TAYLOR COLLISON

Andrew Williams
awilliams@taylorcollison.com.au
+61 417 880 680
www.taylorcollison.com.au

Empire Energy Limited (EEG)

18 October 2020

A liquids rich outcome above expectations

Recommendation: BUY

Our View

The Federal Government's multi-pronged gas strategy including the establishment of a major gas hub at Wallumbilla and the integration of new sources of supply is of significant support to the east coast gas investment thematic. Within that context Empire Energy represents one of few pure, independent and highly leveraged exposures to the transformational potential of the Beetaloo/McArthur basins. The plays and opportunities are at an early stage of evaluation but the process of resource definition (volumes, flow rates and liquids contents) can unlock transformational valuation upside on success.

The company has delivered an important first step in the 'unlocking' process, reporting the presence of liquids rich gas in the Carpentaria-1 well. Gas liquids can be a game changer…enhancing development economics, lowering economic thresholds and shortening timelines. The results to date exceed pre-drilling expectations. More evaluation is required and testing results will likely not be to hand until 2Q21. The Carpentaria-1 result could underpin an expansion and acceleration of the next phase of evaluation drilling on a regional basis. We suspect other operators will be looking at the outcomes closely.

The confidence level associated with the economic gas potential is growing and EEG is sitting on an extensive gas resource.

Key Points

A good result in many ways – gas liquids is just the start. EEG has reported the presence of **liquids rich gas** in the Carpentaria-1 well on logs and the gas chromatograph. The gas indications are **stronger than in equivalent wells** in the basin…and quite simply, **a liquids leg improves the economics.**

Importantly the primary target horizon Velkerri Shale has been intersected **significantly shallower** in the well and is **thicker** than expected, which makes drilling cheaper and adds to the economic case.

Testing is the next major step which will occur in the dry season. Flow rates are the critical key to economics. After the well is completed for logging, coring and fracture analysis it will be suspended awaiting finalisation of the testing programme. The initial phase of testing will use vertical fracks with the potential for a second phase – drilling and testing a lateral section.

EEG is not operating in a vacuum. We note Santos (STO.ASX) and Origin Energy (ORG.ASX) will be returning to drilling, with STO in particular, including a prospect closer to its permit boundary with EEG. These appraisal wells will provide important benchmarking data. The scope and character of the gas play is evolving. and EEGs targets are large…success could deliver a quantum volume of gas.

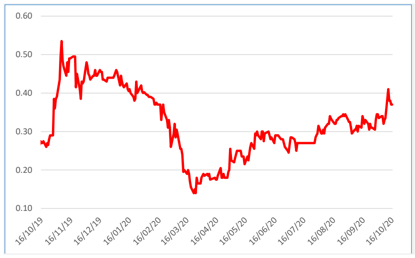
We upgrade our Target Price and valuation. Based on higher confidence levels, confirmation of the play concepts and the strong potential of a gas liquids leg, we value the company in a range of $101-487mn ($0.31-1.51/share).

We retain our recommendation at **BUY** with a **Target Price of $0.63/share**, equivalent to our middle-point valuation to reflect the current technical, market and operating outcomes, noting the potential for a significant re-rating on further evaluation and testing results from Carpentaria-1.

Summary (AUD)

Market Capitalisation	**$120**
Share price	**$0.37**
52 week low (23-Mar-20)	$0.13
52 week high (5-Nov-19)	$0.55

Share price graph (AUD)



Source: Yahoo Finance

Key Financials (US$000s)

US$	2019	2020E	2021E
Production (kboe)	385	294	303
Revenue	**5,397**	**4,648**	**5,599**
EBITDAX	724	1,617	2,494
EBIT	**(10,034)**	**(7,223)**	**(3,421)**
Underlying NPAT	(16,075)	(7,699)	(3,421)
EPS (Acps)	**(9.3)**	**(3.4)**	**(1.5)**
Growth (%)		na	na
PER (x)		nm	nm
EV/EBITDAX (x)		(16.2)	0.6
CFPS (Acps)	**(4.1)**	**(1.6)**	**0.2**
PCF (x)		nm	nm
ROE (%)		na	na
ROA (%)		na	na

Empire Energy Limited - Summary of Forecasts

Share Price	EEG	$0.370

ORDINARY SHARES	M	324	Fully Diluted M	342
OPTIONS	M	18		
MARKET CAP	A$mn	120		

PROFIT & LOSS SUMMARY (US$000s)

Year end December		2018	2019	2020E	2021E
Commodity Price Assumptions					
Realised oil price	**US$/b**	**59.86**	**59.76**	**38.86**	**42.21**
Realised gas price		3.24	0.00	2.48	2.92
Exchange Rate		**0.7452**	**0.6958**	**0.6953**	**0.7166**
Total Revenue		**6,593**	**5,397**	**4,648**	**5,599**
Cost of sales		(4,723)	(4,189)	(3,881)	(4,005)
Gross Profit		**1,870**	**1,208**	**767**	**1,594**
EBITDAX proxy		**1,870**	**724**	**1,617**	**2,494**
Other revenue		0	0	0	0
Other income		**2,192**	**155**	**150**	**200**
Write downs/impairments		0	(1,167)	(1,879)	0
Finance costs		**(801)**	**(637)**	**(452)**	**(365)**
Other expenses		(8,399)	(11,397)	(6,261)	(4,850)
EBIT proxy		**(4,339)**	**(10,034)**	**(7,223)**	**(3,421)**
Profit before tax		(5,138)	(11,838)	(7,675)	(3,421)
Taxes		(115)	(135)	(25)	0
NPAT Reported		**(5,254)**	**(11,973)**	**(7,699)**	**(3,421)**
Underlying Adjustments		(10,714)	(4,102)	0	0
NPAT Underlying		**(15,968)**	**(16,075)**	**(7,699)**	**(3,421)**
Margins on Sales Revenue					
EBITDAX		**28.4%**	**13.4%**	**34.8%**	**44.5%**
EBIT		91.9%	nm	nm	nm
NPAT Und		**nm**	**nm**	**nm**	**nm**
Change on pcp					
Total Revenue					
EBITDA			nm	nm	nm
EBIT			**nm**	**nm**	**nm**
NPAT Adj.			nm	nm	nm

PER SHARE DATA

Year end June		2018	2019	2020E	2021E
Shares Outstanding	M	2,313	263	324	328
EPS Und	**A cps**	**(1.4)**	**(9.3)**	**(3.4)**	**(1.5)**
Growth (pcp)		*na*	*na*	*na*	*nm*
Dividend	**cps**				
Franking	%				
OCF per Share	**A cps**	**(0.2)**	**(4.1)**	**(1.6)**	**0.2**
NTA per share	A cps		7.5	12.3	10.5

KEY RATIOS

Year end June		2018	2019	2020E	2021E
$D_N/(D_N + E)$	**%**	**49%**			
ROE	%	na	na	na	na
ROA	**%**	**na**	**na**	**na**	**na**
(Trailing) Debt/Cash	x	0.0x	0.0x	0.0x	0.0x

VALUATION MULTIPLES

Year end June		2018	2019	2020E	2021E
PER	**x**		**na**	**na**	**na**
Dividend Yield	%				
FCF Yield	**%**		**-11.1%**	**-4.4%**	**0.6%**
EV/EBITDA	x		0.0x	-16.2x	0.6x

BALANCE SHEET SUMMARY (US$000s)

Year end June	2018	2019	2020E	2021E
Cash	4,157	9,882	21,281	19,038
Property Plant & Equip	31,241	26,633	28,804	31,629
Exploration	0	141	127	114
TOTAL ASSETS	**64,071**	**39,650**	**50,860**	**51,525**
Borrowings	24,369	6,481	5,244	4,694
TOTAL LIABILITIES	**42,701**	**25,985**	**23,218**	**26,791**
TOTAL EQUITY	**21,370**	**13,665**	**27,643**	**24,734**
Gearing dn/(dn+e)			na	na

CASH FLOW SUMMARY (US$000s)

Year end June	2018	2019	2020E	2021E
Operational Cash Flow	**2,828**	**1,267**	**117**	**449**
Net Interest	(2,974)	(1,885)	(452)	(365)
Taxes Paid	0	0	0	0
Other	(115)	(135)	(30)	(30)
Net Operating Cashflow	**(261)**	**(754)**	**(365)**	**54**
Exploration	0	0	(5,000)	(2,500)
PP&E	(49)	0	0	0
Petroleum Assets	(168)	(1,848)	0	0
Net Asset Sales/other	359	20,008	115	(304)
Net Investing Cashflow	**(120)**	**17,407**	**(5,250)**	**(2,750)**
Dividends Paid				
Net Debt Drawdown	(7,878)	(18,497)	(1,238)	(550)
Equity Issues/(Buyback)	11,677	8,037	18,209	1,003
Other				
Net Financing Cashflow	**3,785**	**(10,693)**	**16,972**	**453**
Net Change in Cash	**3,404**	**5,961**	**11,357**	**(2,243)**

PRODUCTION

Year end June		2018	2019	2020E	2021E
Crude Oil	kb	127	89	3	3
Nat Gas	mmcf	1834	1778	1748	1801
TOTAL	**kboe**	**432**	**385**	**294**	**303**

RESERVES & RESOURCES (as of 18/05/2020)

Northern Territory	1U	2U	3U	1U	2U	3U
		Gas (Bcf)			Oil (Mb)	
~~Lower Kyalla~~	~~24~~	~~72~~	~~161~~			
Velkerri Fm	1,283	2,339	4,751	1	7	33
Barney Creek Fm	1,633	11,053	45,380	2	44	448
Wollogorang Fm				0	0	0
TOTAL	**2,916**	**13,392**	**50,131**	**4**	**53**	**488**
US				1P	2P	3P
Gas	Bcf			24	34	38

EQUITY VALUATION

				Risked Range		
NT	***Low***	***Mid***	***High***	**Low**	**Mid**	**High**
Gas	*$56*	*$111*	*$290*	$0.17	$0.34	$0.90
Liquids	*$17*	*$60*	*$157*	$0.05	$0.19	$0.49
US Onshore						
Appalachian	*$17*	*$23*	*$29*	$0.05	$0.07	$0.09
	$90	***$194***	***$476***	**$0.28**	**$0.60**	**$1.47**
Net cash/(debt)	*$16*	*$16*	*$16*			
Corporate costs	*($5)*	*($5)*	*($5)*			
TOTAL	***$101***	***$205***	***$487***	**$0.31**	**$0.63**	**$1.51**

Source: Company data; Analyst estimates, priced close trading 16/10/20

Confidence levels rise…wet gas will do that

Empire Energy Group (EEG) has released an update on its Carpentaria-1 drilling programme highlighting it had intersected an *"…extensive interval of liquids rich gas in the Velkerri Shale",* which materially *"…exceeds Empire's pre-drill expectations".*

Source: ASX Release 12-Oct

The Velkerri Formation at this location is nearly 1,000m thick and shallower than evidenced in analogue wells.

Appraisal of the play through fracture stimulation and testing is scheduled for 2021, likely early in 2Q (the dry season).

This is a not totally unexpected, but certainly better than expected outcome…and to put it simply, gas liquids can be a game changer. Significantly more data is needed to confirm the specific parameters and extent of the gas liquids opportunity, which will come through the follow up evaluation and testing activity in the well; and a direct look-through from the STO and ORG drilling programmes to be conducted out to end-2020.

Management has indicated a resource update will be conducted by end-2020 noting the Carpentaria-1 results will better define the tie to seismic and previous assumptions made with respect to the potential of the target intervals will be revised – the Velkerri sequence is thicker, with a liquids leg and the Kyalla shale is absent. On an holistic basis and without any specific guidance we wouldn't expect major changes to gas volumes, but we should see the first specific assigning of liquids volumes, even if only on a prospective basis (U volumes).

Any upgrading or assignation to a Contingent Resource category requires testing and evaluation.

In resource estimate terms, with a thicker than expected Velkerri sequence, on balance there is the potential for upside to volumes, with a small offset from the absence of the Lower Kyalla Shale, which only represents ~0.5% of the currently attributable Prospective Resources. These estimates included a very nominal volume for 'liquids' at the Velkerri level (7Mb), so revisions potentially could deliver a significant upgrade to volumes.

With the release of the Federal Government gas strategy, new sources of gas supply in the Beetaloo (and others) have been highlighted as having the potential to make a material contribution to the east coast supply-demand balance. Proposed additions and expansions to pipeline infrastructure have also opened the market options for NT gas from Darwin through to Adelaide…although still early, the economic case for NT gas is building.

We lift our Target Price to $0.63/share

We had set our previous target price as being equivalent to our low-point valuation to reflect the then technical, market and operating uncertainties, noting the potential for a significant re-rating on delivery of drilling results.

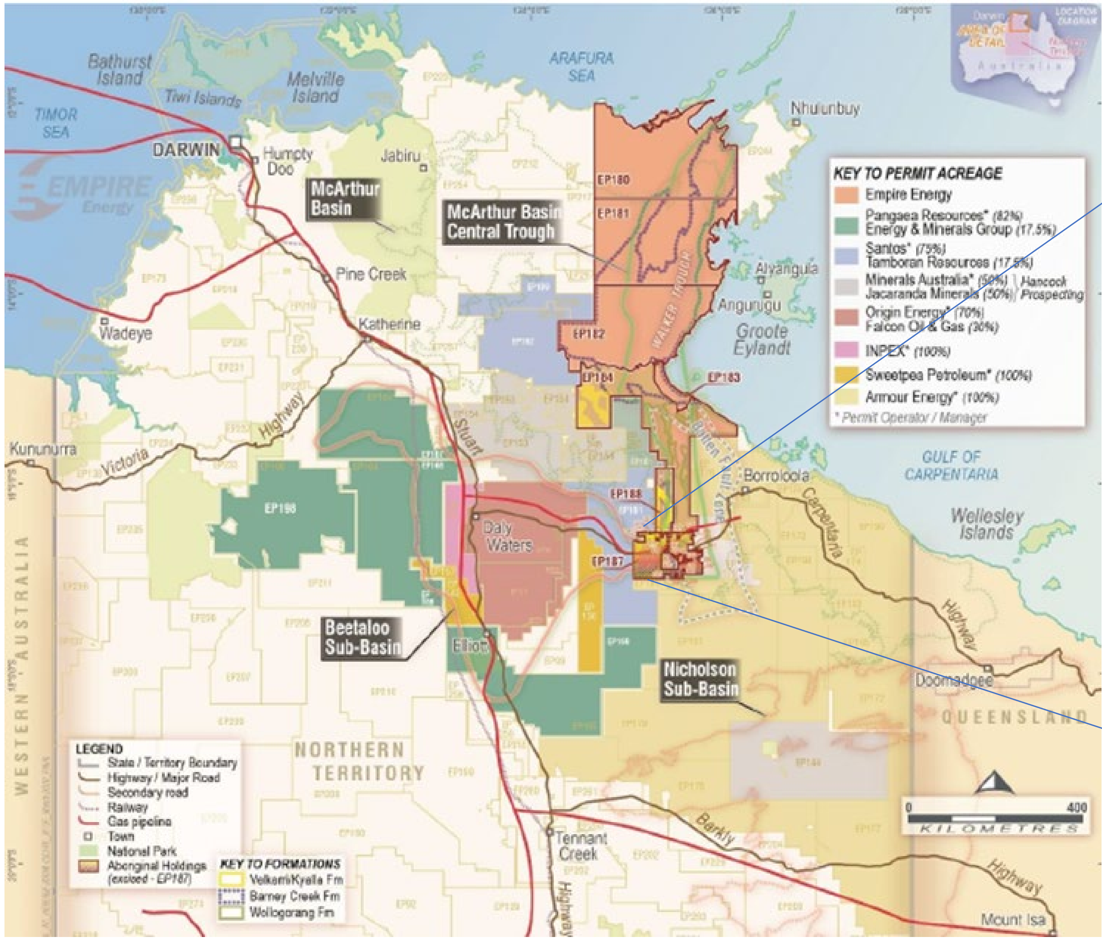
Figure 1: A valuation range based on current Prospective Resource estimates underpins the share price at the 'low' end

			Risked Range			
		Pr	**Low**	**Mid**	**High**	
Northern Territory	100%					
Gas		7.5%	$56	$111	$290	After discounting and averaging, we raise the success factor to 7.5%, which could be considered too low
Liquids		7.5%	$17	$60	$157	
US Onshore			$17	$23	$29	Based on recent EEG Independent Assessment adjusted for 2020 production (year to date).
			$90	**$194**	**$476**	
Net Cash/(debt)				$16		Company is 'net cash pre-drilling'
Corporate costs				($5)		
TOTAL			**$101**	**$205**	**$487**	**A mid case 66% premium to the reference price (38cps close trading 14-Oct)**
			$0.31	**$0.63**	**$1.51**	
Shares on issue (mn)	324					Recent options exercise increases issued capital, offsetting changes to risk weightings

Source: Analyst estimates

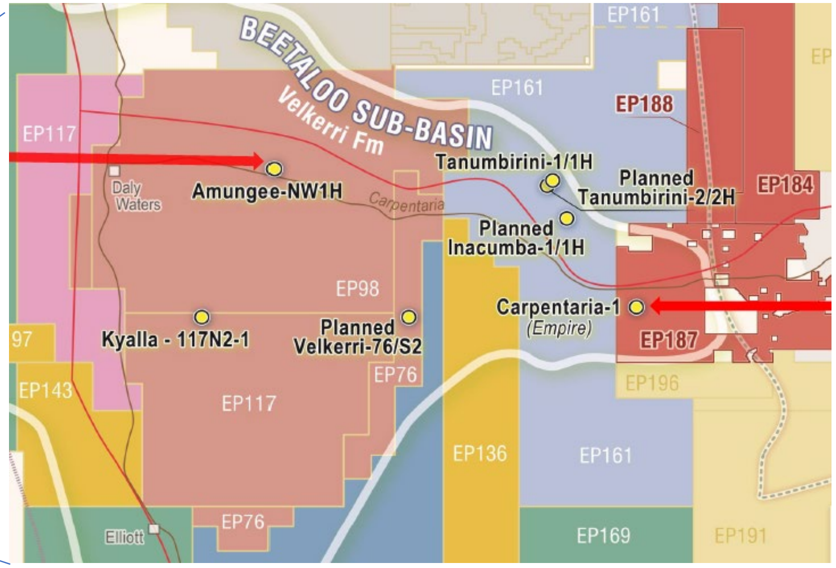
On the strong results posted from Carpentaria-1 we believe the mid-point (risk-weighted) of our valuation range better reflects the next point in the re-rating process. Successful testing underpinning positive revisions to reserves/resources and better definition of the commercial parameters could be the catalyst to the next share price re-rating.

Figure 2: As a reference point – Carpentaria-1 is the tip of the EEG gas iceberg



The primary focus of EEG's work is on EP187, tying into current and previous work programmes as conducted by both STO and ORG. The permit contains the geological margin of the Beetaloo Sub-basin, which has been identified as a 'liquids rich gas fairway' by Origin Energy'

Source: Côté et al, The APPEA Journal - 2018



In many aspects, Carpentaria-1 will provide the first significant data of the liquid rich gas play, in terms of defining the commercial potential.

The testing data in particular, will determine the operational characteristics of the play…recoveries, rates and ratios.

Source: Company data

What could it be worth?

In assessing the range of potential values that could be generated from a liquids rich play, we restrict our analysis to the Carpentaria Prospect which was assigned pre-drill dry gas potential of ~1.8Tcf as a 'best' estimate resource (**Fig. 3**). We believe 1.8Tcf continues to represent an adequate benchmark, notwithstanding <u>the absence of the Lower Kyalla sequence at this location</u>, which is likely to be offset by the thicker Velkerri intersection as drilled and the remaining uncertainty associated with the seismic mapping.

Figure 3: Prospective Resources across Carpentaria, which has stand-alone, transformational potential

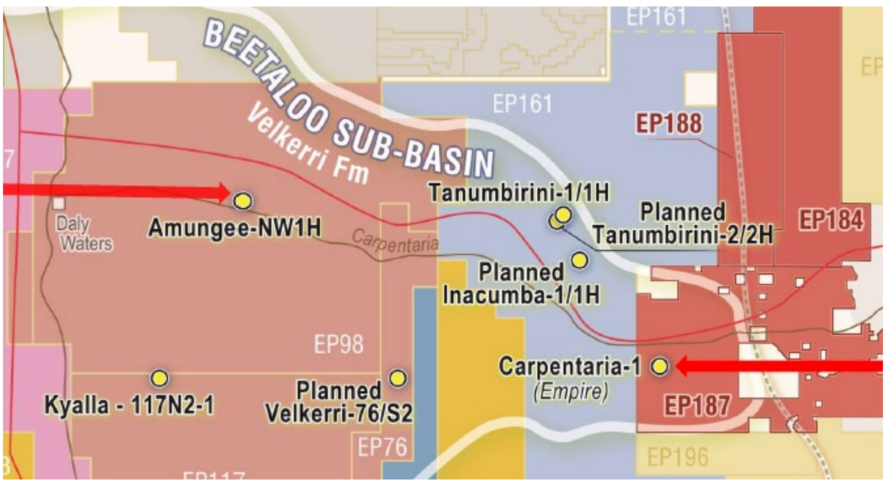
EP187		Undiscovered Original Gas-in-Place (BCF)			Unrisked Gross (100%) Prospective Gas Resources (BCF)			Unrisked Gross (100%) Prospective Oil Equivalent Volumes (MMBOE)		
Prospect	Reservoir	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)	Low Estimate (1U)	Best Estimate (2U)	High Estimate (3U)
~~Carpentaria~~	~~Lower Kyalla~~	~~387~~	~~540~~	~~768~~	~~19~~	~~54~~	~~115~~	~~4~~	~~11~~	~~24~~
Carpentaria	Mid Velkerri A	868	1,220	1,616	43	122	323	7	21	56
Carpentaria	Mid Velkerri B	3,796	4,715	5,808	569	943	1,743	95	160	303
Carpentaria	Mid Velkerri C	2,669	3,379	4,178	400	676	1,254	67	115	218
Carpentaria	**Aggregate**				**1,031**	**1,795**	**3,435**			

Source: Company data – volumes set on a dry gas basis

We refer to an APPEA published paper (Côté et al, The APPEA Journal – 2018) for broad guidance on what the liquids rich gas opportunity could look like, bearing in mind that the analysis is based on a limited set of data points. We highlight a number of pertinent points:

- "*Origin interprets a liquids rich gas play fairway within the Velkerri Formation along the northern and south-eastern limits of the Beetaloo Sub-basin east.*" **(Fig 4)**
- *"The total porosity and absolute permeability of the shales appears to be higher on the flanks than in the centre of Beetaloo east; however, in situ gas and water saturations are relatively unknown."*
- *"Regional gas composition and maturity data indicate a possible CGR in the region of <u>5–40b/mmcf.</u>"* (emphasis added).
- *"A horizontal fracture stimulated well, testing the deliverability of the resource, is required to assess the technical viability of this play."*

Figure 4: Note the location of Carpentaria with respect to the Amungee (ORG) and Tanumbirini (STO) data points



Source: Company data (cropped diagram)

In general terms the Beetaloo sub-basin margin can be considered as the extent of the Velkerri liquids rich gas play, but at this stage the data set is limited to only a few wells and regional 2D seismic coverage.

The margin as mapped is defined in places by outcrop but the extent of the liquids play is still subject to interpretation.

The ratio range of 5 - 40b/mmcf is broad and naturally reflects the uncertainties in the absence of testing data, which will be provided at least by EEG in the next Carpentaria phase, but perhaps also by both ORG and STO in their respective campaigns.

We estimate **Carpentaria could hold 10-70Mb of liquids.** Against an average forecast liquids price of A$77/b over 10 years (TC commodity price deck), we estimate an unrisked NPV range with a base of A$150mn, noting multiples of upside.

We do not imply this is the basis of a risked value that should be included against the liquids' potential of the assets, but simply highlight the impact that the defining of a gas-liquids rich play can underpin. It is always worth reiterating…**gas liquids can be the game changer**.

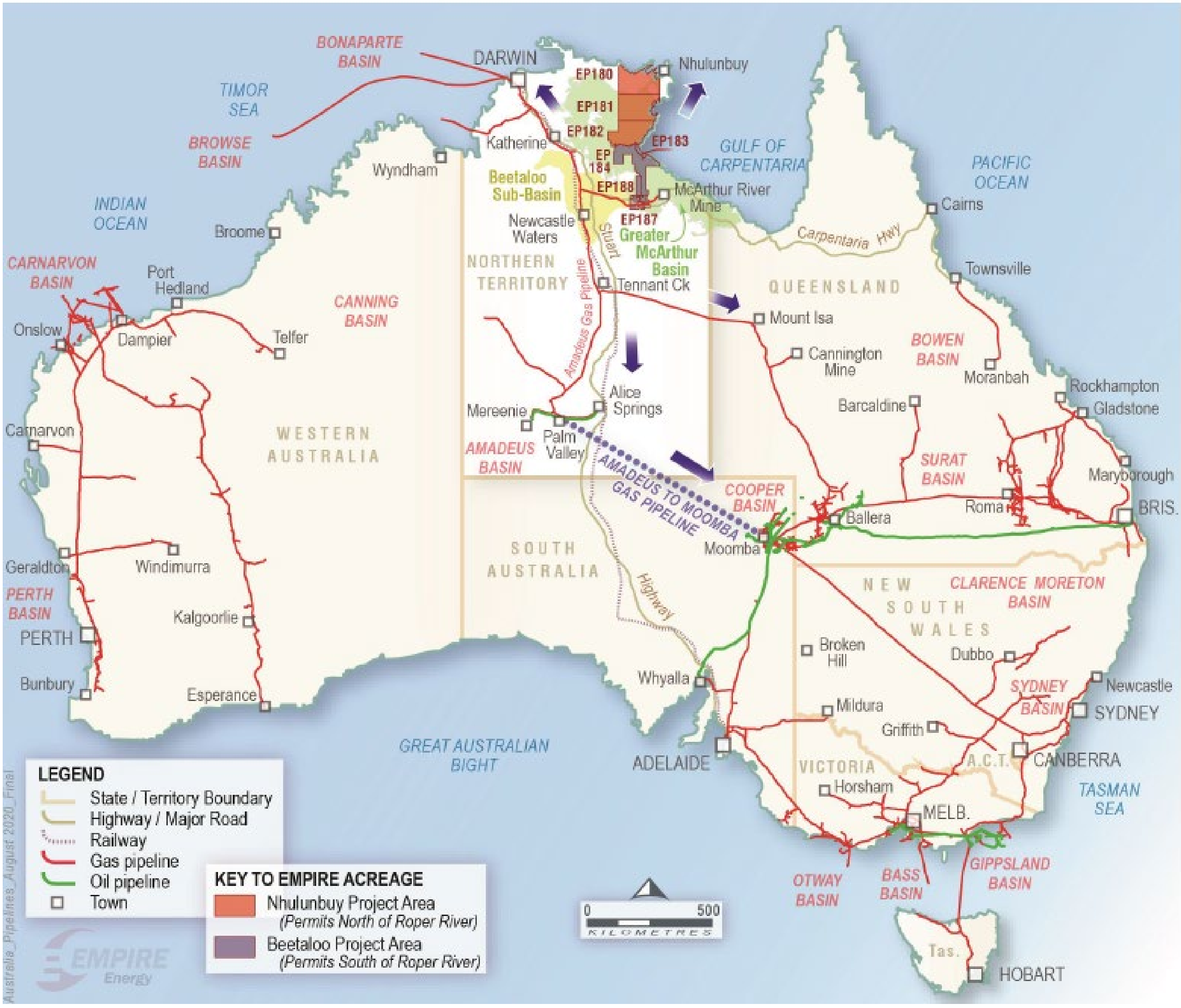
Infrastructure plans support the economic case

If there is one map that captures the commercial setting it is outlined in **Fig.5**. Infrastructure construction and expansion to provide capacity to end markets is a significant and key risk to economic outcomes.

The Northern Territory (NT) has a strategy to assist in the development of regional infrastructure to support its aim to create a Darwin LNG hub and to link into the eastern gas markets.

The transmission gas pipeline network in the NT at this point is limited to the Amadeus to Darwin and Northern gas pipelines, which would require significant upgrading and expansion. The addition of a pipeline link to Moomba opens up the supply opportunity in a tangible way, from Darwin to Adelaide, through direct supply or gas swaps.

Figure 5: The expansion of the integrated pipeline network makes the economic case for NT gas stronger



Source: Company data

Multiple points of sale in the network does not guarantee commercial outcomes. Gas from the Beetaloo/McArthur basins is still remote for eastern markets on a direct supply basis, but the development of a swap market at say Moomba and an expanded Wallumbilla hub would be an important mechanism for trading and certainly for gas price discovery.

The proposed 950km Amadeus to Moomba Gas Pipeline, is expected to cost at least $1.2Bn and is targeted to come online in the March quarter of 2024. The southerly connection from the NT to Moomba, is one of the key projects nominated for government support with a construction go ahead targeted for 2H21. The timing looks right for potential Beetaloo gas projects.

The proposed pipeline is being designed for 124TJd (45PJ pa) and like all pipelines, will have the capacity to be expanded where necessary.

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Date Prepared: October 2020

Analyst: Andrew Williams

Release Authorised by: Scott Dolling

TAYLOR COLLISON LIMITED
Sharebrokers and Investment Advisors
Established 1928

ADELAIDE
Level 16, 211 Victoria Square
Adelaide SA 5000
GPO Box 2046
Adelaide SA 5001
Telephone 08 8217 3900
Facsimile 08 8321 3506
broker@taylorcollison.com.au

SYDNEY
Level 10, 151 Macquarie Street
Sydney NSW 2000
GPO Box 4261
Sydney NSW 2001
Telephone 02 9377 1500
Facsimile 02 9232 1677
sydney1@taylorcollison.com.au

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ABN 53008172450
AFSL 247083