Hurricane Energy

Site visit

Fabrication on track; commissioning now in focus

Oil & gas

On 12 December 2017, we visited the Aoka Mizu FPSO at Drydocks World Dubai, and had the opportunity to meet a number of Hurricane Energy and Bluewater employees. We returned with greater confidence in Hurricane's ability to mobilise the Aoka Mizu to location in Q218 and to deliver first oil in H119. While some risk remains relating to weather-critical items, we feel that the risk of schedule slippage is lower than we had previously assumed. We bring first oil forward by six months in our updated valuation; this is offset by a slightly more conservative view of production ramp-up and uptime assumption in the first six months of production.

Year end	Revenue (£m)	EBITDA (£m)	Operating cash flow (£m)	Capex (£m)	Net cash (£m)
12/15	0.0	(5.4)	(2.6)	(3.4)	9.9
12/16	0.0	(6.5)	(4.1)	(46.8)	82.2
12/17e	0.0	(7.2)	(5.6)	(60.3)	247.0
12/18e	0.0	(7.2)	(18.0)	(193.0)	36.0

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

Vessel upgrade on track

On visual inspection of upgrade activity on the Aoka Mizu FPSO, the vessel turret and buoy construction, it was clear that the project is currently running to schedule, if not a few days ahead. We have increased confidence that the FPSO will be ready for sail away from Dubai in Q2/Q318 and, assuming successful SURF/mooring installation in the 2018 summer weather window, it should be able to deliver first oil in H119. The relative simplicity of the upgrade project was apparent, with minor modifications being made to the marine system and topsides, and the construction of a new buoy well underway. Management has built in spare capacity within the buoy system and topsides such that additional producers can be tied in to the FPSO – current maximum oil capacity stands at 30kbod.

Flow assurance risks mitigated

Our understanding of Lancaster EPS flow assurance has evolved, and we feel it is prudent to introduce a slightly slower production ramp-up and vessel uptime in the early months in our base case. High drawdown/flow rates could lead to water breakthrough, while low flow rates could lead to wax build-up in flow lines. Hurricane has identified these risks opting to limit wells to a 10kbod initial production rate and employing a combination of flowline insulation, wax suppressant/dissolver, regular pigging runs (every two weeks) and topsides pre-heating in order to reduce wax-related risks.

Valuation: Small change to EPS valuation

We have adjusted our valuation to reflect end-H119 first oil (from Q120), which is offset by increased contingency in our assumptions of production ramp-up and uptime. The net result is a Lancaster EPS-only valuation of 32.7p/share from 33.1p/share. Our RENAV moves from 79.5p/share to 78.4p/share.

19 December 2017

Price	**28.25p**
Market cap	**£554m**

Estimate net cash (£m) at 31 December 2017 including convertible debt	247
Shares in issue	1,959.0m
Free float	53%
Code	HUR
Primary exchange	AIM
Secondary exchange	N/A

Share price performance

%	1m	3m	12m
Abs	5.6	(0.9)	(32.7)
Rel (local)	3.4	(4.6)	(38.2)
52-week high/low		67.0p	24.0p

Business description

Hurricane Energy is an E&P focused on UKCS fractured basement exploration and development. It owns 100% of the 523mmbbl (RPS 2P reserves plus 2C resources) Lancaster oil discovery, West of Shetland.

Next events

FPSO sail away	Q2/Q318

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Edison profile page

Hurricane Energy is a research client of Edison Investment Research Limited

Aoka Mizu – on track

With investors firmly focused on mechanical progress of the Aoka Mizu FPSO upgrade and buoy fabrication, it was encouraging to see that activity is progressing in line with schedule, if not tracking a few days ahead. Visually, it was apparent how little upgrade activity is required to prepare the Aoka Mizu for Lancaster EPS service, with the majority of the key marine and topside components already in place. Turret upgrades and buoy fabrication also appeared to be well progressed.

Key tests before sail away (scheduled for Q2/Q318) include:

- leak testing of the process facility (using nitrogen and hydrogen);
- electrical testing, using laptop-based simulation to test the control system and instrumentation on new topside units; and
- buoy and vessel sea trials to ensure marine worthiness.

We expect an update on the completion of these key tests before sail away in Q118.

Future proofing

It was encouraging to see that Hurricane is planning for potential EPS enhancements by building in spare capacity in key infrastructure. The Aoka Mizu itself can handle up to 35kbod of fluids with a maximum oil rate of 30kbod, and water rate of 20kbwd. Additionally, the newly constructed buoy incorporates 11 J-tubes that enable a total of five producers, five umbilicals and one gas disposal well to be hooked up to the FPSO turret. This compares to the Lancaster EPS base case, which will utilise just two producers and one umbilical at the outset.

Travel routes to the North Sea

Hurricane has a couple of sail away options when relocating the Aoka Mizu from yard in Dubai to the North Sea. These may interest those who like to track vessel movements, but do not have a significant bearing on the timing of FPSO arrival at Lancaster, in our view. Routing via the Suez Canal is expected to lead to a four-week sail time, but will require the FPSO flare tip to be attached in a European yard due to route height restrictions. The alternative would be to route around South Africa, which would require approximately six to seven weeks but would limit the time required in a European yard, where in both cases the bottom plate of the turret is to be removed.

Weather-critical components in 2018

Since our last note, we have increased confidence in the timing of FPSO delivery to the North Sea and everyone we met in Dubai appeared confident that there was enough weather contingency built in to the plan to minimise schedule slippage risk and/or day rate-related capex overruns. As highlighted in our update note published on 2 November, key components of the development plan that are weather dependent and to be executed in the summer 2018 weather window include:

1. re-entry and completion of 6 & 7z wells;
2. boulder clearance;
3. mooring system clearance;
4. SURF installation; and
5. FPSO arrival and hook-up.

First oil target

We shift our modelled first oil from Q120 to end Q219 (forward by six months), corresponding with Hurricane's announced first oil target of Q1/Q219. From a valuation perspective, this is offset by a more conservative view on production ramp-up, which we highlight below.

Flow assurance and wax management

We take a moderately more conservative view on production ramp-up and vessel uptime in our base case EPS valuation, due to some uncertainty around flow assurance and flowline pigging requirements in the early years of production. We view this as conservative but prudent, given the number of development projects that have incurred commissioning hiccups, and higher than planned production downtime in the early years of production. We note that Hurricane already assumes an 85% uptime assumption in its base case production profiles to reflect the need for regular flowline pigging. We conservatively assume 50% uptime in H219 (the first six months of our production forecasts), 80% in 2020, rising to company guidance of 85% in 2021. Our updated EPS valuation stands at 32.7p/share and we note that moving to company uptime guidance would add c 1.5p/share to this.

Our understanding is that Lancaster crude has a 38°C wax appearance temperature, which is approximately 20°C lower than reservoir temperature. Wax management is therefore a key consideration for the project's subsea and facility process engineers. Current wax management philosophy uses a combination of several components:

- High U-value (insulation) flowlines.
- Ability to inject wax suppressant/dissolver chemicals at the wellhead.
- Ability to displace crude from flowlines for extended shutdowns.
- Procedure to run a pig through a pigging loop (both flowlines) every two weeks. This involves a production shut-down for a short period and is reflected in Hurricane's 85% vessel uptime assumption.
- Crude inlet pre-heating.

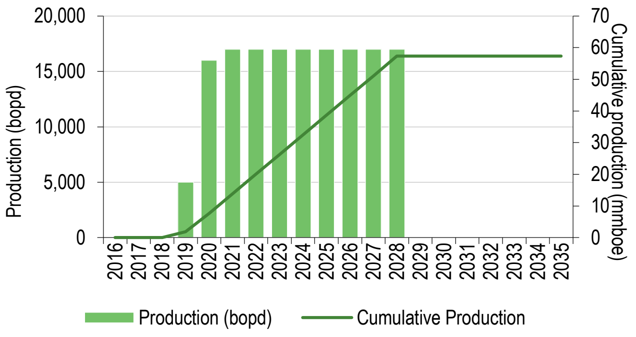
We assume that there will be a production ramp-up phase in H219 as Hurricane brings on wells individually, and fine-tunes production parameters and wax management philosophy. This would involve working within a production envelope with well rates capped by the requirement to minimise drawdown (avoid water breakthrough) at 10kbod, and a floor set by the need to sustain a sufficient oil rate in the subsea flowlines to avoid wax appearance (c 6kbod per flowline).

Gas handling

Hurricane currently has flaring approvals in place to cover the EPS phase; however, if the gas to oil ratio is higher than predicted, or if applications for extended flaring consents are not approved beyond 2022 management may elect to drill a gas injection well. We conservatively include gas injection in our base case EPS valuation (in 2022) at a cost of $60m to cover well costs and compression capex – this is unchanged from our previous modelled assumptions. We note that the Aoka Mizu has a low pressure and high-pressure gas compression capability onboard, which may be recommissioned and upgraded to facilitate gas compression. However, it is uncertain if there is a suitable subsurface location to enable gas reinjection.

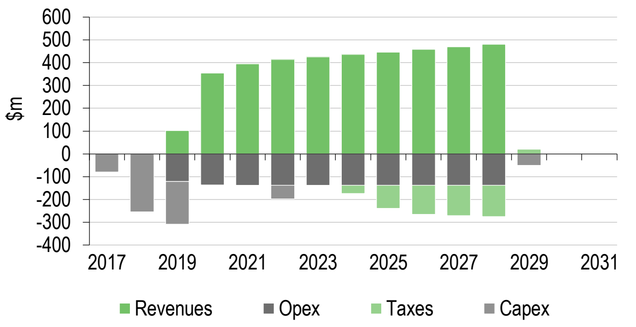
Edison production profile and cash flow profile

Exhibit 1: Lancaster EPS assumed production profile



Source: Edison Investment Research

Exhibit 2: Lancaster EPS free cash flow profile



Source: Edison Investment Research

Valuation

Our updated valuation reflects the changes we have made to our modelling of Lancaster EPS. We have not changed our assumptions with regard to Lancaster full field development and the source of funding – this remains on the basis of an asset farm-out with a farminee carrying Hurricane through the development phase and generating an IRR of 20%. Our oil price forecasts remain in line with those of the EIA for the next two years and rise to 70$/bbl Brent long term (2022).

Exhibit 3: Hurricane change in valuation

Change in valuation	Old (p/share)	New (p/share)	Change %
Core (Lancaster EPS+cash-SG&A)	33.1	32.7	(1.4)
Core+Contingent (inc Lancaster FFD)	63.9	62.8	(1.8)
Total risked NAV (inc GLA)	79.5	78.4	(1.4)

Source: Edison Investment Research

Exhibit 4: Hurricane Energy base case valuation table

				Recoverable reserves			Net risked	Value per share
Asset	**Country**	**Diluted WI**	**CCoS**	**Gross**	**Net**	**NPV/boe**	**Value**	**Risked**
No of shares: 2,401.5m		**%**	**%**	**mmbo**	**mmbo**	**$/boe***	**$m**	**p/share**
Net (debt)/cash YE17e ex convert (assumed conversion)		100%	100%				601	19.3
SG&A (2 years)		100%	100%				(15)	(0.5)
Lancaster EPS - 10y	UK	100%	90%	57	57	7.9	433	13.9
Core NAV							**1,019**	**32.7**
Contingent								
Lancaster FFD (post-EPS)	UK	42%	73%	462	194	6.6	940	30.1
Contingent RENAV				**462**	**194**		**960**	**30.1**
Lincoln 250mmbo dev	UK	42%	48.8%	250	105	5.0	253	8.1
Halifax 250mmbo dev	UK	42%	45.0%	250	105	5.0	234	7.5
Total inc exploration RENAV				**962**	**404**		**2,447**	**78.4**

Source: Edison Investment Research

Financials

Short-term cash flow and balance sheet items are driven by investment in the Lancaster EPS before first oil, which we now model in H119. Hurricane is fully funded for the EPS phase with contingency based on current capex forecasts; however, further funding would be required to accelerate the appraisal of Greater Lancaster Area (GLA) in 2018/19. The total gross cost of a five-well programme could be c $350m and is yet to be funded. In September 2017, Hurricane changed its functional currency to US dollars. We will be updating our financial model to US$ on publication of the company's FY17 results and historic restatements.

Exhibit 5: Financial summary

£ '000s	2015	2016	2017e	2018e	2019e	2020e
Dec	IFRS	IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS						
Revenue	0	0	0	0	78,035	134,563
Operating Expenses	(5,366)	(6,500)	(7,230)	(7,230)	(7,230)	(3,615)
EBITDA	(5,366)	(6,500)	(7,230)	(7,230)	70,805	130,948
Operating Profit (before amort. and except.)	(5,448)	(6,540)	(7,325)	(7,325)	49,465	96,956
Exploration expenses	0	0	0	0	0	0
Exceptionals	0	0	0	0	0	0
Other	0	0	0	0	0	0
Operating Profit	(5,448)	(6,540)	(7,325)	(7,325)	49,465	96,956
Net Interest	(75)	1,839	1,606	(10,812)	(11,263)	(5,691)
Profit Before Tax (norm)	(5,523)	(4,701)	(5,719)	(18,137)	38,202	91,265
Profit Before Tax (FRS 3)	(5,523)	(4,701)	(5,719)	(18,137)	38,202	91,265
Tax	0	5,365	0	0	0	0
Profit After Tax (norm)	(5,523)	664	(5,719)	(18,137)	38,202	91,265
Profit After Tax (FRS 3)	(5,523)	664	(5,719)	(18,137)	38,202	91,265
Average Number of Shares Outstanding (m)	632.2	889.5	1,581.0	1,959.2	1,959.2	1,959.2
EPS - normalised (p)	(0.9)	0.1	(0.4)	(0.9)	1.9	4.7
EPS - normalised and fully diluted (p)	(0.9)	0.1	(0.4)	(0.9)	1.9	4.7
EPS - (IFRS) (p)	(0.9)	0.1	(0.4)	(0.9)	1.9	4.7
Dividend per share (p)	0.0	0.0	0.0	0.0	0.0	0.0
Gross Margin (%)	NA	NA	NA	NA	90.7	97.3
EBITDA Margin (%)	NA	NA	NA	NA	90.7	97.3
Operating Margin (before GW and except.) (%)	NA	NA	NA	NA	63.4	72.1
BALANCE SHEET						
Fixed Assets	176,231	247,621	307,862	500,724	620,697	586,706
Intangible Assets	176,012	245,146	245,146	245,146	245,146	245,146
Tangible Assets	89	15	60,256	253,118	373,091	339,100
Investments	130	2,460	2,460	2,460	2,460	2,460
Current Assets	10,771	86,152	426,783	215,784	134,013	134,013
Stocks	410	359	359	359	359	359
Debtors	420	5,893	5,893	5,893	5,893	5,893
Cash	9,941	79,900	420,531	209,532	127,761	127,761
Other	0	0	0	0	0	0
Current Liabilities	(271)	(21,341)	(21,341)	(21,341)	(21,341)	(21,341)
Creditors	(271)	(21,341)	(21,341)	(21,341)	(21,341)	(21,341)
Short term borrowings	0	0	0	0	0	0
Long Term Liabilities	(3,221)	(4,829)	(180,648)	(180,648)	(180,648)	(55,392)
Long term borrowings	0	0	(175,819)	(175,819)	(175,819)	(50,563)
Other long term liabilities	(3,221)	(4,829)	(4,829)	(4,829)	(4,829)	(4,829)
Net Assets	183,510	307,603	532,656	514,520	552,722	643,987
CASH FLOW						
Operating Cash Flow	(2,558)	(4,115)	(5,624)	(18,042)	59,542	125,256
Net Interest	0	0	0	0	0	0
Tax	0	0	0	0	0	0
Capex	(3,407)	(46,773)	(60,336)	(192,958)	(141,313)	0*
Acquisitions/disposals	0	0	0	0	0	0
Financing	22	121,338	230,772	0	0	0
Dividends	0	0	0	0	0	0
Net Cash Flow	(5,943)	70,450	164,812	(210,999)	(81,771)	125,256
Opening net debt/(cash)	(15,856)	(9,941)	(82,230)	(247,042)	(36,043)	45,728
HP finance leases initiated	0	0	0	0	0	0
Other	28	1,839	0	0	0	0
Closing net debt/(cash)	(9,941)	(82,230)	(247,042)	(36,043)	45,728	(79,529)

Source: Company data, Edison Investment Research. Note: *FFD funded through farm-out and cost carry.

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