

Empyrean Energy

THREE PILLARS FOR SUCCESS

EME

Capital Structure

ASX Code: EME	
Shares	399 m.
Options	30 m.
Price	£0.093
Market Cap	£37 m.
Cash (est Dec '17)	£1.0 m.

Valuation

Valuation	£m.	£/shr
Duyung	44.0	0.091
Cash (est Dec '17)	1.0	0.002
Options + New equity	5.9	0.012
Admin	(1.6)	(0.003)
Base value	49.4	0.102
Risked Dempsey	7.5	0.016
Risked California	38.9	0.081
Block 29/11	24.2	0.050
Total Risked value	£120	£0.248

Source: Strachan Corporate

Board

Dr Patrick Cross	Non-Exec Chairman
Tom Kelly	Managing Director
Frank Brophy	Technical Director
Gaz Bisht	Executive Director
John Laycock	Finance Director

Investment Drivers

- ♦ **RISKED VALUATION:** Strachan Corporate assesses a diluted risked valuation for the company's net cash plus Indonesian gas discovery of £49 million or £0.10 per share. Adding risked value for the company's Californian acreage and Chinese exploration portfolio lifts the risked target value to £120 million or £0.25 per share. The company's exposure to California has an un-risked value potential to over £1 per share on success.
- ♦ **HIGH IMPACT DRILLING IN NORTHERN CALIFORNIA:** Early gas shows seen in shallow Forbes Formation sediments above a depth of ~1,350 metres support a thesis for commercial gas and potential for deeper targets at the Dempsey prospect. Empyrean's project targets multi-Tcf scale gas in a premium gas market in the USA, which is becoming a net gas exporter for the first time.
- ♦ **ACQUIRING SEISMIC OVER RECENT INDONESIAN GAS DISCOVERY:** Drilling on the Mako gas field demonstrated strong gas delivery from a 7 metre net pay zone. 3D seismic will be used to further define gas Resource size ahead of developing or monetising the asset. Indonesia is set to become a net LNG importer by 2022, supporting an already strong gas market.
- ♦ **SEISMIC SURVEY OVER SUBSTANTIAL OIL PROSPECTS OFFSHORE CHINA:** 3D seismic data over the Jade and Topaz oil targets offshore China, set for acquisition during H2 '17 will be used to select drill locations ahead of attracting funding to drill in 2018.
- ♦ **FUNDED FOR SUCCESS:** Empyrean has about US\$6 million of net cash with plans to spend about US\$4 million during H2 '17.

Empyrean's activity schedule at project areas

Project	Sep Qtr 17	Dec Qtr 17	Mar Qtr 18	Jun Qtr 18	Dec Qtr 18
California 25-30%	Dempsey drilling	Alvares drill/re-enter	Follow-up Dempsey		
Duyung 10%	Mako core analysis	3D seismic Survey	Interpretation & analysis	Well planning. Monetise or fund to develop.	
Block 29/11 100%	3D seismic survey	Technical evaluation & well planning		Farm-out to drill	



Opinion

Empyrean is generating a steady stream of news from three, active project areas that is likely to continue to keep the stock in focus. Exploration success in California holds significant valuation upside for the company.

Empyrean is a speculative buy. It has a strong and funded portfolio with a well planned schedule of activity running out into mid 2018.

Peter Strachan

Three pillars for growth in oil & gas

Summary

Empyrean Energy is a Perth based and London listed petroleum exploration company. Empyrean has a 10% interest in a gas discovery, offshore Indonesia. It is also working with a 100% held permit where oil is targeted, offshore China and has recently farmed in to earn a 30% interest in a high impact gas exploration project in the northern Sacramento Basin.

Sacramento Basin – Earning 25% - 30%

Empyrean has farmed-in to assist funding of drilling that is currently underway on the Dempsey gas prospect in the Sacramento Basin, where operator Sacgasco estimates potential for a ~1 Tcf discovery in several horizons at depths between 1,600 and 3,200 metres. Empyrean has paid US\$2.1 million towards dry-hole drilling costs and will then be responsible for its 30% working interest of completion costs. Strachan Corporate estimates that Empyrean will pay ~56% of total drilling and completion costs at the Dempsey well, for which it will earn a 30% working interest. Additionally, Empyrean has negotiated to earn a 30% interest in a follow-up Dempsey trend well by paying 60% of drilling costs and will earn 30% of two subsequent wells by funding 45% of drilling costs.

Large gas targets...

At the Alvares prospect, where the operator Sacgasco estimates a ~1.6 Tcf target, Empyrean has agreed to earn a 25% working interest by funding 33% of drilling costs.

Drilling at the Dempsey prospect commenced on the first of August, with an expected dry-hole cost of US\$3.8 million. Drilling is likely to run through until early September.

Forgotten Sacramento Basin

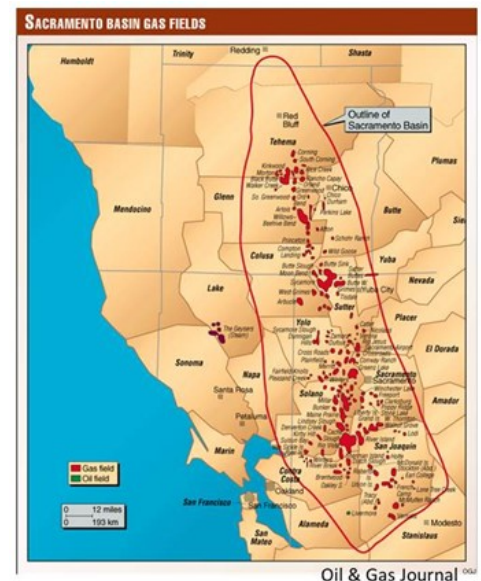
It is often said that the best place to find petroleum is where it has already been discovered. Very often, large fields lie hidden for decades before a change in geological interpretation, technology or pure luck results in a new and massive discovery in an area that had previously been thought to have been well picked over and explored.

An excellent example is the recent discovery of a very large gas field at Waitisia in the Perth Basin by AWE and Origin Energy, more than 50 years after the first gas was found in this Basin. Here, reinterpretation of geological and geophysical data, plus new technology and a lot of luck, led to what is now looking like a field of over 700 Bcf of gas, right next to a transport pipeline!

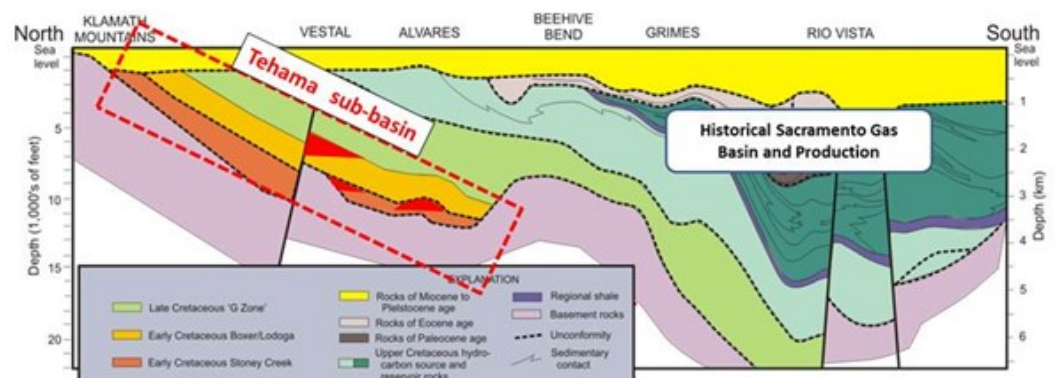
Reinterpretation of data outlines possible gas...

The Sacramento Basin sits inland from San Francisco and runs northwards towards Oregon State. The basin has produced over 7 Tcf of gas from prolific sandstone reservoirs, mostly exploited from the centre of the Basin.

In recent times the industry has focused on oil production from the south of the State and there has been very little exploration in the region since the mid 1980's.



Drilling on the flanks of the basin 30-40 years ago, focused on the potential for oil discovery. Shallow gas shows were produced but deeper sediments were largely ignored.



Prospects have been identified along the Tehama sub-basin, on the western flank of the Sacramento Basin by operator Sacgasco. Surprisingly, very little drilling has been carried out to date, even though thick gas columns were intersected. This is no better illustrated than at the Alvares prospect where over 1,500 metres of gas bearing sediments were found below a depth of about 2,500 metres.

Of the few previous wells drilled, only two are interpreted to have been drilled within structural closure and both these wells intersected up to 1,500 metres of gas shows, with samples indicating 'pipeline quality' dry gas.

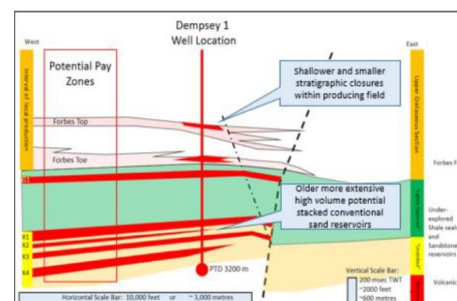
In early 2015, The California Resources Production Company and private partner Cirque Resources LP drilled the Tulainyo well in the Tehama sub-basin, located on-trend and to the south of the Alvares prospect. As always in the US oil & gas game, drilling results are kept confidential even though gas was discovered below about 1,800 metres but could not be tested. Empyrean's partner in the basin, Bombora Natural Energy (now Pancontinental Petroleum) gained exclusive and confidential access to the technical data from Tulainyo and was so impressed that it has agreed to earn up to a 33.33% interest in the project under extraordinarily generous terms, by fully funding up to three wells on the prospect. This might also explain why Pancon was keen to farm in on a suite of prospects.

This sort of background activity for the basin supports the activities of Sacgasco and its partners as it continues to lease-up prospects that it is identifying off seismic data.

Dempsey prospect

The Dempsey natural gas prospect is a flagship drilling project in the Basin, and remains the focus for near-term development plans. The prospect has the potential for near-term natural gas production because it is located adjacent to the operator's existing production facilities.

Empyrean has paid US\$2.1 million towards dry-hole costs and will meet its 30% working interest component to well completion costs. Assuming a total cost for drilling and well completion of ~US\$4.5 million, Strachan Corporate calculates that the company will be required to fund ~US\$2.4 million for the project if it is successful.



Dempsey	WI	Pay	Completed
	%	%	Cost US\$m.
Sacgasco	50%	14%	\$ 0.80
Empyrean	30%	56%	\$ 2.38
Bombora/PCL	10%	20%	\$ 0.85
Xstate	10%	10%	\$ 0.47
Total	100%	100%	\$ 4.50

The partners at the Dempsey project are tabulated, showing working and approximate paying interests with amounts in USD for a well that is tested and completed for production.

Drilling commenced on 1 August '17 and early work at shallow depths supports the programme after several significant gas shows in shallow sand units. While an assessed drilling cost of about US\$3.8 million or A\$5.1 million has been estimated, some further cost reduction might be expected in the current depressed operating climate where wages, equipment lease rates and cost of consumables are very competitive.

Operator Sacgasco interprets 7 stacked target gas reservoir units at the Dempsey prospect below 1,600 metres, where drilling will be designed as a combined appraisal and exploration well, drilled to a total depth of ~3,200 metres.

The location and extent of each target zone is based on structural and seismic stratigraphic interpretation and good quality 3D seismic, integrated into regional 2D seismic data and well information.

The company rates probability of success in a range of 40% to 10% for each individual prospective zone.

Individual, un-risked Deterministic Prospective Resources for the primary targets range from 116 Bcf to 352 Bcf of recoverable gas. Should all of the stacked reservoirs be full of gas, a cumulative un-risked recoverable Prospective Resource within the prospect could exceed 1 Tcf. Several shallow Forbes Formation sandstone targets sit above ~1,800 metres with each zone likely to hold 1-3 Bcf of gas, but the first major target zone should be reached at ~2,100 metres.

Flurry of activity based on strong results at Tulainyo well...

Available infrastructure will rapidly translate into commercial production from any discovery...

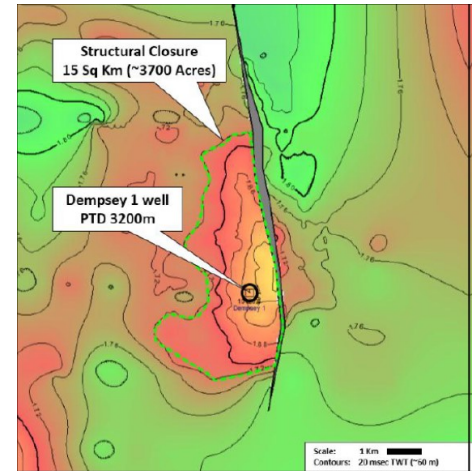
Early strong gas shows while drilling in shallow sands supports the programme...

Importantly, seismic amplitude anomalism has been found to be highly diagnostic for the presence of gas in the basin...

Primary target zones at Dempsey are interpreted to sit in a series of Cretaceous sandstone units that exhibit structurally coincident amplitude anomalies similar to those that are observed on seismic data elsewhere in the Sacramento Basin, where conventional sandstone reservoirs have trapped natural gas in mapped structural closures. This coincidence of structure, known reservoir units and seismic anomalism works to de-risk the project.

Key risks to the project going forward include:

- ◆ engineering risks associated with being able to drill a well and effectively test zones of interest.
- ◆ Unexpected zones of high reservoir pressure, which could impact on an ability to drill.
- ◆ The presence of gas in the target zones, though seismic data gives strong support.
- ◆ The quality of reservoir units intersected, which may prove to have low permeability and may thus not flow gas at a commercial rate.



Structure Map near Top X1 Reservoir

A positive result at Dempsey, no matter how small, would improve the prospectivity for identified leads and prospects that could subsequently become drilling targets. At a minimum, Strachan Corporate believes that the work has a high probability of finding enough shallow gas to repay drilling costs.

Additionally, operator Sacgasco owns gas processing and transport facilities near Dempsey that would enable the joint venture to rapidly move into production from any gas found.

Sacgasco has identified several additional prospects in the Sacramento Basin that might be considered as Dempsey look-a-likes. Empyrean has agreed to earn a 30% WI in the first three targets selected by paying 60% of the cost of the first well and 45% of the cost of the subsequent two wells.

Very large gas prospect...

Alvares

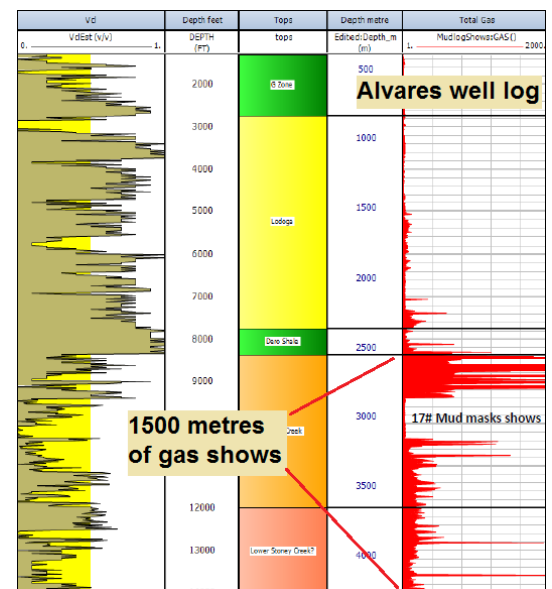
Alvares is a large structure mapped on 2D seismic. The operator interprets the prospect to hold prospective resources of over 2 Tcf of estimated potential recoverable gas. A well drilled by American Hunter Exploration Limited in 1982 exploring for deeper oil, intersected over 1,500 metres of gas shows. No valid flow test was conducted due to equipment limitations and a failure to find oil. However minor gas flows to surface were recorded even with these limitations.

Empyrean Energy has agreed to pay 33% of the dry hole well costs in the next appraisal well to earn a 25% WI in the Alvares prospect. Dry hole costs include all costs up until testing and setting of production casing or abandonment. Empyrean's 25% earn-in is capped at a total well cost for Alvares of US\$10,000,000, after which Empyrean will pay 25% of the costs moving forward. Empyrean also agreed to pay US\$20,000 upon signing of the deal.

The current status of the Alvares project sees SGC holding a 39% working interest, Xstate retaining 21%, while Pancontinental will earn 15% and Empyrean will earn a 25% working interest.

Potential for low cost re-entry & test...

Assuming that Empyrean retains a 25% WI on final drilling of a 560 Pj discovery at Alvares, Strachan Corporate calculates a value to the company of £107 million or £0.22 per share could accrue if gas has an insitu value of £0.76 (US\$0.79) per Gj.



Alvares	WI	Pay
	%	%
Sacgasco	39%	36%
Xstate	21%	17%
Empyrean	25%	33%
Pancon	15%	13%
Total	100%	100%

As currently structured, discovery of 120 Pj of gas at Dempsey would be worth £33 million to Empyrean, both of which compare favourably to the company's current market capitalisation of ~£40 million.

Joint venture partners will examine potential to use an existing well bore at Alvares to sidetrack and get a valid flow test, thus reducing costs for an initial test.

Gas production

Success at Dempsey and Alvares would see Empyrean participate in expanded gas production capacity into 2018, enabling the company to maintain solid focus on the under-supplied Californian gas market.

Leasing activity in 2017 has enabled operator Sacgasco to secure gas processing facilities, including meter stations and pipelines in the Rancho-Capay and East Rice Creek fields and adjacent to its existing SGC producing assets at Rancho-Capay. In the event of further discovery, Empyrean would benefit from access to these facilities.

California consumes an average of around 7.2 Bcf of gas daily through the year with about 90% imported from interstate. This year, following a crippling blow-out at the Aliso Canyon gas storage facility, California faces a significant gas shortage and higher pricing during the winter months commencing in November. Cold weather typically sees Californian gas demand rise to as much as 11 Bcf per day, which will not be available while the storage facility is offline.

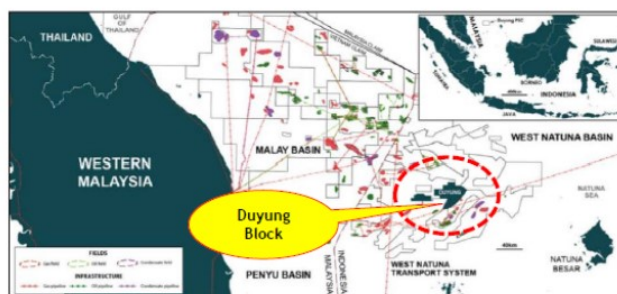
The price of gas in the USA has risen over the past year as supply remains steady but the USA ramps up a massive LNG export industry. Meanwhile, the price paid for gas by the Californian market sits at a significant premium to the Henry Hub marker price.

Success at Dempsey would translate into production revenue during 2018...

Gas at premium to HH in California...

Asian Activities

Two material projects...



Source: Empyrean

Indonesian Gas

Duyung PSC - 10%

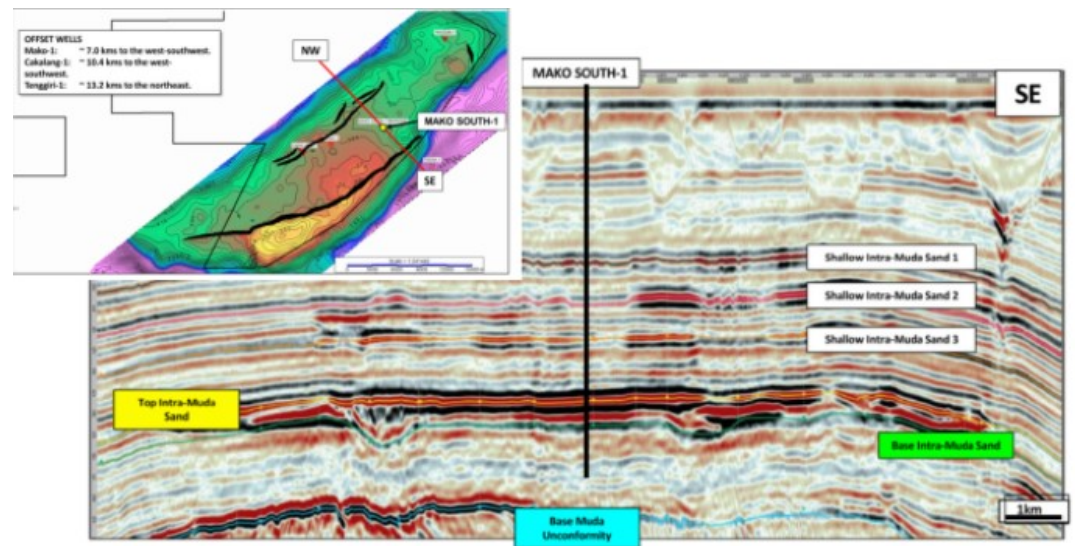
The Mako gas field is located in water depths of 60-100 metres within the Duyung PSC, close to the Indonesian government owned, West Natuna Transport System. The shallow gas field is estimated to contain between 400 billion cubic feet to 1.3 trillion cubic feet of gas-in-place, with estimated resources of ~395 Bcf of commercial gas. Three previous wells drilled at Mako between the 1970s and 1990s intersected the gas zones but were not flow tested.

Empyrean Energy participated in drilling on the Mako South gas field during July '17. Flow testing saw a pure methane gas flow of 10.9 million cubic feet of gas per day with no associated formation sand on a drill stem test through a 128/64 inch choke that was limited by test equipment,.

Logging indicates 7 metres of net pay in the shallow Muda Formation, with very high permeability, indicating that strong gas flows will be possible on production. This confirmation of flow potential will move the project towards commercial development.

Discovery of ~395 Bcf of gas...

Strong gas flow from highly permeable reservoir...



Partners in the Duyung PSC plan to follow-up this success by acquiring further seismic survey data over the field to better characterise the Muda Formation. Emyprean will then decide whether to participate in development options or monetise its interest in the project.

The PSC holds additional exploration appeal for both gas and oil.

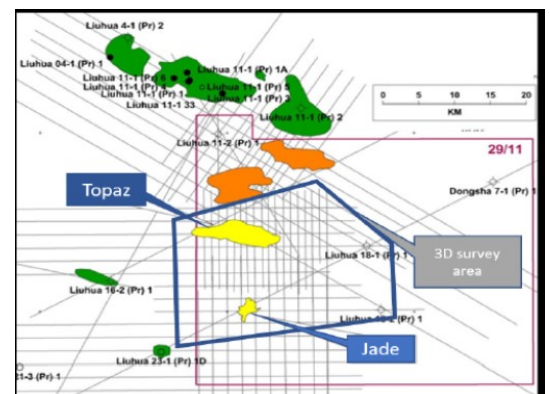
Indonesia is a premium gas market, with current pricing at around US\$8/Gj. The country has embarked on a 35,000 MW power acceleration programme, which is expected to be 35% fuelled by gas. The nation is already constructing LNG import terminals to top up supply from dwindling domestic sources and is expected to be a net gas importer from 2022.

Strong Indonesian domestic gas demand at premium price...

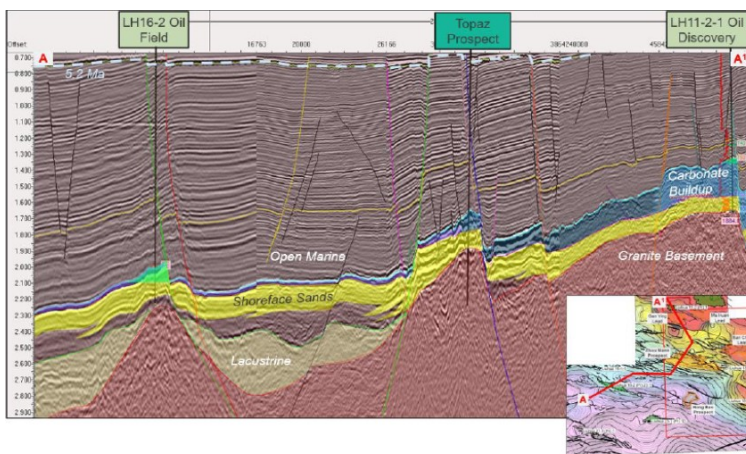
China 100% Reducing to 50% at FID

Empyrean is the operator with 100% of this 1,800 km² permit where water depths range from 340-600 metres. The company has set aside US\$3 million to acquire 3D seismic survey data over its two key prospects at Jade and Topaz during October '17, which will cover existing well-control points for accurate calibration, which will be used to define drill locations.

The project area is located to the south of the 1.3 billion barrel oil-in-place Lihua11-1 oilfield and is on-trend with CNOOC's recent discoveries immediately to the south and west of the block.



3D seismic will lead to well planning...



Source: Emyprean

Good quality legacy 2D seismic has been used to define a 4-way dip closure over a carbonate build-up structure in the permit, along with a large faulted 3-way structure Located mid-point between LH11-1 and LH16-2 oil accumulations, that appears to be a close analogue for the nearby LH16-2 oil discovery.

Jade with 80 mmbbl & Topaz with >200 mmbbl potential to be refined by 3D seismic...

Armed with this data, Emyprean aims to attract a funding farm-in partner during 2018 to drill test its targets.

Valuation

*Total risked valuation target
of ~25 pence per share...*

Strachan Corporate assesses a risked value target for Empyrean of 25 pence per share, after assuming dilution from £5 million of additional equity at the current share price. This estimate is based on a risked value for its 10% interest in an estimated 395 Bcf of gas in the Mako structure offshore Indonesia, as well as a risked value for exploration projects in California and China.

Valuation	£m.	£/shr
Duyung	44.0	0.091
Cash (est Dec '17)	1.0	0.002
Options + New equity	5.9	0.012
Admin	(1.6)	(0.003)
Base value	49.4	0.102
Risked Dempsey	7.5	0.016
Risked California	38.9	0.081
Block 29/11	24.2	0.050
Total Risked value	£120	£0.248

Source: Strachan Corporate

Prospect	WI		Target				Success		POS	Cost	Risked
	%	% rtn	Gas Bcf	Oil mmbbl	ISV		value £m	EME £/shr			
					Gas	Oil					
Dempsey	30%	30%	120	2	£0.77	£9.2	£33	£0.07	25%	0.8	8
Dempsey shallow	30%	30%	3	0	£0.77	£9.2	£1	£0.00	50%	0.8	0
Dempsey upside	30%	30%	980	2	£0.77	£9.2	£232	£0.48	8%	6.9	12
Dempsey Trend one	30%	30%	200	2	£0.77	£9.2	£52	£0.11	12%	-0.2	6
Dempsey Trend	30%	15%	800	2	£0.77	£9.2	£95	£0.20	12%	1.0	10
Alvares	25%	25%	560	0	£0.77	£9.2	£108	£0.22	20%	9	12
Risked Sacramanto	30%	12%	1,500	2.6	£0.77	£9.2	£141	£0.29	7%	11	-1
Duyung	10%	10%	395		£1.54	£9.2	£61	£0.13	75%	2	44
Jade Block 29/11	100%	20%		80	£1.54	£6.2	£98	£0.20	25%	0	24

Source: Strachan Corporate; ISV = Insitu value per Mcf or bbl

Strachan ascribes an insitu value of US\$1 (£0.77) per Mcf of gas in California and US\$2 (£1.54) per Mcf of gas offshore Indonesia. Following a very positive drill result and flow testing on the gas field, the Mako field in the Duyung PSC is ascribed a 75% chance of commercial success (POS), which StockAnalysis believes will prove to be conservative.

The Dempsey prospect in California has a risked value at £7.5 million for EME's 30% WI, on the basis of a 25% probability of discovering 120 Bcf of gas. Success at this level is assessed to have a value of 7 pence per share, while discovery of 560 Bcf at Dempsey is assessed to be worth 28 pence per share to Empyrean.

The company is assumed to withdraw from its current 100% position at Block 29/11 offshore China as EME farms out to fund drilling and as CNOOC takes up its option to fund 50% of any discovery from FID to production. On this basis, assuming that a discovery of mmbbls at the lower ris, 4-way dip structure of Jade alone has a 25% POS and that oil in this location might have an insitu value of US\$8/bbl, the project is assessed to have a risked value of £24 million to Empyrean, while discovery at this level would be worth £98 million or 20 pence per share to Empyrean.

Leadership

Chairman

Dr Patrick Cross

Patrick Cross has experience in corporate finance, organisation structures, marketing and joint venture operations. He previously worked in marketing, strategic planning and business development across different cultures with BP and was President of Cable and Wireless Japan, as well as Managing Director of BBC World Ltd. He is non-executive chairman of Mercom Capital Plc and is a Trustee of the Royal Society of Tropical Medicine and Hygiene.

Managing Director

Tom Kelly

Tom has worked in the corporate, financial and investment banking industries for over 20 years. He has been responsible for the financing of numerous listed companies on the Australian Securities Exchange and several mergers and acquisitions within the Australian corporate sector. He is a Senior Associate of the Financial Services Institute of Australasia and a founding director of Empyrean Energy.

Finance Director

John Laycock

John has broad experience in accounting, finance and risk management. He worked with BP in the UK, France and Japan. He has a degree in Mechanical Engineering from Bristol University and is a Fellow of the Chartered Institute of Management Accountants.

Technical Director

Frank Brophy

Frank has a long career as a petroleum geologist with global experience. He was Maurel & Prom's General Manager of the Hanoi operation in North Vietnam. He was Manager of International Business Development for Ampoex Limited, Chief Geologist of Elf Aquitaine Australia and Exploration Manager for Peko Oil Limited.

Executive Director (China)

Gaz Bisht

Gaz is an oil and gas professional with over 28 years' of experience in exploration and production. He has built effective relationships with international companies as well as regulators in South East and North Asia, particularly in Indonesia, China and Malaysia.

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