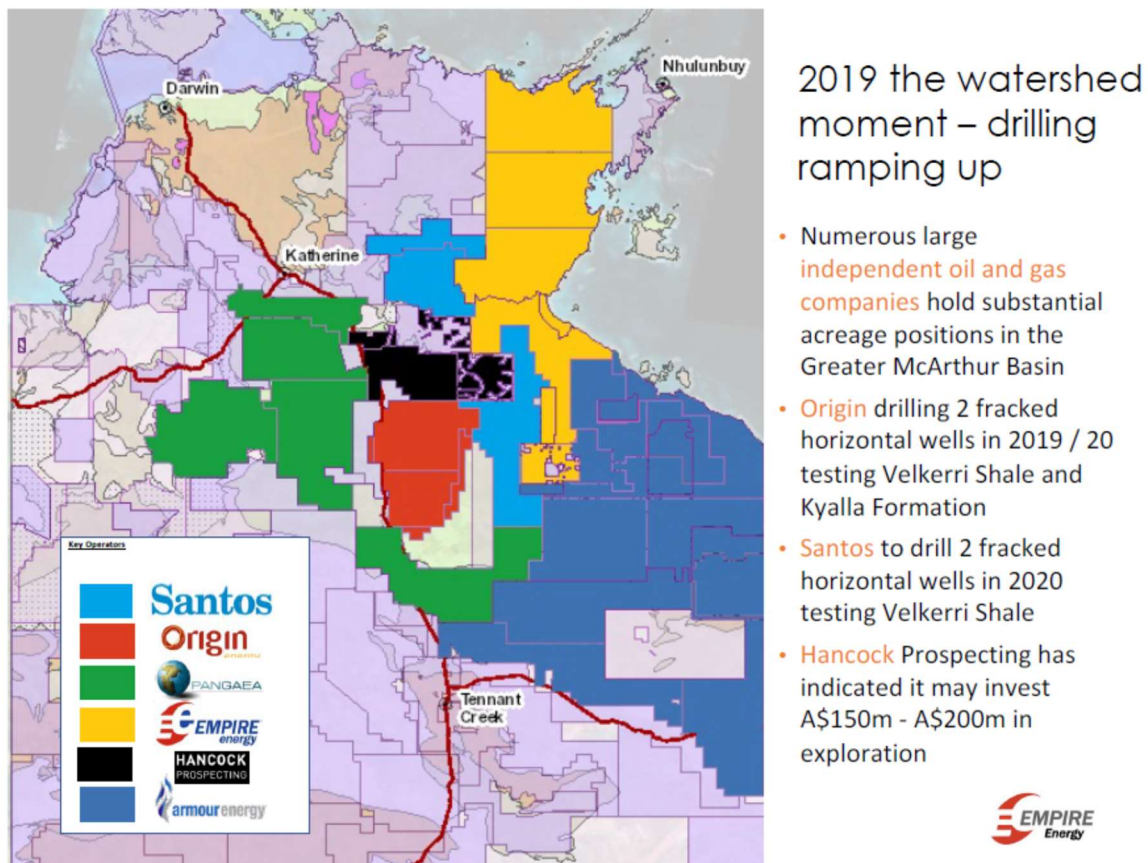


Figure 6; Exploration permits in the McArthur Basin (Source Company data)

ORIGIN

Origin is earning a 70% interest in these permits, at the completion of the farm-in. Falcon controls the other 30% share in the joint venture.

Through its previous drilling and testing success, Origin has booked a gross 2C Contingent Resource of 6.6 Trillion cubic feet (Tcf) of gas, based on the Velkerri B Shale, in their Beetaloo permits based on the results of the Amungee NW-1H well. The resource was booked over a 1,968 square kilometre area, which represents approximately 10% of their total permit area.

Origin has immediate plans to drill two exploration wells in the Beetaloo in the remainder of 2019. These two wells will target both the Kyalla and Velkerri shale sequences which are intended to test the wet gas potential of both sequences. The Kyalla well commenced drilling in early October and has reported encouraging results within cores. The joint venture has committed to an immediate horizontal well within the Kyalla sequence, which will be fracture stimulated and production tested in early 2020.

The Origin-led joint venture also has plans to drill a second well on the eastern edge of their permit area.

Encouragement from this program will see a likely acceleration of drilling activity by Origin in the Beetaloo, with a further two wells being planned for the 2020 drilling campaign.

It is noteworthy that Origin elected to retain the Beetaloo acreage during the recent formation of Lattice and sale of their exploration and production assets.

SANTOS

Santos is earning a staged 75% joint venture share in the eastern Beetaloo permits. Tamboran holds the remaining 25% share.

Santos has previously reported success in the Beetaloo at Tanumbirini-1 to the east of Origin's operations with the well reporting strong gas shows while drilling and in cores. The immediate plan is to undertake fracture stimulation of the well and conduct an extended production test across the Velkerri sequence. The fracture stimulation is currently under way, with initial results expected in December.

Santos also has approval for drilling in the Beetaloo, although drilling issues in the Amadeus basin program has resulted in some delays. Santos has approved plans for the drilling of a horizontal well to appraise the Tanumbirini discovery and has sought drilling approval for the nearby Inacumba prospect. These wells are now scheduled for mid-2020.

The Beetaloo and Empire's 1-3 Tcf early production target

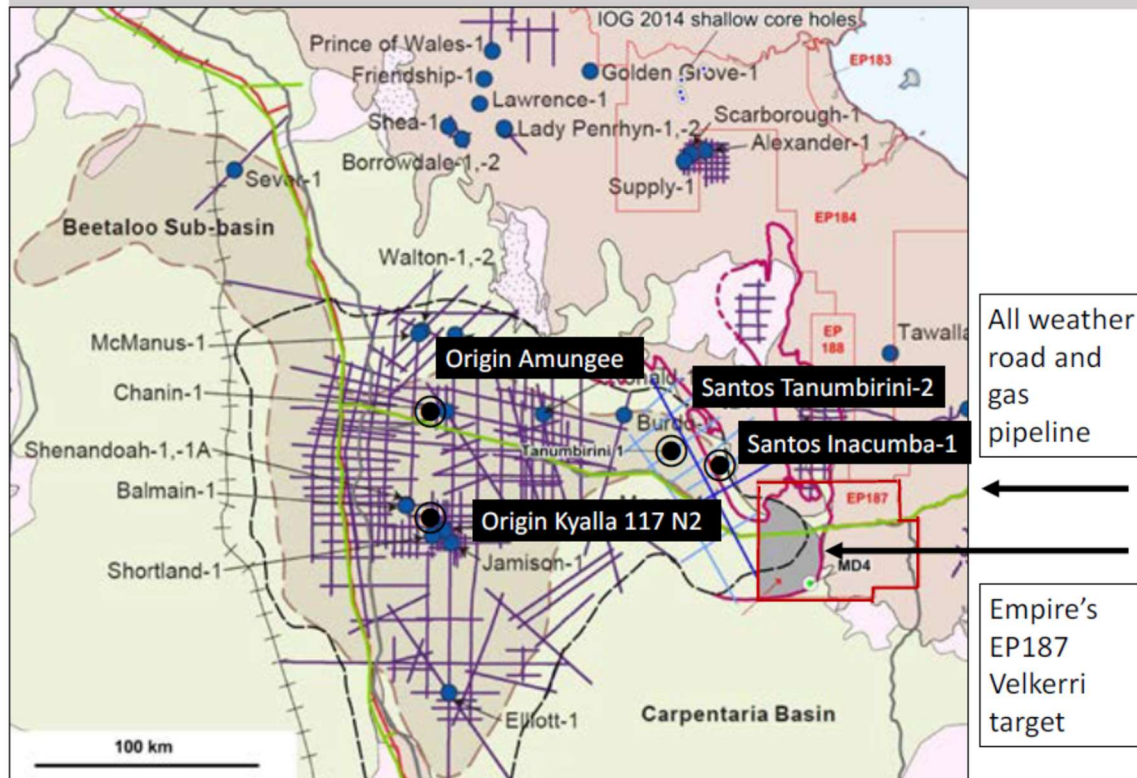


Figure 7; Current exploration activity in the Beetaloo Sub-basin (Source Company data)

EMPIRE

Empire owns 100% of a large acreage position in the McArthur Basin, including sections of the Beetaloo in its southern permit area, EP 184. This permit is immediately east of the planned testing and drilling to be undertaken by Santos.

Empire has developed the Environmental Management Plan for the seismic activity, which demonstrates positive community consultation with local landowners, traditional owners, and other affected stakeholders and regulatory authorities. Most of the survey is to be undertaken on traditional lands, where community consultation and liaison with the Northern Land Council has been fruitful. The survey also utilises existing rights of way, including the road verge of the Carpentaria Highway, which minimises land clearing and disturbances.

Empire has received approval for the acquisition of 231 line kilometres of 2D seismic in the western portion of EP 184, where historical seismic and mapping indicates that a thick sequence of Beetaloo sediments are present. This seismic program was completed in November 2019, with results to be interpreted for planned drilling in mid-2020.

Empire has also submitted an Environmental Management Plan for the drilling of up to two wells in EP 187 in the eastern portion of the Beetaloo Sub-basin. The approvals are progressing well and approvals are anticipated in advance of the drilling in mid-2020.

Empire has reported that its southern permit area retains an independently certified prospective resource of approximately 1.2 Tcf of gas, with additional liquid potential. The adjacent testing and drilling campaigns, in conjunction with the planned seismic in EP 184, will provide added certainty on the commercial direction of these Beetaloo prospects.

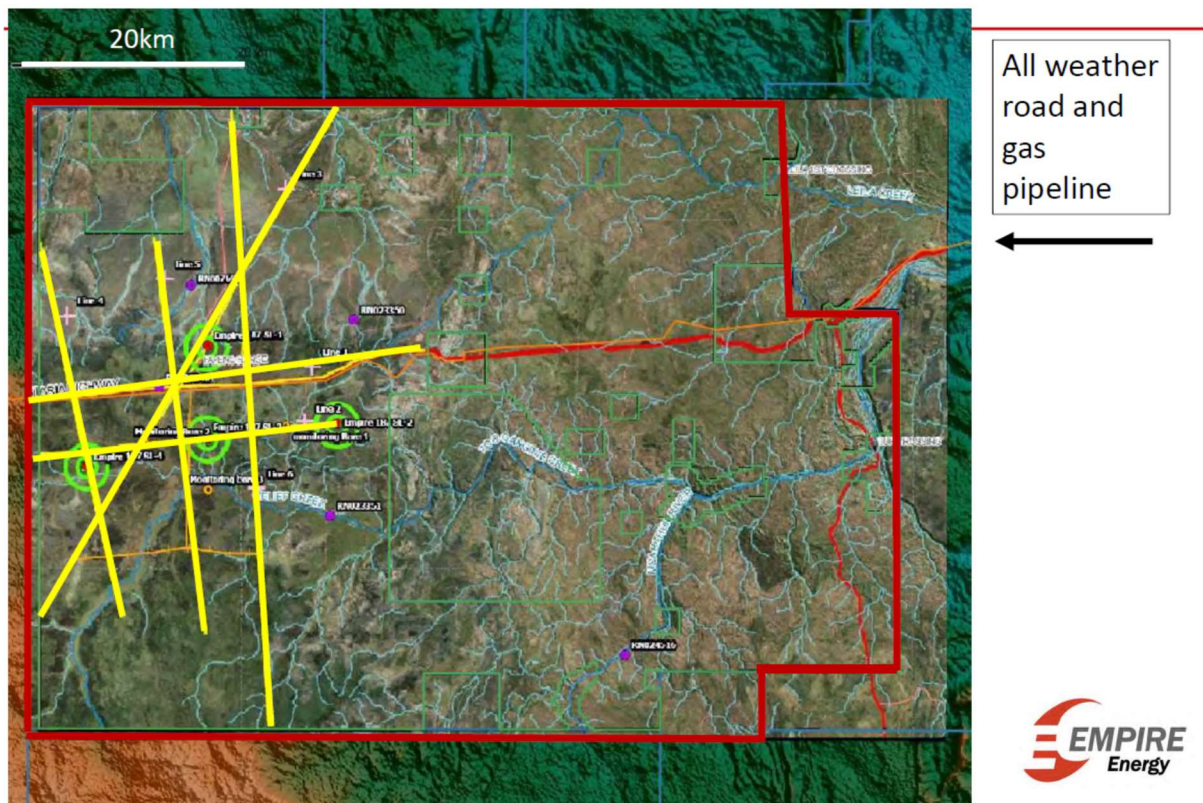


Figure 8; Empire's seismic program for October and November 2019 (Source Company Data)

DEVELOPMENT SCENARIOS

In the success case, there are several potential development scenarios for the gas and liquids from the McArthur Basin. We have reviewed the feasibility of some of these potential options which are briefly highlighted below.

EAST COAST GAS MARKET

The macro-environment for gas sales into the east coast market remains strong, with demand for gas remaining high and the existing supply sources showing some increased signs of maturity. The latest reports from the Australian Energy Market Operator indicate a tight gas market on the east coast of Australia with scope for shortfalls beyond 2024, where an increased reliance on contingent resources will allow for new entrants in the gas market.

Figure 3 Projected eastern and south-eastern Australia gas production (export LNG and domestic), 2019-38; supply from all available resources (including uncertain undeveloped projects)

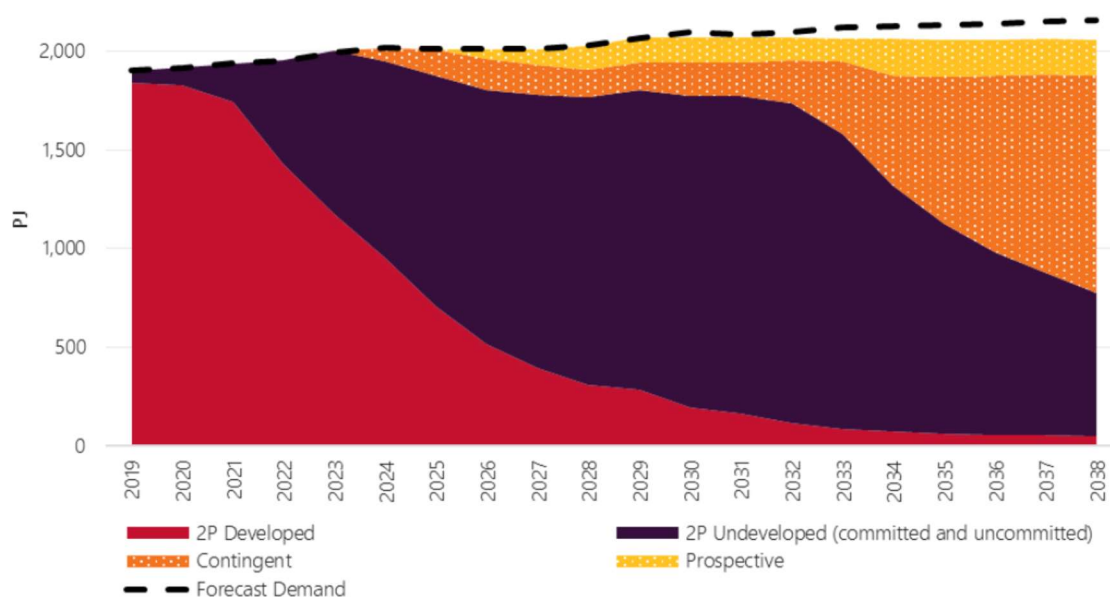


Figure 9; Gas production and demand forecasts. (Source 2019 AEMO GSOO Data)

East Coast gas pricing has remained at historically high levels, following the step-change in pricing in 2016. These stronger prices were seen coincident with the start-up of LNG sales at Gladstone and have remained at these premium levels. Given the strong linkage between the LNG sales and historical pricing, an assumption on future gas prices in the east coast market would likely continue to follow the LNG prices into the future, as a base case.

The Australian Competition and Consumer Commission opines on LNG netback prices, as a base for future gas pricing in the east coast. Based on this body of work, the recent trend of weaker LNG prices has been regularly noted, as numerous new LNG facilities have been commissioned over the past 5 years, providing a surge of new supply. Australian LNG has been driving most of the new global LNG supply which is now in production.

Further new LNG developments have slowed in recent years, and prices are beginning to recover, providing some added support to the stronger east coast gas markets.

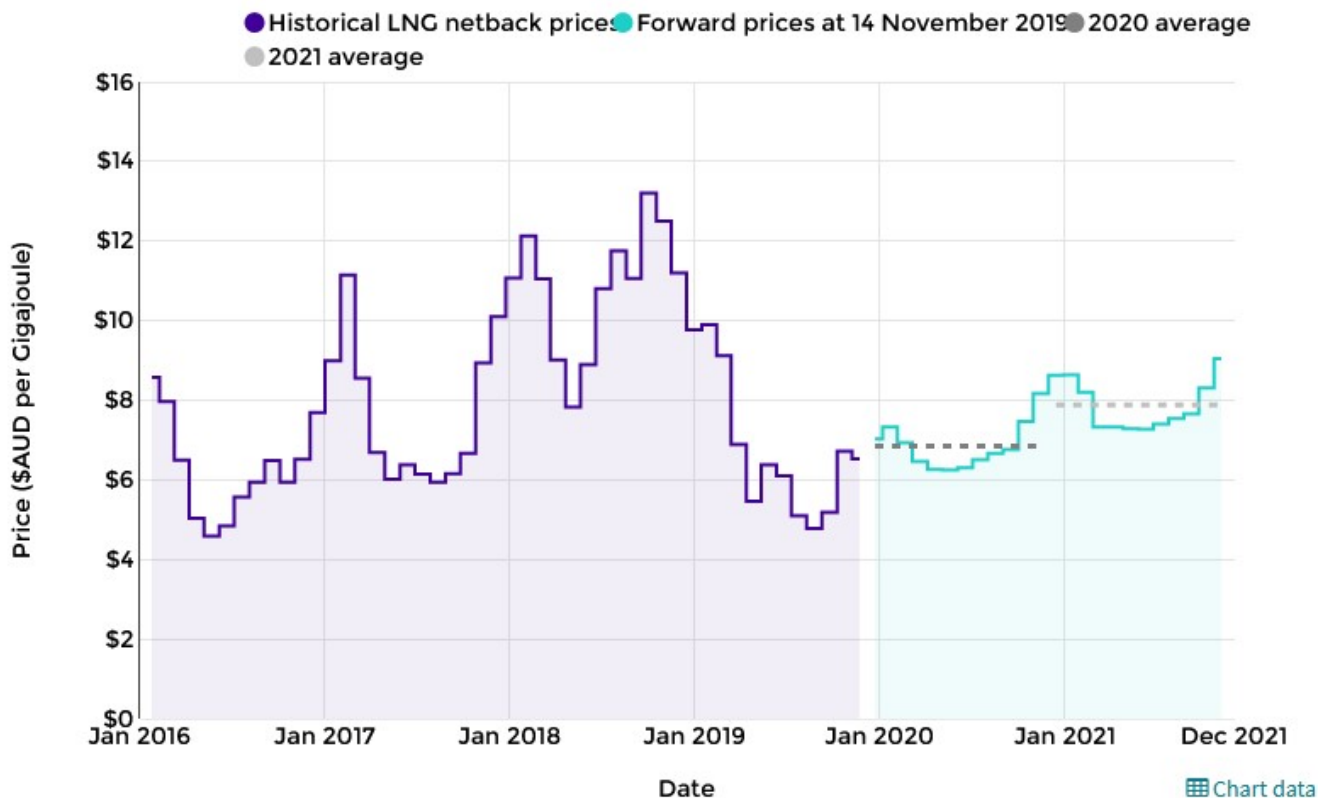


Figure 10; East coast gas prices, based on LNG netback. (Source ACCC November 2019)

Based on the strength of local and LNG demand for gas, and the continued supply issues with the historical sources, of gas, we maintain that domestic gas prices will remain strong for the foreseeable future. New sources of supply will be required to be developed over the next 3 to 4 years to satisfy the current level of gas demand.

The development of the Northern Gas Pipeline (NGP) in early 2019 has allowed the first gas to flow from the Northern Territory into the deeper gas markets of the east coast. The initial development of the pipeline has low relative volumes, circa 90 terajoules per day, but Jemena has expressed a desire for expansion through looping and compression should the supply of added gas become commercially viable. The NGP is located to the south of Empire's prospective Beetaloo acreage, enhancing the economics of development in the success case.

THE DARWIN LNG OPTION

The LNG hub in Darwin has expanded over the past decade, with the original Darwin LNG Project (single train development with first gas in 2006) being joined by the Ichthys Project in 2018 (dual train project). The Northern Territory Government is providing encouragement for the expansion of the existing LNG developments, specifically noting both onshore and offshore potential projects. The Santos purchase of the Darwin LNG assets indicates a desire to add brownfield gas volumes at Darwin. Clearly, the McArthur Basin remains a strong viable option for the expansion projects.

Furthermore, as offshore production declines from the more mature projects, there is an opportunity to provide added gas from the McArthur Basin as backfill from the onshore developments. This potential backfill option will compete with major projects but will likely have a cost and flexibility advantage over these alternate and expensive offshore developments.

These options in Darwin can be accessed via the existing pipeline corridor, with the likely development of a new, large scale infrastructure required to provide the necessary volumes from the potential McArthur Basin gas developments.

LOCAL MINING OPERATIONS

Locally, Empire may also target some of the local mining and remote operations in the Northern Territory for gas sales via electricity generation. Some of these operations are currently accessing gas via existing pipeline networks, but the local suppliers may be a more viable, cheaper option upon success. The pipeline spur to the McArthur River Mine runs through the southern portion of EP 184, the initial exploration targets in the Empire acreage. It is unlikely that the larger operators will target these smaller commercialisation opportunities.

SWOT ANALYSIS

Strengths	Weaknesses
<ul style="list-style-type: none"> • 100% ownership of large acreage position • Vastly improved balance sheet • Early definition of Contingent Resources indicates large scale opportunity • Very strong board • Good relationship with the local community • Initial infrastructure in place 	<ul style="list-style-type: none"> • Unconventional exploration comes at a high cost • Uncertain investor sentiment to pure exploration activity • Availability of equipment and quality personnel • Unproven commercial outcomes • Need for capital to fund future activity and developments
Opportunities	Threats
<ul style="list-style-type: none"> • Current exploration commitment by large nearby operators • Empire retains option on adjacent success, at modest capital cost • Multiple potential sources of finance available • Multiple gas sale outlets in success case 	<ul style="list-style-type: none"> • Government uncertainty towards gas prices and unconventional gas drilling • Green politics • Cost and schedule • Massive success in adjacent permits may restrict market access

BOARD AND MANAGEMENT

The Empire board was restructured in late 2018 and early 2019, with the appointment of Professor John Warburton, Mr Paul Espie AO, and Mr John Gerahty. These new Directors add substantial business acumen and a strong technical understanding of the resource sector.

Directors currently hold approximately 7% of the issued capital in Empire following recent purchases of shares on the market.

Mr Paul Espie AO (Non-Executive Chairman)

Appointed November 2018

Mr Espie was the founding principal of Pacific Road Capital, a manager of private equity funds investing in the resources sector internationally, in 2006. He was Chairman of Oxiana Limited during the development of the Sepon copper/gold project in Laos (2000 to 2003) and prior to that Chairman of Cobar Mines Pty Ltd after a management buy-out in 1993. Mr Espie was previously responsible for Bank of America operations in Australia, New Zealand, and Papua New Guinea and Chairman of the Australian Infrastructure Fund. He is a Director of Aurelia Metals Limited, a Fellow of the Australian Institute of Company Directors, Trustee of the Australian Institute of Mining & Metallurgy, Educational Endowment Fund, and a Director of the Menzies Research Centre.

Mr Alexander Underwood (CEO and Managing Director)

Appointed as MD August 2018

Mr Underwood has nearly 15 years of specialist upstream oil and gas investing and financing experience. Previously he spent two years with the Commonwealth Bank of Australia, Singapore as Director of Natural Resources and spent nine years with Macquarie Bank in Sydney and Singapore as Associated Director of Energy Markets Division. He commenced his career at BHP Billiton Petroleum.

Mr Underwood was appointed as an Executive of Empire and a Director and Chief Executive Officer of the Company's wholly-owned subsidiary, Imperial Oil & Gas Pty Ltd on 6 March 2018.

Mr John Gerahty (Non-Executive Director)

Appointed November 2018

Mr Gerahty is a former investment banker and company director with wide experience in business and commerce. He was a Founding Director of Macquarie Bank and has served as a director of a considerable number of publicly listed companies, including roles as Chairman of ARP Group PLC and MPI Mines Ltd. He is also a Director of Kaplan Partners Pty Ltd and Kaplan Funds Management Pty Ltd, as well as his family-owned Liangrove group companies. He was formerly a Director (and Chairman) of the Sydney Swans, a Director of Cricket NSW, and a Trustee of the SCG Trust.

Professor John Warburton (Non-Executive Director)

Appointed February 2019

Professor Warburton has 35 years of professional oil and gas experience in operated and non-operated conventional and unconventional petroleum discovery, development and in new business delivery. He has resided as an expatriate in a number of regions where his values demand continuous focus on people, safety, cultural heritage and environment. and has been a Director of Empire's wholly-owned Northern Territory subsidiary, Imperial, since 2011 and was it's Chief Executive Officer from 2011 to 2014.

Professor Warburton is a Visiting Professor in the School of Earth & Environment at Leeds University UK where he has also served for eight years on the External Advisory Board of 'Petroleum Leeds', the centre for excellence in Petroleum Engineering & Geoscience. Professor Warburton was Chief of Geoscience & Exploration Excellence at Oil Search Limited and is a Non-Executive Director of ASX listed Senex Energy Limited where he also serves on the People & Remuneration Committee.

Mr David Evans (Chief Operating Officer)

Appointed October 2019

Mr Evans is an experienced oil and gas professional with over 30 years global upstream oil and gas exploration, development and production experience. David has worked in senior technical roles with significant exposure to Australian and North American unconventional hydrocarbon plays. For the past 3 years, David held the position of Chief Operating Officer with Elk Petroleum Limited and was previously the Chief Technical Officer and Acting Chief Operating Officer with ASX listed company, Drillsearch Energy Limited.

SUMMARY OF DIRECTOR'S SHAREHOLDINGS

Director	Holding (m)	Share Holding ⁽¹⁾ (%)	Date of recent change
Paul Espie	2.35 m shares 0.375 m options	1.0%	9 October 2019
Alex Underwood	1.7 m shares 3.15 m perf. rights 1.0 m service rights 0.85 m options	0.7%	1 July 2019
John Gerahty	12.25 m shares* 5.6 m options*	5.3%	8 November 2018
John Warburton	0.154 m shares	0.07%	9 October 2019

* Shares and options are adjusted for 1:10 share consolidation in June 2019.

(1) Based on issued capital of 262.2 million shares (As per Appendix 3B; 26 November 2019)

SUMMARY VALUATION

Empire's key assets in the McArthur and Beetaloo Sub-basin are early-stage exploration targets. Several ways of assessing value on these permits have been tested, including net present values, multiples of risked success and value per acre in the key prospective basins. A multiple of risked success has been used as the primary valuation tool, as the early stage exploration assets do not allow for an accurate assessment via the traditional net present value method.

The Beetaloo target comprises an estimated contingent resource of 1,193 PJ of gas, with associated liquids of 24 million barrels. Based on our experience, a 60% conversion of this to a 2P reserve is assumed upon success. A 20% chance of commercial success has been assumed for the target price. In-ground values of \$0.50 per GJ for gas and A\$5/Bbl for oil has been assumed. This is below the range of historical transactions in the east coast market.

The McArthur Basin targets are higher risk, as the exploration to date is less advanced than the Beetaloo. However, the acreage holding is very extensive and the current estimate of 2C prospective resources is a large 8,700 PJ of gas with associated liquids of 174 million barrels. A low chance of commercial success (1%) has been utilised, on the 60% conversion of the gas to 2P reserve and an assessed value of gas in the ground at \$0.50 per GJ. The valuation equates to approximately \$4 per acre of prospective permits in the McArthur Basin.

Empire holds an effective option over the current drilling and testing expenditure by nearby operators in the Beetaloo Sub-basin, which has value and is accretive to the valuation base case. Success nearby would further increase the potential for commercial success for Empire.

Based on the level of current and future level of activity and the potential for success, we have assessed a target price of 50 cents per share for Empire.

Asset	Basis	A\$ million	cents per share
Beetaloo target	20% COS, based on 720 PJ of gas, capitalised at \$0.50/GJ, A\$5/bbl	86	27
McArthur Basin target	1% COS, based on of 5,200 PJ of gas, capitalised at \$0.50/GJ	26	8
US gas assets	Multiple of ongoing profits	25	8
Cash	As at June 2019	7	2
Debt	As at June 2019	(35)	(11)
US sale proceeds		25	8
CR Proceeds		12	4
Future option proceeds		16	5
Total Assets (fully diluted)	(291 million shares) *	163	49

Totals may not add due to rounding

* Fully diluted capital assumes the exercise of all the existing options.

FINANCIAL SUMMARY

Empire Energy Group Limited

Code: EEG
Stock Details

Recommendation:	BUY		
Target	\$0.85	Share Price	\$0.43
NAV	\$0.49	52 Week High	\$0.55
Total Implied Return	98%	52 Week Low	\$0.11

Enterprise Value	\$157m
Diluted MCap	\$138m
Diluted Shares	321m
Free Float	85%
Avg Daily Value	\$0.2m

Year End December

Production	2017	2018	1H 2019	2019	2020
Oil (k Bbls)	126	127	66	4	4
Gas (MMcfd)	1.85	1.83	0.87	1.90	1.90
Total (MM BOE)	0.43	0.43	0.21	0.32	0.32

Profit & Loss (US\$m)	2017	2018	1H 2019	2019	2020
Revenue	14	14	3	6	6
Operating Costs	(8)	(9)	(2)	(4)	(4)
Operating Profit	6	5	1	2	2
Corporate & Other	(6)	(1)	(5)	(3)	(3)
Exploration Expense	(0)	(0)	(0)	(2)	(1)
EBITDA	(0)	4	(4)	(3)	(2)
D&A	(3)	(2)	(1)	(1)	(1)
EBIT	(3)	2	(5)	(4)	(3)
Net Interest Expense	(3)	(3)	(0)	(0)	(0)
Pre-Tax Profit	(6)	(1)	(5)	(5)	(4)
Tax Expense	(0)	(0)	(0)	-	-
Underlying Profit	(6)	(1)	(5)	(5)	(4)
Significant Items (post tax)	(14)	(15)	(2)	-	-
Reported Profit	(20)	(16)	(7)	(5)	(4)

Cash Flow (US\$m)	2017	2018	1H 2019	2019	2020
Operating Cashflow	2	3	1	(1)	(1)
Tax	(0)	(0)	(0)	-	-
Net Interest	(3)	(3)	(1)	(0)	(0)
Net Operating Cash Flow	(1)	(0)	(0)	(2)	(1)
Exploration	(1)	(0)	(0)	(2)	(12)
Capex	(0)	(0)	(0)	-	-
Acquisitions / Disposals	0	0	2	19	-
Other	-	-	(0)	-	-
Net Investing Cash Flow	(1)	(0)	2	17	(12)
Equity Issue	4	12	-	8	-
Option exercise	-	-	-	-	15
Borrowing / Repayments	(2)	(8)	(1)	(17)	(2)
Dividends	-	-	-	-	-
Other	(0)	(0)	(0)	-	-
Net Financing Cash Flow	2	4	(1)	(8)	14
Change in Cash Position	0	3	1	7	0
FX Adjustments	(0)	(0)	(0)	-	-
Cash Balance	1	4	5	12	12

Balance Sheet (US\$m)	2017	2018	1H 2019	2019	2020
Cash	1	4	5	12	12
Other Current Assets	4	27	25	2	2
PP&E	70	32	31	30	41
Other Non Current Assets	0	0	0	1	1
Total Assets	76	64	61	44	55
Debt	37	24	24	8	6
Other Liabilities	19	18	23	19	20
Net Assets	20	21	14	17	29

Macro Assumptions	2017	2018	1H 2019	2019	2020
Exchange Rate (A\$/US\$)	76.68	74.75	70.64	70.00	70.00
WTI Oil Price (US\$/bbl)	50.88	64.94	57.31	60.00	62.00
Henry Hub gas priced (US\$)	3.16	3.19	2.70	2.90	3.00

Ratio Analysis	2017	2018	1H 2019	2019	2020
Shares on Issue	110	231	231	231	281
Diluted Shares	m	110	287	290	330
EPS - Diluted	Ac	(18.3)	(5.5)	(2.5)	(1.5)
P/E	x	n/m	n/m	n/m	n/m
CFPS - Diluted	Ac	(0.9)	(0.1)	(0.2)	(0.5)
P/CF	x	n/m	n/m	n/m	n/m
Dividends	Ac	-	-	-	-
Dividend Yield (FF)	%	n/m	n/m	n/m	n/m
Payout Ratio	%	n/m	n/m	n/m	n/m
Franking	%	n/m	n/m	n/m	n/m

Enterprise Value	A\$m				157
EV/EBITDA	x	n/m	n/m	n/m	n/m
ROE	%	(31%)	(4%)	(36%)	(28%)
ROA	%	(9%)	(1%)	(8%)	(11%)
Net Debt / (Cash)		36	20	19	(4)
Gearing (ND/(ND+E))	%	64%	49%	58%	(28%)
Gearing (ND/E)	%	178%	95%	139%	(22%)

Reserves and Resources

P50 Prospective Resources (via Muir and Assoc.)

	Gas (PJ)	Liquids (MM Bbls)
Beetaloo (Velkerri)	1,192	24
McArthur (Barney Creek)	8,699	174
McArthur (Wollogorang)	1,185	24

Total	11,076	222
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Valuation (All in A\$m)	Stake	A\$m	A\$/sh
Beetaloo	100%	86	0.26
McArthur	100%	26	0.08
US Gas Assets	Var.	25	0.08
Cash as at June 2019		7	
Debt as at June 2019		(35)	
November Cap Raise		12	
Final US Sale proceeds		25	
Future option proceeds		16	
			P/NAV
Net Asset Value		163	0.49
			0.87x

APPENDICES

APPENDIX 1

Top 20 Shareholders (as at 27 November 2019)

Rank	Name	Units	% Units
1	MACQUARIE BANK LIMITED <METALS MINING AND AG A/C>	33,951,367	12.93
2	GLOBAL ENERGY AND RESOURCES DEVELOPMENT LIMITED	25,711,000	9.79
3	LIANGROVE MEDIA PTY LIMITED	12,245,000	4.66
4	ELPHINSTONE HOLDINGS PTY LTD	12,000,000	4.57
5	HSBC CUSTODY NOMINEES (AUSTRALIA) LIMITED	6,039,794	2.30
6	CITICORP NOMINEES PTY LIMITED	5,792,992	2.21
7	CHA QIAN	5,145,000	1.96
8	MR KOOI ONN CHYE	4,643,363	1.77
9	CHEOY LEE YACHTS AUSTRALIA PTY LTD	4,130,000	1.57
10	CS THIRD NOMINEES [TY LIMITED <HSBC CUST NOM AU LTD 13 A/C>	3,547,564	1.35
11	GROSVENOR EQUITIES PTY LTD <NO 2 A/C>	2,989,956	1.14
12	MR TEIK TATT OH	2,500,000	0.95
13	INVIA CUSTODIAN PTY LIMITED <PACIFIC ROAD PROVIDENT A/C>	2,350,000	0.90
14	ORACLE FINANCIAL PLANNING PTY LTD	2,101,000	0.80
15	MR CHARLES PHILLIP LOWSLEY PEAKE	1,903,000	0.72
16	JOHN WARDMAN & ASSOCIATES PTY LTD <THE WARDMAN SUPER FUND A/C>	1,806,487	0.72
17	MR ANDREW FORSTER	1,850,000	0.70
18	JETAN PTY LTD	1,750,095	0.65
19	COLOWELL PTY LTD <DAVID DAGG FAMILY A/C>	1,700,000	0.65
20	RHB SECURITIES SINGAPORE PTE LTD <CLIENTS A/C>	1,691,800	0.64
Totals		133,848,418	50.98

APPENDIX 2

KEY TERMS OF DEBT FACILITY

Borrowers	Empire Energy E&P, LLC Empire Energy USA, LLC
Guarantor	Empire Energy Group Limited
Lender	Macquarie Bank Limited
Principal Amount	US\$7.5 million
Term	5 years
Upfront Fees	1% of Principal Amount
Interest Rate	LIBOR + 650 bps (unchanged)
Repayment Terms	No principal repayments for the remainder of 2019, then 100% of Appalachia Net Operating Cashflow subject to minimum amortisation of US\$550,000 per annum (reduced from minimum amortisation of US\$2,500,000 per annum)
Equity Kickers	None
Hedging	Empire shall maintain a rolling hedging program whereby 55% of forecast Proved Developed Producing Reserves shall be hedged for 5 years (reduced from minimum hedging of 70% of forecast production)
Key Covenants	Net Debt > 1.3x Proved Developed Producing reserves PV10 (unchanged) Interest Coverage ratio > 1.3x (reduced from 1.8x)

APPENDIX 3

SUMMARY OF ISSUED CAPITAL (AS AT NOVEMBER 26, 2019)

Ordinary shares	262,534,301
Unlisted options	53,975,004 (exercise prices between 30-32 cents)
Performance rights	3,150,000
Service rights	1,000,000
Total Capital	320,651,305

Unlisted Options

Number	Exercise Price A\$	Expiry Date
500,000	\$0.30	31 January 2020
1,000,000	\$0.32	31 July 2020
37,500,000	\$0.30	26 September 2020
600,000	\$0.30	26 October 2020
1,300,000	\$0.30	30 December 2021
12,000,000	\$0.32	31 December 2021
300,000	\$0.30	30 December 2021
300,000	\$0.30	30 December 2021
1,700,000	\$0.30	30 December 2022

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