Empire Energy Group Ltd

Update Report

Gas bells are ringing

Energy

4 April 2023

Empire Energy Group Limited (ASX:EEG) is an oil and gas producer/developer, with onshore Northern Territory (NT) and US oil/gas production assets. EEG has the largest tenement position in the highly prospective Greater McArthur Basin, which includes the Beetaloo Sub-basin. The NT energy basins are fast developing as strategic high-calorific gas bolsters for east coast Australia's future domestic requirements, growing Gladstone LNG ullage and potential supply for Darwin's expanding LNG export terminals, amid funding support from Territory and Federal governments. Empire Energy represents a pure, independent, and highly leveraged exposure to the transformational potential of the NT basins. Recent data from well testing is hitting the commercial threshold. One result is not definitive or unequivocal, but boxes are being ticked on gas rates and EURs and economic confidence is rising. EEG is sitting on an extensive and pervasive gas resource and what works in one well is highly likely to be replicable in others. The pathway and timeline to early commercialisation remains on track. We expect the share price discount to materially unwind as the development model firms and the company moves towards a final investment decision (FID) and first gas over the next 18 months to two years.

Business model

Empire Energy Group Limited (EEG), is an oil and gas development and production company, focused on maturing its portfolio of onshore, long-life oil and gas opportunities. The key asset is the substantial tenement holdings across the world-class McArthur-Beetaloo basins in the NT where testing and evaluation data underpins the potential for material increases in gas resource bookings supporting an early gas development option. In practical terms the company can be considered to be in a pre-development phase. Success from this point should see EEG on an accelerated path to first gas. EEG holds a current cash balance of ~$15.7mn with $15mn in undrawn debt and $7.6mn remaining in Beetaloo Drilling Program grants.

If it is not there yet, it is getting very close

We highlight the additional testing data from Carpentaria-2H, recording an IP30 average of 3.0mmcfd (normalised), ticking the box on the required threshold flow rate for commerciality. Preliminary independent analyses indicate EURs of between 6.2Bcf (~7PJ) on a P_{50} case up to 8.1Bcf (~9PJ) on a P_{10} case for a well with a 3,000m lateral and 60 frack stages – another box ticked. Well costs are estimated to be as low as $15mn/well in a development case or $2-3/gj with additional optimisation benefits to come. We see the potential for a material de-risking across the portfolio across the next 12 months with success cases providing the platform for financing and potential partnering arrangements.

The valuation shows the size of the success case

Whilst valuing pre-development phase assets is a subjective exercise, new data to hand builds confidence in the economic and commercial with more re-rating events to come – more testing data, upgraded resource estimates and sales contracts with a project sanction by end 2023. We maintain our base-case (mid-point) valuation of $642mn ($0.83/share) with an upside case to $770mn ($1.03/share). Against a reference share price of $0.155/share, this suggests the market is risk weighting the EP 187 (Carpentaria option) at around 23% of our ascribed value. The success case at Carpentaria is rapidly building and could deliver valuation upside well in excess of our base case…such is the nature and attraction of gas plays in the proof-of-concept phase.

Share Details

ASX code	EEG
Share price (3-Apr)	$0.16
Market capitalisation	$123.7M
Shares on issue	773M
Cash (current)	$15.7M
Free float	~47%

Share Performance (12 months)

Upside Case

- Success cases at currently evaluating Carpentaria (-2H, -3H and -4V) wells delivering above-expectation testing data
- Delivery of initial 'P' certification to underpin commercial development case
- Securing a binding off-take agreement and/or a farm-in partner to offset market perceptions of future equity dilution

Downside Case

- Frack performance of C-3H in particular falls below expectations
- Continuing Federal Government development and approval hurdles slowing progress to first gas
- Continuing financing reliance through equity issues on weaker field data resulting in excessive share dilution

Board of Directors

Alex Underwood	Managing Director / CEO
Paul Espie AO	Chair
Dr John Warburton	Non-Executive Director
Peter Cleary	Non-Executive Director
Louis Rozman	Non-Executive Director
Paul Fudge	Non-Executive Director

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***Analyst holds shares**

RaaS
Research as a Service

The Gas Data Keeps Coming And In This Case, 'More Is More'

Empire Energy has released further data from the ongoing flow testing of its Carpentaria gas play, delivering results supporting the commercial case for a Beetaloo gas project.

Whilst only related to the Carpentaria-2H (C-2H) well at this time and only an incomplete data set, given the consistency of the geology and pervasive nature of the play, we retain a high level of confidence that the results can be replicated across the immediate Carpentaria area…**what works here will work across the play**.

More data is required and it's probably too early to be unequivocal, but the C-2H data is ticking boxes and there aren't many more to tick from an operational (field) perspective.

The company enterprise value(~$125mn) at the reference share price reflects a discount of ~69% to our ascribed value of the mid-point 2C gas volumes only. The discount to the resource value likely reflects a bearish market sentiment to gas policy uncertainty, residual concerns on the economic case, and perhaps anticipation of an equity raise…or just the small company discount in a market in a risk-off investing phase.

We would highlight that this discount is not unusual compared to the unit values the market is applying to the sector. However, **de-risking the type curves, material upgrades to gas resources, and definitive progress through FEED to FID should close the 'value gap'** and underpin a resource rating as financed, commercial outcomes become more tangibly demonstrable.

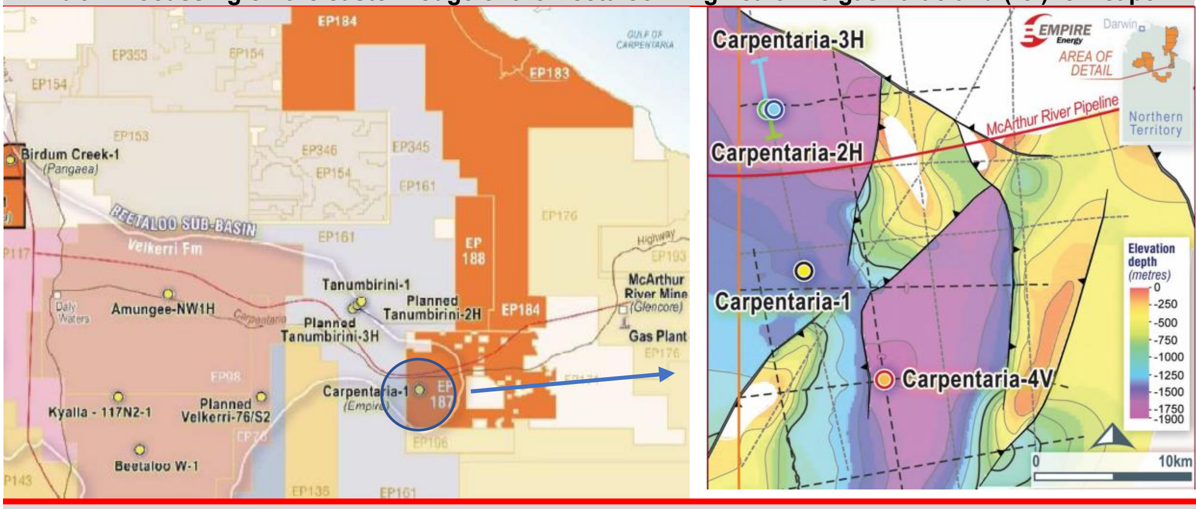
The value proposition lies in being able to unlock gas opportunity.

Exhibit 1: The business case is not set in cement but we are getting ready to pour the foundations

Carpentaria-2H (C-2H) The well placed a hz section of 927m in the Velkerri B and was iniitally flow tested for 51 days before being shut-in	EEG has reported an **IP30 rate of 2.81mmcfd**, noting this is **34% higher than the corresponding initial test result and continuing to demonstrate a lower rate of decline**. **On an extrapolated basis (per 1,000m) the test rate normalises to 3.0mmcfd and that is the nominal benchmark advocated for the deeper, more central parts of the basin**. Reaching the threshold rate means comparatively more to EEG simply because of its lower capex base. *C-2H is approaching its regulatory limit for testing (90 days per well) but importantly has clearly demonstrated the commercial potential of the play at this location, noting also that -2H does not represent the final development well model, having been completed and trialling four different frack designs.* *In comparative terms against the initial phase of testing, the well is running 34% more productively at a nominal decline rate of 14% versus 18% for the 30-day period.*
Look-through capital costs also support the economic case	Analyses completed by Subsurface Dynamics Inc. (SSD) on the flow data indicates EURs (gas recovery per well) of between 6.2Bcf (~7PJ) on a P_{50} (50% Prob) case up to 8.1Bcf (~9PJ) on a P_{10} case for a well with a 3,000m lateral and 60 frack stages (every 50m). Bearing in mind that frack optimisation is still a work in progress, we suggest this data may represent the lower end of a base-case range.
Well capex numbers are perhaps starting to crystallise	Early estimates suggest capex in the order of ~$20mn for a 3,000m hz and 60 frack stage well, in a pilot case potentially reducing to ~$15mn in a development case (accounting for scale economies) which would represent unit drilling and completion costs of ~$2-3/gj on a project basis. As per all assumptions to date we believe this should be considered as perhaps the higher end of a base-case range given the design is yet to be finalised.
What's next?	• More testing, with the C-3H well still undergoing 'soaking' after initially being flowed for 27 days. In referencing the improved performance from the -2H well, -3H results will provide further calibration of the operational and commercial parameters.economics. The C-3H well is contains a **2,632m lateral completion in the Velkerri-B horizon** with over 90% contained within the target horizon; and is approximately 150m deeper than in the -2H.well, with 40 frack stages. • Update resources certification across the Carpentaria area incorporating the low data and C-4V results is expected by mid-2023. *We expect a material upgrade.* • Ongoing FEED studies to tie down planning, design and costs; and securing bankable gas sales agreement heading to a first-mover project anticipated to be sanctioned (FID) by end 2023.
Financing position remains comfortable	EEG holds a cash balance of ~A$15.7mn with $15mn in undrawn debt and $7.6mn remaining against the Beetaloo Cooperative Drilling Program grants.

Source: Company data; *RaaS commentary*

Exhibit 2: Focussing on the eastern edge of the Beetaloo – high calorific gas value and (rel) low capex

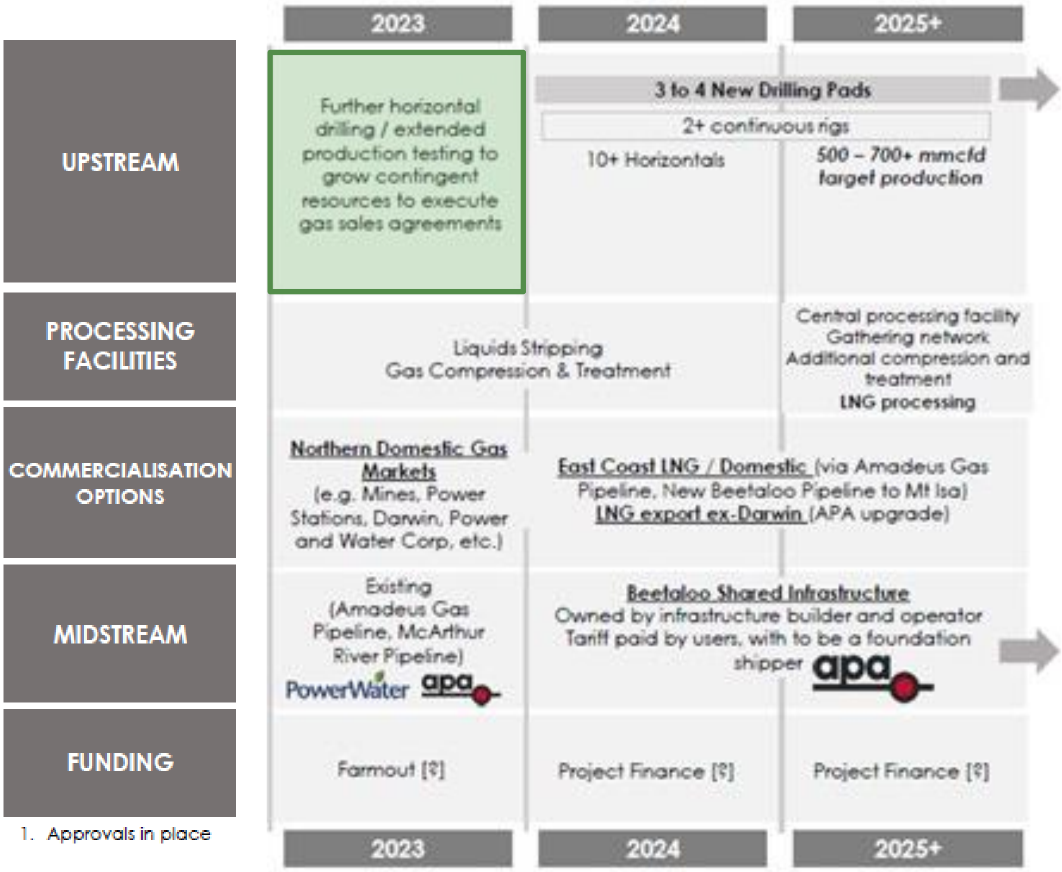


Source: Company data

Gas Data To Support The Timeline To First Gas

We suggest building the set of the testing data and next increment of resources certification continues to support the company's timeline to a project FID and start-up by end-2023.

Exhibit 3: A timeline and a plan to first production



Source: Company data

We reiterate comments made in previous update notes:

Any-development project will probably be undertaken on a phased basis, with local gas supply supporting an extended commercial proof-of-concept and providing important early cash-flow and operational experience.

The company has identified a number of opportunities in local power generation for township and mining operations that could aggregate to a 'starter' project of up to 25TJd (9PJ pa) of high calorific gas.

This may only require three-four wells from one drilling pad and be in production sometime in 2024. ***At a gas price of say $10-12/gj, a project at this scale could generate $90-108mn pa*** *at ramped supply, at low operating cost with the gas likely requiring only minimal processing and compression.*

A successful Phase 1 project would represent an important 'proof-of-project' model providing a substantial operational and finance base on which to build, delivering important initial cash flow to support further financing (debt and partnering options) whilst minimising dilution of the capital base.

Beetaloo Gas Can Progress Despite The Political Hurdles

The Federal Government has recently announced a series of changes to the Safeguard Mechanism legislation. Amongst a number of points, we highlight the following as likely impacting proposed Beetaloo projects directly:

- Beetaloo projects **particularly singled out** requiring Net Zero Scope 1 emissions from Day-1;
- All new gas developments supplying into LNG projects (not new LNG projects) need to be Net Zero from Day 1 as per international best practice as a standard.

The implications that follow suggest the approvals process could be longer and potentially more complicated, particularly if under the legislation the requisite federal minister becomes directly involved. We understand that an application for a new (greenfield) Queensland gas project will be submitted in July that should be the first practical test of the application of the new regulations.

Capex and opex will nominally rise on offsets and mitigation processes rise. Nominally, these costs could be offset by rising gas prices but subject to the 'reasonable pricing provisions'. However, we suggest these imposts could be a material issue for high CO_2 projects noting **that EEG is reporting CO_2 contents of <1% for its resources**, compared to the deeper parts of the Beetaloo with tag levels of 3-4%.

We suggest the economic impost to EEG will be at the margin.

The requirement for net zero reservoir CO_2 is considered international best practice only for fields that supply LNG. Fields developed for domestic supply will not necessarily have the same international best-practice requirement as we understand the intention.

The best-practice requirement for domestic gas will be determined over the coming months in consultation with industry and other stakeholders. In that respect final operating conditions can be considered as somewhat uncertain, but applying the 'LNG supply standard' as a worst-case outcome, should still only result in cost at the margin given the intrinsically low CO_2 component of the gas stream.

RaaS Research as a Service

Our Valuation Remains Unchanged In The Range Of $502mn-$770mn

We maintain our value range for EEG between $0.68-1.03/share **with a mid-point (base case) of $0.83/share,** noting the closing share price of $0.155/share (3-April) represents a 84% discount to the low end of the NAV range and in isolation can be considered a risk weighting of ~69% to our assigned value of the 2C resources.

Exhibit 4: The risked NAV range represents a material premium to the market price

		Risked range (A$m)			
		Low	Mid	High	
Northern Territory					
Contingent Resources		$328	$378	$479	2C volumes certified to 554Bcf of which 396Bcf (~70%) are attributed to EP 187 and 295Bcf to the mid-Velkerri B zone.
Prospective Resources		$147	$202	$242	2U volumes are largely associated with ex-EP 187 and ex-Pangaea tenements and represent longer-dated gas potential. The geological confidence level is relatively high on the look-through, but realisation will require extensive drilling campaigns.
US Onshore		$39	$48	$66	Benefitting from higher US gas prices…these assets are self-funding.
		$514	**$629**	**$788**	
Net cash/(debt)			$17		
Corporate			($5)		
TOTAL		**$525**	**$640**	**$799**	
Shares issued (mn)	773	$0.68	$0.83	$1.03	

Source: RaaS analysis; Risked ranges based on discretionary RaaS risk adjustments

We would highlight that this discount is not unusual compared to the unit values the market is applying to the sector.

However, **additional flow data and updated reserves declarations due before mid-year should close the 'value gap'** and underpin a resource rating as commercial outcomes become more tangibly demonstrable.

Research as a Service

Exhibit 5: Financial Summary

nm = not meaningful
na = not applicable

EMPIRE ENERGY GROUP LTD		EEG	
YEAR END		Dec	
NAV	A$mn	$0.68	
SHARE PRICE	A$cps	$0.155	priced as of close trading 3-Apr
MARKET CAP	A$mn	120	
ORDINARY SHARES	M	773	
OPTIONS	M	10	

COMMODITY ASSUMPTIONS		2020	2021	2022E	2023E
Realised oil price	US$/b	39.48	67.98	94.25	79.32
Realised gas price	US$/mcf	1.96	3.72	6.42	4.21
Exchange Rate	A$:US$	0.6989	0.7514	0.6946	0.6819

RATIO ANALYSIS		2020	2021	2022E	2023E
Shares Outstanding	M	324	612	773	773
EPS (pre sig items)	UScps		(2.41)	(0.54)	(0.14)
EPS	Acps	(2.73)	(2.41)	(0.54)	(0.14)
PER	x		na	na	na
OCFPS	Acps	(0.61)	(5.35)	37.40	2.11
CFR	x		na	na	na
DPS	Acps				
Dividend Yield	%				
BVPS	Acps	13.4	23.8	23.7	24.2
Price/Book	x			0.7x	0.6x
ROE	%			na	na
ROA	%			na	na
(Trailing) Debt/Cash	x				
Interest Cover	x				
Gross Profit/share	Acps	3.7	5.7	5.9	7.6
EBITDAX	A$M	2.9	3.0	6.7	6.8
EBITDAX Ratio	%				

EARNINGS	A$000s	2020	2021	2022E	2023E
Revenue		6,464	8,502	12,662	11,421
Cost of sales		(5,266)	(5,005)	(8,135)	(5,534)
Gross Profit		**1,198**	**3,497**	**4,527**	**5,887**
Other revenue					
Other income		1,039	1,606	1,927	293
Exploration written off					
Finance costs		(755)	(568)	(677)	(668)
Impairment		0	0	(2,705)	0
Other expenses		(8,682)	(14,332)	(8,511)	(6,764)
EBIT		(7,013)	(11,305)	(1,851)	166
Profit before tax		**(7,485)**	**(10,835)**	**(3,983)**	**(877)**
Taxes		(200)	(213)	(213)	(200)
NPAT Reported		**(7,684)**	**(11,048)**	**(4,196)**	**(1,077)**
Underlying Adjustments		0	0	0	0
NPAT Underlying		**(7,684)**	**(11,048)**	**(4,196)**	**(1,077)**

CASHFLOW	A$000s	2020	2021	2022E	2023E
Operational Cash Flow		**(1,970)**	**(7,044)**	**13,796**	**1,686**
Net Interest		(755)	(568)	(677)	(455)
Taxes Paid		(200)	(213)	(187)	(120)
Other					
Net Operating Cashflow		**(2,924)**	**(2,460)**	**20,082**	**1,110**
Exploration		(856)	0	0	(4,181)
PP&E		(12)	0	(133)	(5)
Petroleum Assets		(12,841)	(12,965)	(54)	0
Net Asset Sales/other		0	0	0	0
Net Investing Cashflow		**(12,841)**	**(24,443)**	**(50,419)**	**(7,500)**
Dividends Paid					
Net Debt Drawdown		(1,845)	(817)	(793)	(500)
Equity Issues/(Buyback)		17,640	39,359	28,928	0
Other					
Net Financing Cashflow		**15,795**	**38,542**	**28,550**	**(500)**
Net Change in Cash		**29**	**11,639**	**(1,786)**	**(6,890)**

BALANCE SHEET	A$000s	2020	2,021	2022E	2023E
Cash & Equivalents		14,146	25,650	24,092	17,202
O&G Properties		46,442	34,900	85,635	93,429
PPE + ROU Assets		1,716	1,306	1,328	860
Total Assets		**66,563**	**158,823**	**207,710**	**207,609**
Debt		7,824	8,027	8,120	7,307
Total Liabilities		**36,327**	**49,502**	**80,232**	**80,020**
Total Net Assets/Equity		**30,236**	**109,320**	**127,477**	**127,589**
Net Cash/(Debt)		6,322	17,622	15,972	9,895
Gearing dn/(dn+e)					

NET PRODUCTION		2020	2021	2022E	2023E
Crude Oil	kb	2	2	2	2
Nat Gas	mmcf	1,630	1,676	1,727	1,727
TOTAL	**kboe**	**273**	**282**	**290**	**290**
Product Revenue	A$mn	6.5	8.5	12.7	11.4
Cash Costs	A$mn	(5.3)	(5.0)	(8.1)	(5.5)
Ave Price Realised	A$/boe	23.64	30.17	43.66	39.41
Cash Costs	A$/boe	(19.26)	(17.76)	(28.05)	(19.10)
Cash Margin		**4.38**	**12.41**	**15.61**	**20.32**

RESOURCES and RESERVES	Contingent Resources			Prospective Resources		
	1C	2C	3C	1U	2U	3U
Northern Territory						
Gas (Bcf)	138.8	553.5	1,707.8	12,561	42,928	139,488
Liquids (Mb)	0.9	5.0	14.1	170	797	3,633
TOTAL (Mboe)	**24.0**	**97.2**	**298.8**	**2,264**	**7,952**	**26,881**
US Onshore						
	1P	2P	3P			
Gas (Bcf)	28	38	42			

EQUITY VALUATION	Risked Range			Low	Mid	High
A$mn	Low	Mid	High		A$/share	
Northern Territory						
Contingent Resources	328	378	479	$0.42	$0.49	$0.62
Scenario Weighting	3%	2%	1%			
Prospective Resources	147	202	242	$0.19	$0.26	$0.31
US Onshore						
Appalachian	39	48	66	$0.05	$0.06	$0.09
	514	**629**	**788**	**$0.66**	**$0.81**	**$1.02**
Net cash/(debt)		17				
Corporate costs		(5.0)				
TOTAL	**525**	**640**	**799**	**$0.68**	**$0.83**	**$1.03**
Shares on issue (mn)	773 mn					

Source: RaaS Advisory, company data

FINANCIAL SERVICES GUIDE

RaaS Advisory Pty Ltd

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of

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Effective Date: 6th May 2021

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In writing to: Australian Financial Complaints Authority, GPO Box 3, Melbourne, VIC, 3001.

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