FoxDavies

Rock Solid Images (RSI LN)

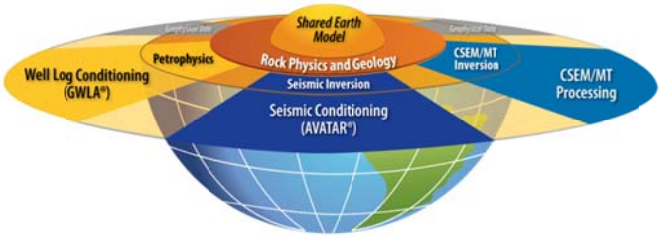
BUY

Initiating Coverage

Target Price: 12.5p

Oilfield Services

17 May 2011



Repositioned and ready to Rock and roll

We initiate coverage of Rock Solid Images (RSI) with a BUY recommendation and a 12 month price target of 12.5p. Having emerged from the disposal of its loss making and cash draining marine CSEM acquisition business, RSI has a transformed outlook as a high end geophysical consultancy with a leadership position in the integration of data types. With the resolution of the strategic uncertainties, RSI is now poised to benefit from its stronger financial position and the opportunities to it in the de-risking of hydrocarbon exploration activity.

RSI has been re-focused as an interpreter and integrator of seismic, well-logging and CSEM data. The group is a leader in rock-physics and seismic reservoir characterisation pioneering the processing, interpretation and integration of data from a variety of sources. The group possesses state of the art inversion and modelling tools providing solutions for exploration challenges and is positioned to dominate the emerging seismic and non-seismic integration market.

The recent trading statement read positively with the group seeing increased interest in its services and technology and sales prospect pipeline growing. The second half of the year will see increasing effort on sales and marketing and further technology development. RSI is positioned to take advantage of this market interest as the only independent supplier of integrated processing and interpretation products and services for seismic and electromagnetics.

The group's financial position is improving. We suggest the group will return to profitability by the end of 2011/12. A strong IP portfolio underpins the valuation and with the prospect of strong revenue growth we believe that the shares are undervalued.

FY Aug £'000	2010	2011e	2012e	2013e
Revenues	3,633	4,058	8,162	11,630
EBITDA	-1,706	-1,954	1,332	2,832
EPS	-6.02	-2.50	0.26	1.42
DPS	0.00	0.00	0.00	0.00
EV/EBITDA	-0.9	-2.6	4.6	2.0
PE	-0.8	-2.0	18.8	3.4

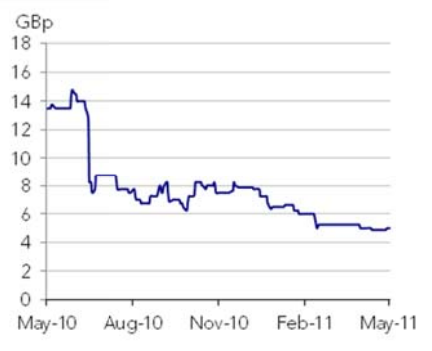
Source: FoxDavies

Stock Data

Current Price:	5.0p
52 - week Range:	4.75-14.75p
Market Cap (M):	£5.5
EV (M):	£5.6

52 Week range

4.75	5.0	14.75



Investment Issues

RSI has strong brand recognition.
Dominant position in niche market.
De-risks hydrocarbon exploration and exploitation activity
Organic and acquisition growth potential
High class technical expertise.
Financial position on a strong improving trend.

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Investment Summary – repositioned to further de-risk hydrocarbon exploration activity

Strategic developments

RSI, newly repositioned and rebranded, is a geophysical consultancy providing products and services to the upstream oil and gas industry. The group is involved in the integration and interpretation of seismic data with well log, CSEM and MT data using advanced rock physics methods combined with geologic models. The data set delivers predictions of reservoir geometries and properties to the group's customers to enable them to drill better and more efficient hydrocarbon wells.

Following a strategic review, RSI management decided to divest the loss making CSEM acquisition business. RSI has retained the high value CSEM processing and integration technology and personnel, which was a complimentary match for the group's seismic and well processing and interpretation capabilities. This has resulted in the conversion of the group into a pioneer of data integration, the first of a new generation of companies that recognised that the value of existing seismic data can be significantly increased via the careful integration of additional data sets such as well logs, CSEM and MT data. Furthermore the group has recently significantly increased investment in the Group's sales force and sales and marketing processes resulting in a substantial and measurable increase in sales pipeline during the first six months of the current financial year. Organic growth will come through the development of the WISE brand with revenue contribution attaining close to 40% by 2014 as well as from solid growth from WSS.

Outlook

Today effective and efficient offshore hydrocarbon exploration and exploitation may be improved via the integration of data from three principle technologies – seismic, well-logging and electromagnetic. Recent trading statements read positively with management stating that it is seeing increased interest in its technology and its sales prospect pipeline is growing. The second half of the current financial year will see more effort on brand support, sales and marketing and further technology development. The group is seeing increased interest in CSEM technology and RSI is positioned to take advantage of this market interest as the only independent supplier of integrated processing and interpretation products and services for seismic and electromagnetics. Rock Solid Images' traditional business remains strong in West Africa and the group continues to work on developing new markets such as unconventional shale plays in North America and fractured reservoirs.

Financials

The group's financial position is on an improving trend and has been strengthened following material losses in 2008/09 and 2009/10. At the end of February 2011 the group's cash balance was £1.8M. We forecast that the group is in essentially a cash neutral position at the end of 2010/11.

Valuation

Valuation comparables are limited by the lack of suitable comparable companies. The shares are favourably valued compared with the universe of reservoir characterisation/seismic companies trading on 2011/12 EV/EBITDA and PE multiples of 4.6 and 19 times respectively. Furthermore, the shares are also favourably valued in EV/EBITDA terms compared with KBC Advanced Technology, also a consultancy corporate to the oil industry. Our DCF valuation suggests the shares are significantly undervalued.

Sensitivities

The reservoir/seismic sub-sector is one of the more cyclical sectors of the oil service industry which in itself is highly cyclical and one of the most volatile and unpredictable of traditional industries. RSI's financial results will vary significantly from year to year as a result of a variety of factors. These factors include general global economic conditions, conditions specific to the oilfield services industry and conditions specific to the company itself. Within the latter, RSI is most sensitive to technological developments and the take up of its consultancy service.

Strategic Developments – A new start with focus on data interpretation

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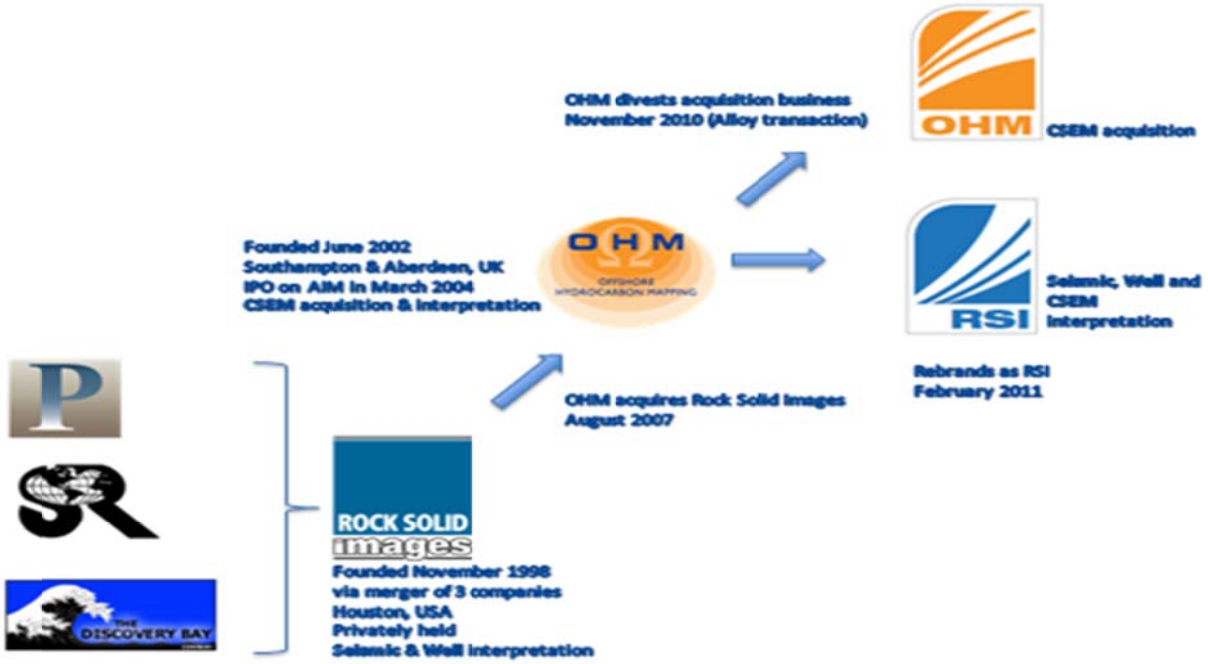
Rock Solid Images was founded in November 1998 through the merger of three companies – PetroSolutions Inc., Seismic Research Corporation and The Discovery Bay Company. The group, privately held, was based in Houston Texas and focused on seismic and well interpretation and achieved above average industry growth rates. In August 2007 Offshore Hydrocarbon Mapping, founded itself in June 2002 and focussing on CSEM acquisition and interpretation acquired Rock Solid Images with the objective of developing and providing a fully integrated hydrocarbon exploration and exploitation service to the oil and gas industry with CSEM being the key technology driver.

Exhibit 1: Company history



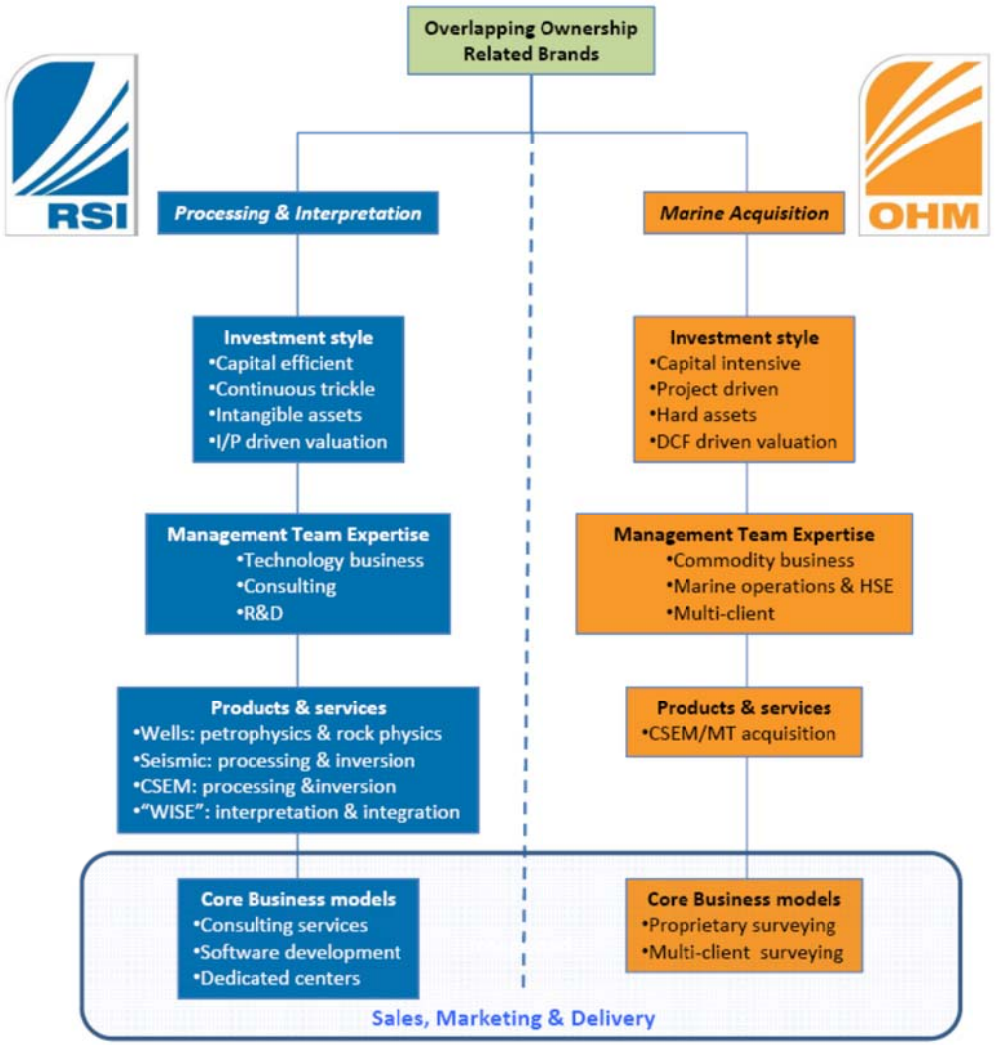
Source: RSI

Marine electromagnetic methods, including CSEM, have been developing in the academic sector for more than 30 years. However CSEM is a relatively young technology in the hydrocarbon industry. First launched commercially in 2002, CSEM methods were marketed as a revolutionary and ground breaking technology for hydrocarbon detection with the potential to even replace seismic as the primary geophysical tool for the exploration and exploitation of hydrocarbons: a game changer. The technology is now viewed by RSI's management as having been 'oversold' and that its real value is as a complementary tool to seismic especially when integrated with other data.

In order to acquire and deliver a valuable CSEM dataset, three key steps must be performed: survey design, data acquisition and data processing, interpretation and integration. Survey design is very important for CSEM – improper placing of receivers and/or use of inappropriate source parameters may result in a survey with little or no target sensitivity. Equally the development of commercial grade processing and interpretation software and the associated growth of independent consultants with the technology and experience required to deliver high value data sets is vital since the raw data itself is of little value without the commensurate ability to process and interpret these data. Data acquisition, which focuses on marine operations, is the hard asset part of the technology. The business is capital intensive, and more commodity orientated. The industry has over-invested in data acquisition technology and under-invested in the other key areas of survey design and processing and interpretation. Consequently there is a degree of overcapacity in the acquisition market resulting in acquisition vessel downtime and low utilisation rates. OHM was very much following this path with investment capital being used to support the acquisition business, to the detriment of the development of its processing and interpretation capabilities.

However CSEM technology market growth declined markedly in 2008 when the industry realised that the technology, whilst still very useful, was not quite the game changer originally predicted. This had a significant impact on the group with losses accelerating over the 2008 to 2010 period. Management realised that unless they were able to strengthen their processing and interpretation technology, they were in danger of losing the ability to deliver robust and reliable high-value data sets to their clients.

Exhibit 2: Reasons for separation



Source: RSI

Following a strategic review, RSI management decided to divest OHM, the capital intensive and loss making CSEM acquisition business (OHM is now free to raise capital independently and develop a strategy for growth within the commodity CSEM marine acquisition business). RSI has retained the high value CSEM processing and integration technology and personnel, which is a complimentary match for the group's seismic and well processing and interpretation capabilities. This has resulted in the conversion of the group into a pioneer of data integration, the first of a new generation of companies that recognised that the value of existing seismic data can be significantly increased via the careful integration of additional data sets such as well logs, CSEM and MT data. Consequently RSI can focus its resources on the development and delivery of high value data and technology. The resulting business going forward will focus on value creation for its shareholders through the development of industry leading tools and workflows for the integration of any combination of seismic, well, CSEM and MT data, with the option to incorporate additional non-seismic data at a later date, such as high-resolution gravity.

RSI has though continued to develop its relationship with OHM. The group has entered into an 18 month agreement with OHM whereby OHM utilises the WISE trademark in all of its public promotional materials with appropriate acknowledgement back to RSI. This agreement helps differentiate the OHM and RSI brands and also provides further support of RSI's new direction.

Exhibit 3: RSI – SWOT Analysis

Strengths	Weaknesses
Strong Brand Image and dominant niche market position Excellence of service provision – healthy repeat business Proprietary technology Large patent portfolio – 71 granted or pending applications in 14 jurisdictions Highly qualified and internationally respected personnel Industry leading expertise in electromagnetic methods and rock-physics	Key customers have high degree of purchasing leverage Lack of critical mass in some operating areas – concentration of expertise in Houston Recovering from lack of investment in technology commercialisation Under-capitalized and currently financially constrained with low revenues and cash flow Significant corporate overhead in relation to the scale of the business Share illiquidity
Opportunities	**Threats**
New product/service offerings – technical innovations – particularly in EM data reprocessing and unconventional plays Geographical expansion opportunities: scalable business Significant revenue growth potential Opportunity to develop software and data library markets M&A rollup opportunities – currently targeting companies with revenues up to £10M	Project failures in strategic areas New/existing competition taking market share Weaker growth in WISE markets Key personnel departing

Source: FoxDavies

Growth – primarily organic but acquisitions will be considered

Following the repositioning and restructuring of the group's business the group's growth strategy will be both organic and through strategic acquisitions. Organic growth will come through the development of the group"s consulting business through investment in existing software and workflow management improvements. In this respect developments from the group's own in-house research and development programme will be very important.

The emphasis is now on building the sales pipeline and expanding the businesses into three areas: traditional well and seismic integration projects (e.g. West Africa, non-conventional reservoirs, N. American shale plays), the EM interpretation and integration (WISE™) market (in partnership with OHM) and the EM reprocessing market.

The group is looking to open regional centres in Europe, Asia, South America and the Middle East as well as dedicated NOC centres and also seeking partnership agreements with data acquisition/providers. Over the medium to longer term the group will be looking to develop further commercial grade software and to build on its existing multi-client library through the development of seismic, well CSEM and MT studies.

The group continues to look at acquisition opportunities. The rationale for any acquisition will be technology enhancements, personnel additions, brand support and geographical diversification. To date research has been undertaken on around a dozen appropriate companies with revenues less than $10M and staff numbers of between 10 and 50. Key criteria for the acquired group are: a dominant niche position, a strong brand, strong intellectual property and providing geographical synergies. We believe that the timing could be anytime in 2011 and 2012 with funding coming from an equity issue.

Table 1: RSI – Possible acquisition targets

Company	Private	Location	Technology	Rationale	Contribution
A	Y	Europe	Seismic reservoir characterization	Geographic synergy	I/P, Revenue, brand
B	Y	Europe	Seismic inversion and imaging	Consulting group	Revenue, People, brand
C	Y	Europe	Seismic processing	Data conditioning technology	I/P, People
D	N	Europe	CSEM processing	EM Technology	I/P, People
E	Y	N. America	Seismic depth imaging	Integrated imaging market	I/P revenue, new market
F	Y	N. America	Reservoir modeling, simulation	Entrance to engineering market	I/P revenue, new market

Source: FoxDavies

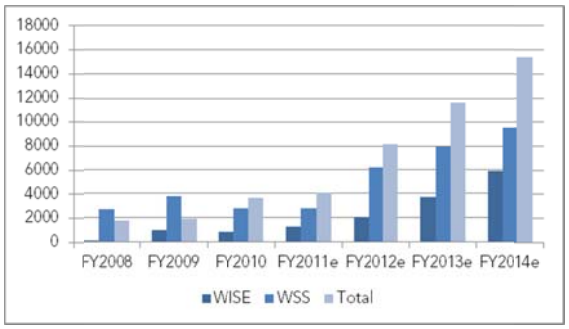
Financials: 2010/11 Interims and forecasts

The group's recent financial results have reflected the difficult industry dynamics and trading conditions facing the company. 2010 results (financial year to August) revealed a pretax loss of £17.3M including impairment charges totalling £6.7M. Following the sale of the marine CSEM survey business in November 2010 financial results have been restated to reflect the new status of the company. For the year ending 31/08/10 the new group reported a group operating loss of £4.612M- a £1.29M loss in H1 and a loss of £3.322M in H2- with a loss before taxation of £4.675M- £1.305M loss in H1 and £3.370M in H2. The group has recently reported its 2010/11 interim results (to February 2011) which revealed a pretax loss of £1.5M compared with the £1.3M loss (adjusted for discontinued operations) for the same period last year. From a business segmental standpoint the WISE business segment reported a gross loss of £38,000 and the WSS segment a gross profit of £577,000. The former results revealed an improving trend over the period whereas the WSS results revealed similar profitability in H1 2010/11 and H2 2009/10 although gross margins were higher in H1 2010/11. At the end of February 2011 the group's cash balance was £1.8M. This compared with £1.38M on 28/02/10 and £3.44M on 31/08/10.

Looking forward our forecasts are based upon revenue assumptions for the two key business segments- the WISE business area is forecasted to see revenues growing from £585K in H1 2010/11 to £1.3M for the full year and the Well and Surface Seismic area seeing growth from £1,267M to £2.7M for the full year 2010/11. The group has reported that it is seeing increased interest in CSEM technology and its traditional business remains strong in West Africa. The group is continuing work on developing new markets such as unconventional shale plays in North America and fractured reservoirs. The sales prospect pipeline is growing as relationships are further developed with both new and existing clients although visibility and timing of sales is sometimes difficult to gauge. Over the medium term the WISE segment will show the strongest growth with the WISE segment revenue increasing to close to 40% of group revenues .

Exhibit 4: Revenue breakdown by business segment

£'000	FY2010	FY2011e	FY2012e	FY2013e
WISE	849	1274	2038	3668
WSS	2784	2784	6125	7962
Total	**3633**	**4058**	**8162**	**11630**

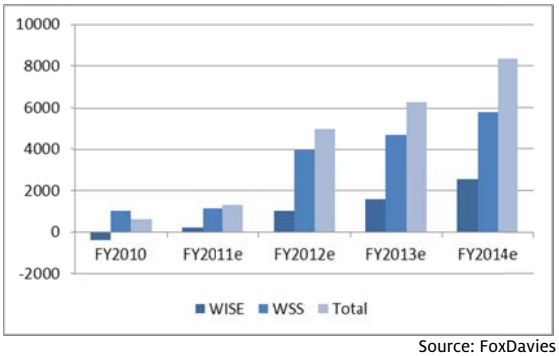


Source: FoxDavies

We see improvement in gross profit and margins over the medium term, At the interim stage RSI reported a gross profit of £539K. We see a slight improvement in profitability in H2 with 2010/11 gross profits attaining around £1.3M. Thereafter gross profits should accelerate as the group benefits from the build-up of its sales force and development of business relating to US shale plays and in West Africa. We see gross profits around £6.3M by the end of financial year 2012/13. Gross margins should improve from 29.1% at the interim stage to just over 60% for 2011/12 before settling at around 55% over the medium to longer term.

Exhibit 5: Gross profit breakdown by business segment

£'000	FY2010	FY2011e	FY2012e	FY2013e
WISE	-387	191	1019	1577
WSS	995	1114	3981	4738
Total	**608**	**1305**	**5000**	**6315**



Source: FoxDavies

The group continues to carry a corporate overhead which is currently disproportionally high compared with the contribution from its business activities. However with the group continuing to be in a growth phase these costs will remain high but under control and will become a proportionally low percentage of sales over the medium term

Financial costs will reflect the company's debt and cash balances and low prevailing interest rates. The group currently has corporation tax losses amounting to £8M. Consequently, the group is unlikely to pay income tax on earnings in the short/medium term. The group does not pay a dividend and this dividend policy will be maintained over the medium term.

The group's capital investment plans for 2011 reflect the investment of over £800,000 in software and computer hardware during the first six months of the financial year, improving the Group's production capacity and technological leadership. The investments made in software are designed to improve processing and interpretation capabilities particularly for seismic and CSEM data (as well as integrating these data through a Shared Earth Model), but also for key enabling technologies such as rock physics.

At the end of February 2011 the group's cash balance was £1.8M. We forecast that the group is in essentially a cash neutral position at the end of 2010/11.

Exhibit 6: Group Financials

Yr End August	£'000	2009	2010	2011e	2012e	2013e
Revenue		**9,227**	**3,633**	**4,058**	**8,162**	**11,630**
Gross Profit		**-3,011.0**	**608**	**1,305**	**5,000**	**6,315**
Gross margin (%)		-32.6	16.7	32.2	61.3	54.3
EBITDA		**-6489**	**-1706**	**-1954**	**1332**	**2832**
EBITDA margin (%)		-70.3	-47.0	-48.2	16.3	24.3
EBIT		**-8781**	**-4612**	**-2744**	**232**	**1512**
EBIT margin (%)		-95.2	-126.9	-67.6	2.8	13.0
Profit before tax		**-8,711**	**-4,675**	**-2,764**	**212**	**1,492**
Net profit		**-8832**	**-4599**	**-2688**	**288**	**1568**
Net margin (%)		-95.7	-126.6	-66.3	3.5	13.5
EPS (p)		**-20.4**	**-6.0**	**-2.5**	**0.3**	**1.4**
DPS (p)		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Cashflow statement		**2009**	**2010**	**2011e**	**2012e**	**2013e**
Operating cashflow (net)		**-6,587**	**-4,204**	**-727**	**1,157**	**1,863**
Capital expenditure/acq		-585	-375	-3,153	-2,020	-1,420
Cash used for financing activities		-39	7,037	574	0	0
Change in cash		**-7,211**	**2,458**	**-3,306**	**-863**	**443**
Balance Sheet		**2009**	**2010**	**2011e**	**2012e**	**2013e**
Non -current assets						
Goodwill		12,636	11,124	11,424	12,374	12,569
Othe intangible assets		6,508	3,425	3,425	3,425	3,425
Plant and equipment		4,283	667	777	727	612
Fixed assets		**23,427**	**15,216**	**15,626**	**16,526**	**16,606**
Cash		1,043	3,443	137	-726	-283
Other current assets		1,356	2,852	1,892	1,987	2,980
Total assets		**25,826**	**21,511**	**17,655**	**17,787**	**19,303**
Equity and liabilities						
Debt		0	1,297	0	0	0
Other liabilities		3,734	6,336	5,417	4,960	4,549
Shareholder Equity		22,092	13,878	12,238	12,826	14,753
Total Equity and liabilities		**25,826**	**21,511**	**17,655**	**17,786**	**19,303**
Key Performance Indicators		**2009**	**2010**	**2011e**	**2012e**	**2013e**
Gross margin %		-32.6	16.7	32.2	61.3	54.3
EBITDA margin %		-70.3	-47.0	-48.2	16.3	24.3
Net Debt/(Cash)		-1,043	-2,146	-137	726	283
Gearing (%)		-4.7	-15.5	-1.1	5.7	1.9
ROE (%)		-40.0	-33.1	-22.0	2.2	10.6
NAV (p)		51.0	18.2	11.4	11.6	13.3

Source: FoxDavies

Valuation – Limited comparable but shares are undervalued

Valuing RSI's shares is complicated by the fact that there are few if any comparable quoted seismic/reservoir service companies and the group is emerging from a period of losses and near term earnings will not be representative of the group's fundamental and normalised earnings prospects. (Our valuation comparables are KBC Advanced Technologies, a leading independent consulting process engineering and software group, and Getech Group, a small niche gravity company.) For RSI, we forecast losses for the current financial year with a return to profitability thereafter so consequently we value RSI on the basis of 2011/12 and 2012/13 EBITDA and earnings.

Oilfield service companies from a valuation standpoint are best valued using the traditional methodologies – PE, EV/EBITDA and DCF. Over the past 10 years, the European sector has averaged around a P/E of 15 times, with a typical range of 11 to 18 times. There is no strong correlation between the multiple and any sector specific macro factor – although the multiple tends to be high when the oil price is rising.

Traditional valuation measures: In traditional valuation terms, RSI trades on a P/E of 19 times for 2012 and an EV/EBITDA of 4.6 times our forecasts for 2012 and declining to 2.0 times in 2013. These valuations compare with 2012 sector average comparisons for PE and EV/EBITDA of around 14 times and 5.5 times respectively.

Exhibit 7: Valuation Metrics

16 May 2011	Share price (Loc)	Mkt Cap US$	1Yr Performance	PE 2010a	PE 2011e	PE 2012e	PE 2013e	EV/EBITDA 2010a	EV/EBITDA 2011e	EV/EBITDA 2012e	EV/EBITDA 2013e
Reservoir Information/Seismic											
CCG Veritas	22.74	4,864	10%	-	38.5	14.2	10.3	7.7	6.5	5.0	4.3
Petroleum Geo-Services ASA	78.5	3,069	4%	-	28.0	12.2	8.7	7.5	6.9	4.9	3.9
ION Geophysical Corp	9.59	1,487	57%	59.9	24.7	15.3	10.1	9.1	6.8	5.6	4.1
TGS Nopec Geophysical Co ASA	139.4	2,600	31%	16.5	13.3	11.5	10.6	-	-	-	-
Schlumberger Ltd	82.71	112,233	27%	27.5	22.3	16.1	13.5	16.3	11.4	9.1	7.8
Getech Group PLC	22.75	11	30%	23.1	37.9	22.8	-	-	-	-	-
Polarcus Ltd	6.31	464	-1%	-	-	6.5	3.8	-	-	-	-
Electromagnetic GeoServices AS	12.2	411	169%	-	34.8	13.7	9.6	-	-	-	-
Seabird Exploration Ltd	2.3	72	-39%	-	-	-	7.1	5.5	10.6	4.2	3.7
Spectrum ASA	11.25	54	2%	-	14.0	8.0	4.6	-	-	-	-
Reservoir Exploration Technology AS	1.5	24	-81%	-	-	-	1.6	-	-	-	-
Average w/o Schlumberger				**33.2**	**27.3**	**13.0**	**7.4**	**7.5**	**7.7**	**4.9**	**4.0**
Average				**31.8**	**26.7**	**13.4**	**8.0**	**9.2**	**8.4**	**5.7**	**4.8**
KBC Advanced Technologies PLC	72.5	66	71%	18.1	10.2	9.9	-	11.0	7.5	6.8	-
Rock Solid Images PLC	5	9	-63%	-0.8	-2.0	18.8	3.4	-0.9	-2.6	4.6	2.0

Source: FoxDavies, consensus

Discounted cash flow valuation: based on our forecasts and a weighted average cost of capital (WACC) of around 15%, our DCF model values the shares significantly above the current share price. Our methodology forecasts detailed revenues and profits until 2014 as per our forecasts. We then apply a 2.5% growth factor to revenues and maintain margins and subsequently then calculate a terminal value for the business.

Exhibit 8: DCF Valuation

RSI

	2011e	2012e	2013e	2014e	2015e	Terminal	Valuation	
Sales	**4,058**	**8,162**	**11,630**	**15,423**	**20,084**	**23,873**	Present value - forecast FCF	10,194
Growth	#DIV/0!	101.2%	42.5%	32.6%	30.2%	2.5%	Present value - terminal CF	8,078
EBIT	**-2744**	**232**	**1512**	**3779**	**4948**	**5,252**	**Enterprise Value**	**18,272**
EBIT Margin	**-67.6**	**2.8**	**13.0**	**24.5**	**24.6**	22.0%		
Growth	#DIV/0!	-108.5%	551.7%	150.0%	30.9%			
Tax	**76**	**76**	**76**	**76**	**76**	**(788)**	Net cash(debt)	137
Tax rate	2.8%	-32.8%	-5.0%	-2.0%	-2.0%	15.0%	Pensions	0
NOPAT	**(2,668)**	**308**	**1,588**	**3,855**	**5,024**	**4,464**	Minorities	0
Margin	-65.8%	3.8%	13.7%	25.0%	25.0%	18.7%	**Market cap equity**	**18,409**
Depreciation/Amort	790	1,100	1,320	1,631	1,987	2,282		
Change in working capital	1,858	(551)	(1,404)	(1,490)	(2,050)	(116)	Shares outstanding	108
Capex	(3,153)	(2,020)	(1,420)	(1,420)	(1,420)	(1,998)		
Free Cash Flow	**(3,174)**	**(1,163)**	**83**	**2,576**	**3,541**	**4,632**		
WACC	14.9%	14.9%	14.9%	14.9%	14.9%	14.9%		
Discount factor	1.00	0.87	0.76	0.66	0.57			
Present Value Free Cash Flow	**(3,174)**	**(1,012)**	**63**	**1,697**	**2,030**			
Cumulative present value	(3,174)	(4,186)	(4,123)	(2,426)	(396)		**Value per share (p)**	**17.1**

Source: FoxDavies

Sector M&A: Over the last few years there were a number of M & A transactions in the reservoir/seismic sub sector (see page 28). The average transaction multiples were around EV/sales and EV/EBITDA of around 10x and 70 times respectively. We believe that M&A will remain a feature in the sub sector and consequently these multiples represent an appropriate valuation guideline for RSI rather than a specific inherent business valuation.

Table 2: Valuation Metrics

Multiples	Revenue	EBITDA
Average	10	70
Median	4	30

Source: FoxDavies

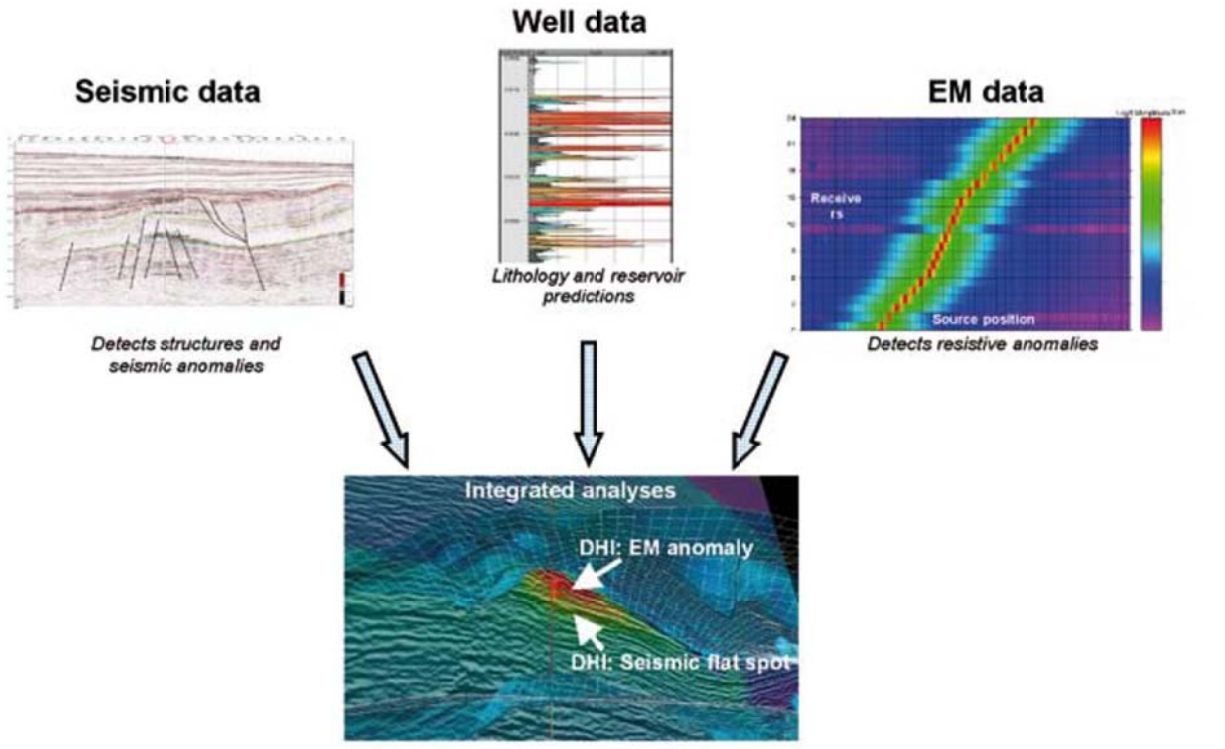
Company Description – A fully integrated sub-surface service provider

RSI, newly created and rebranded, is a geophysical consultancy providing product and services to the upstream oil and gas industry. The group is now exclusively based in Houston, Texas, US where its technical centre is located (the Houston and Aberdeen processing staff were combined and centralised in Houston) and has partner offices in Aberdeen, UK and Kuala, Lumpur, Malaysia. The group is regarded as an industry leader and has a highly qualified and experienced staff with 45 permanent employees including 30% with PhDs.

Currently on average only about 40% of reserves are recovered from hydrocarbon fields, leaving 60% of discovered hydrocarbons in the ground. With good reservoir management and understanding of sub-surface characteristics recovery can be increased to above 70%. The development and deployment of advanced geophysical methods are vital steps in raising the recovery factor in these reserves.

The RSI group is involved in the interpretation and integration of seismic data with well log, CSEM and MT data using advanced rock physics methods combined with geologic models. The data set delivers predictions of reservoir geometries and properties to the group's customers to enable them to drill better and more efficient hydrocarbon wells. This business strategy is based upon the Shared Earth Model concept whereby various disciplines and technologies are brought together to work on a common sub-surface model to create a better understanding of the sub-surface physical and chemical characteristics and properties.

Exhibit 9: Hydrocarbon exploration technologies



Source: First Break

Seismic will always be the primary tool of choice for hydrocarbon exploration and exploitation, but the addition of non-seismic data can add value to existing or new seismic and can still further reduce interpretation risk. The group's core technologies include: pre and post-stack seismic inversion, seismic attribute calculation and calibration, seismic facies modelling, well-driven rock-physics analysis and modelling, CSEM and MT processing, interpretation and modelling, WISE integrated seismic and EM projects, CSEM and MT survey planning and modelling. These tools and the group's expertise are utilised to solve customer problems over a broad range of hydrocarbon areas including: sub-basalt

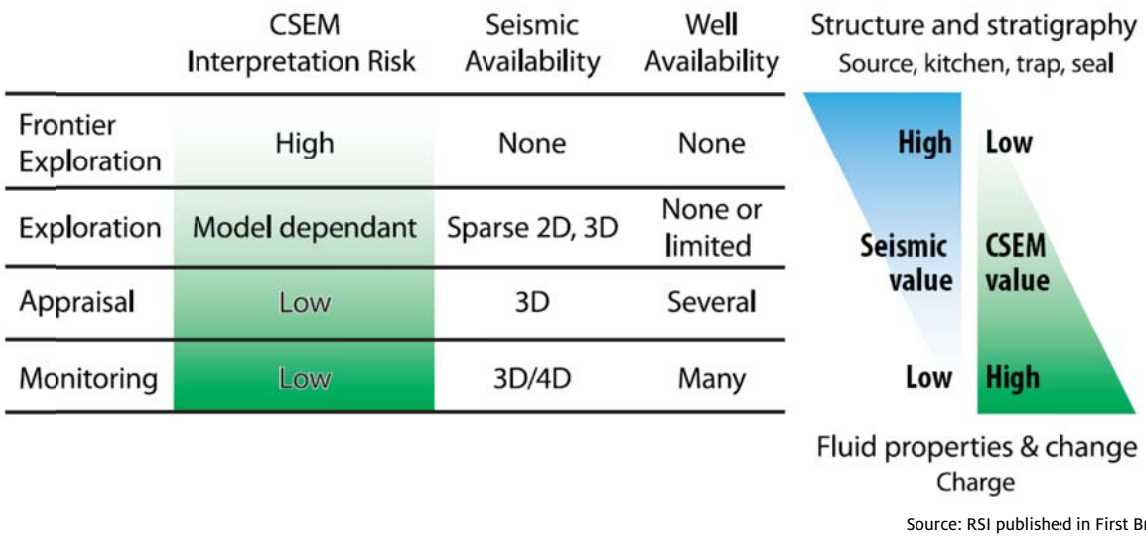
imaging, carbonate reservoirs, non-conventional reservoirs, appraisal and monitoring studies, fractured reservoirs and transform margin plays.

Exhibit 10: Hydrocarbon exploration technologies: each method has strengths and weaknesses.

	CSEM	Seismic	Well data
Imaging Structure	Poor	Very good	Poor (local measurement only)
Detecting fluids	Good – Resistivity changes associated with fluid can be large	Poor: possible in some circumstanes to resolve fluids. Often hard.	Very good.
Determining mineralogy	Poor: need well calibration	Poor: need well calibration	Very good
What can go wrong ? Ambiguities	Method measures resistivity (NOT hydrocarbon): Cause of resistivity anomalies may be ambiguous,	Saturation is often hard to determine. Cause of AVO/amplitude anomalies may be ambiguous.	Severely under sampled laterally.

Source: RSI

Exhibit 11: Hydrocarbon exploration technologies



Source: RSI published in First Break.

The RSI group currently operates in two business areas: Well-driven Integration of Seismic and Electromagnetics (WISE) and Well and Surface Seismic (WSS).

The Group's WISE interpretation approaches use available seismic, CSEM and well log data to add value to interpretations at all stages of the oil field life cycle, by providing quantitative measurements of rock and fluid properties. The value of geophysical data and interpretations is significantly increased when different data types are integrated to utilise the strengths of each other. The WISE product range and focus is seen as being critical to the future success of the group and management are allocating resources to this business segment and monitoring performance accordingly.

Within the Well and Surface Seismic (WSS) business segment, the group is the industry leader in the integration of rock physics with well data and surface seismic in order to interpret geophysical signatures in terms of reservoir properties. Careful integration of these data can lead to quantitative measurements of rock and fluid properties such as porosity and hydrocarbon saturation.

RSI has successfully completed a number of seismic inversion and reservoir characterisation projects for companies operating in Ghana and Equatorial Guinea. RSI has established a reputation as the premier supplier of seismic inversion and rock-physics data for operators exploring in this highly active region. In recent years, there has been huge interest in exploiting shale gas reservoirs in the US. RSI has developed a number of proprietary technology and workflows for maximising reservoir performance in shale reservoirs, including the FracNav process, introduced at the 2010 Denver SEG conference.

RSI has an extensive suite of proprietary software. The three main proprietary software suites are: iMOSS-EM, a powerful, interactive rock-physics-driven seismic and CSEM modelling and interpretation application, designed to meet the in-house consulting, research and data-library needs; Attrib3D, a seismic attribute calculation application that computes post-stack seismic attributes; Lithann, a modelling application that is designed to complement Attrib3D. It uses advanced neural network algorithms to define regions of common attribute response or seismic facies; and a suite of proprietary CSEM processing workflows and inversion algorithms.

Client List – widespread amongst oil/gas industry

RSI is amongst the top players in its field and has become a respected name in the integration of geophysical data for reservoir properties. The group has completed numerous projects from a simple log analysis on a single well (GWLA) to inverting over 4,000 square kilometers of 3D seismic data for a WSS data integration project.

The groups' current and potential client list includes the entire oil/gas E and P spectrum from super majors, both IOCs and NOCs, to small independents around the world including BP, Chevron, Chesapeake, Kosmos, Royal Dutch Shell, Statoil, Total, Reliance Industries, Vanco, Apache, Marathon et al.

Competitive Landscape – RSI a small player but focussed

There are several companies that offer similar products and services to RSI including subsidiaries of the major oil service companies as well as independents and smaller private companies. These include WesternGeco (Schlumberger), Global Geophysical Services, CGG Veritas, PGS, Ikon Science, DownUnder GeoSolutions, Geokinetics , Geotrace, and Fugro Electro Magnetic.

Table 3: WSS (Rock physics modelling (RPM)- Seismic Reservoir Characterisation (SRC)) Competitive Market place

	Product or Service description	Product or Service features	Strengths	Marketing Strategy
Schlumberger	Software & Consultancy – Petrel-reservoir development software	Dynamic inversion Static Seismic inversion	Global Activity Technical innovation	A global offering from the market leader
CGG Veritas	Software & Consultancy – Hampson-Russell software suite	Data conditioning, seismic inversion,geo-statistical mapping	Global operations. Technical innovation driven by acquisition and processing	Global Service Company,
Landmark	Software & Consultancy	Conventional RPM-SRC	Global activity Technological innovation,	Technology focus
Fugro	Software & Consultancy	Seismic to simulation software	Almost global, leader in seismic inversion	Integration focus
Geotrace	Seismic process/imaging	AVO/Attribution, Inversion, Reservoir description	Technical innovation	Strong in unconventional markets. Highlighting integration concept
Fusion	Technology and Services (project based)	Processing , Inversion, Resolution enhancement, Seismic imaging	Technical innovation-seismic inversion	Focussing on strategic partnerships and regional alliances
Ikon	Software, Service project and multiclients	RPM, Inversion , 4D	RPM	Technology focus

Source: RSI/FoxDavies

Whilst the market is dominated by several major service companies, the smaller companies like RSI offer highly focussed and specialised services which will enable them to develop a more differentiated service proposition which should provide higher growth opportunities.

Table 4: WISE Marketplace- Competitive analysis

	Product or Service description	Product or Service features	Strengths
EMGS	Market leader in CSEM acquisition.. Alliance with Fugro-Jason and entering into a Jv with RDS	Processing, 3D CSEM offshore survey acquisition, modeling and inversion	Global regional activity Technical innovative Strong/aggressive sales force
Schlumberger	Software, Consultancy, Onshore acquisition	Simultaneous inversion, land EM acquisition, land and marine EM data processing and interpretation	Global activity, technical innovative, strong integration capabilities
RSI	Software and Consultancy	Sensitivity study and survey design processing Processing, modeling and inversion, and integration with seismic/wells.	
PGS	Develops EM technology. R& D in enhanced 3D modeling and inversion techniques	Sensitivity study and survey design processing Processing, modeling and inversion.	Global activity, integrated solutions
Fugro-EM	Developing EM capability. Marketing agreement with EMGS	Processing and interpretation of CSEM data.	Global activity.

Source: RSI/FoxDavies

Markets – significant growth potential

The markets in which RSI operate are detailed below:

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Table 5: RSI – Target Markets

Segments	Names	Brief Description
Markets	WSS (RPM & SRC)	Rock physics modeling and Seismic Reservoir Characterisation projects without EM-MT
	WISE Workflow	EM-MT data processing and interpretation and/or integrated RPM and SRC projects with EM-MT component
Sub- Markets	Offshore- Transform Margins	Offshore prospect evaluation- exploration setting with few well, often seismic and CSEM data
	Unconventional Reservoirs	Onshore shale gas and tight gas plays. Production and Drilling driven . Mainly US but potentially global
	Fractured Reservoirs	Naturally fractured reservoir characterization. Mainly carbonate, tight sand,, share gas reservoirs
	Oil-Gas Saturation	Off/onshore, /worldwide, reserves assessment of field development plan
	Appraisal	Producing fields with numerous well. Good candidate for integration since much data. Large market size
	Monitoring	Final phase of the field development- a fast growing market, data acquisition driven
	Sequestration	CO2 storage and sequestration. Driven by government policies and subsidies
	Carbonate reservoirs	Carbonates hold around 60% of world's oil and 40% of world's gas. Heterogeneities characterization is key(
	Sub-basalt imaging	Mainly exploration setting. Sun-Basalt domes imaging where seismic by itself cannot properly image reservoir structures

Source: FoxDavies

The Well and Surface Seismic (WSS) market which includes Rock Physics Modelling and Seismic Reservoir Characterisation (RPM & SRC) is large, mature and competitive. This market is global with a relatively higher growth rate among the NOCs and Independents rather than among the IOCs since there are still NOCs and Independents which are not major users of RPM & SRC techniques. Part of this market may be considered as a commodity market where the cost and project time turnover is of prime importance. The Service Companies are playing a major role in this market since most the oil & gas companies are outsourcing RPM & SRC type of work.

Market share is dominated by the seismic acquisition & processing service companies which offer proprietary technologies and very often discounted processing price when associated with an acquisition project. However independent multi-disciplinary consultant-expert type companies which are focusing on quantitative workflows for prospect evaluation and reservoir management have a fast increasing market share. From a technology standpoint the key market drivers are: more data acquisition /data integration, quantitative characterization for drilling prediction, and the introduction of integrated earth modelling software platforms.

The WSS market is forecast to grow by between 5% and 10% pa over the next five years with the Group's share of this market increasing from approximately 5% to between 10% and 15%. The Group's WSS revenues are therefore forecast to increase by approximately 40% per annum over this period.

The WISE market is an emerging niche market. A major part of the market is associated with CSEM offshore acquisition surveying. Consequently, RSI plans to develop partnerships with CSEM acquisition companies to access this market component; processing & integration is the key differentiator for companies operating in this market. This market offers the possibility for rapid growth as the value of CSEM technology is established.

Though today RSI and OHM make an ideal partnership, to be successful RSI needs to qualify its offer and consider the CSEM Acquisition Company as a 'client' in terms of process and business relationships. The other potential WISE market segment is reprocessing and prospect – reservoir management studies. This segment is subject to the availability of legacy EM data but companies need to develop multi-disciplinary consultancy type expertise and services along with technology innovations. The main success driver will be the integration of EM with Seismic and Well-Logs.

The WISE market is forecast to grow by between 25% and 30% per annum over the next five years with the Group's share of this market increasing from approximately 15% to approximately 50%. The Group's WISE revenues are forecast, based upon company projections, to increase by between 50% and 60% per annum over this period.

Table 6: Market segments

	2011			2015		
	Market	WSS	WISE	Market	WSS	WISE
	$	%	%	$	%	%
Offshore Transform margins	$15M	90%	10%	$30M	70%	30%
Unconventional resources	$7M	100%	0%	$27M	100%	0%
Fractured reservoir	$45M	100%	0%	$54M	100%	0%
Gas saturation	$23M	70%	30%	$27M	50%	50%
Appraisal	$60M	70%	30%	$72M	50%	50%
Monitoring	$15M	100%	0%	$30M	70%	30%
Sequestration	$3M	0%	100%	$15M	20%	80%
Carbonate reservoir	$30M	70%	30%	$36M	70%	30%
Sub-basalt imaging	$9M	20%	80%	$18M	30%	70%
	$206M	**$161M**	**$45M**	**$309M**	**$206M**	**$103M**

Source: RSI/FoxDavies

Technology Research and Development – most important

Rock Solid Images is committed to research and development. The R&D team consists of world class scientists from the fields of rock physics, well logging, seismic, electromagnetics, geophysical data processing, modelling, and inversion. The goal is to develop and deliver to the market state-of-the-art 3D integrated interpretation solutions. The main projects are:

Development of New Solutions for Seismic and CSEM Data Conditioning. Data quality is key to providing efficient performance of any interpretation approach. The group is heavily investing in enhancing its processing and data conditioning technologies and software to allow for rapid delivery of high quality datasets for WISE interpretation workflows.

Development of Advanced 3D CSEM and MT Inversion Solutions. Inversion is the basis for marine CSEM and MT data interpretation. The team is focusing on improving existing and developing new anisotropic 3D EM modelling and inversion algorithms and interpretation workflows to allow complex and geologically realistic earth models to be recovered.

Development of 3D Integrated Geological Model Building Tools. Central to the WISE approach is a Shared Earth Model, in which seismic, EM, and wells can be integrated to provide a consistent model of the subsurface. The group is building an integrated modelling platform based on industry leading software platforms to allow detailed analysis and seamless interpretation of a wide range of G&G data types

Advanced Studies of Rock Physics. The group continues to invest in research into appropriate rock physics models to describe ever more complex subsurface situations. Current work includes analysis of electric and elastic rock physics models to describe anisotropic shales and to develop robust rock physics models to consistently describe electric and elastic properties.

The RSI group's patent portfolio consists of 71 granted or pending applications in 14 jurisdictions. RSI's intellectual property strategy is to seek patent protection for key aspects of seismic, CSEM and well log interpretation and integration technology that support the Company's ongoing development of these technologies.

Central to RSI's technology plan is the integration of seismic, EM and well log data, for improved reservoir characterisation. To oversee progress in all areas of technology development the company has formed a Technology Board to provide independent review, oversight and guidance on the future direction of RSI's technology.

Membership of the board will comprise the CEO, CTO and VP of R&D, along with several external experts in the field of seismic analysis and inversion, EM and rock physics. These members include Professor Gary Mavko from Stanford University, Professor Steve Constable from The Scripps Institute and Dr. Sven Treitel, who is a world leader in seismic processing and interpretation. The key objectives include: reviewing the quality and performance of RSI's key technologies, assessing technology needs and priorities at RSI and guiding the formulation of plans to address them, assessing wider industry technology needs and providing high level guidance on meeting these needs, keeping abreast of new technology developments in the industry and provide review and feedback on these.

Directors and Executive Management Team – highly experienced

The group has a highly qualified and experienced staff with 45 permanent employees including 30% with PhD's. The non-executive, executive and senior management team include the following

Richard Charles Cooper, Chief Executive Officer: Richard is a graduate from the University of Liverpool in UK with an honours degree in geophysics. He joined Digicon (which became Veritas and now CGGVeritas) in 1979 and held a variety of positions in data-processing, research, marketing and management in UK, Australia, Singapore and US. He joined CogniSeis Development in 1993 and spent two years as managing director of the EAME division, before returning to Houston as CogniSeis President and COO. Following the sale of CogniSeis to Paradigm, Richard founded Rock Solid Images in 1998 and served as CEO and director until the sale of Rock Solid Images to OHM in 2007. Richard is currently CEO of RSI, and is based in Houston, Texas. Richard is also a non-executive Director of the privately held company Terraspark Geosciences, L.L.C

Robert Ian Auckland, Chief Financial Officer: Bob was previously Financial Director and Company Secretary of J W Holdings Limited where he was for 12 years. Bob has extensive experience in financial and general management with a proven track record of integrating acquisitions, balance sheet management and building value for shareholders through a period of change. Bob is a chartered accountant having qualified with Deloitte Haskins & Sells, and has a BCom degree from Edinburgh University.

Dr. Lucy Margaret MacGregor, Chief Scientific Officer: Lucy has over fifteen years' experience as a leading researcher in CSEM and its application to the detection and characterization of fluids in the earth. Lucy has extensive experience in the development and application of data processing, modeling and inversion techniques. Lucy has a PhD from the University of Cambridge for research in the field of CSEM. Following her PhD she was a Green Scholar at the Scripps Institution of Oceanography working on marine electromagnetic methods, before returning to Cambridge as a Leverhulme Trust/Downing College research fellow. In 2000 she moved to the National Oceanography Centre, Southampton as an NERC research fellow to continue her work on marine CSEM sounding in both academic and industrial settings, before co-founding OHM in June 2002.

Peter Andrew Reilly, Non-executive chairman: Peter Reilly has 23 years' experience in the upstream oil industry having worked for five years in each of BP, BG Exploration and Enterprise Oil in tax, commercial and finally investor relations roles, before founding a financial PR consultancy in 2002 focused on helping smaller exploration and production and oil service companies raise their profile among investors and industry. At Enterprise Oil, Peter was appointed as Senior Commercial Adviser and then Commercial Manager, UK, before being appointed Head of Investor Relations from 1999 until the takeover of Enterprise by Shell in 2002. Peter spent 11 years in the Inland Revenue before joining the oil industry in 1988

Keith Geddes Lough, Non-executive director: Keith has an MA in economics from Edinburgh University, a Masters in finance from London Business School and is a Fellow of the Association of Chartered Certified Accountants. He has over 20 years' experience in the oil and gas and energy industries including recent appointments as Finance Director, British Energy plc, Chief Financial Officer, Hurricane Hydrocarbons (now PetroKazakhstan, Inc) and MD Europe & North Africa for LASMO plc. He is currently Chief Executive of Composite Energy Limited, a private-equity funded energy company.

Alan Kennedy Faichney, Non-executive director: Alan Faichney is currently Chief Executive of Edinburgh Instruments Limited. Up until June 2009 he was COO of DEM Solutions Limited, a start-up engineering software company. Until December 2007, Mr. Faichney was a Senior Vice President of Ion Geophysical, responsible for strategy and R&D, and for over 20 years prior to that was Technical Director and latterly Managing Director of Concept Systems Limited. An inventor of several US and worldwide hardware and software patents, Mr. Faichney is highly experienced in technical product development and the provision of technical services to industry, and has significant experience in managing and growing new technology offerings. He has worked extensively in a number of exploration industry bodies, including being Chairman of the SEG's Technical Standards Committee from 2000 to 2004, and recipient of their Cecil Green Award for Enterprise in 2005. Mr. Faichney was also a Director of the UK charity Hatwalk from 2005 to 2011.

Corporate and Shareholder structure – Three major shareholders

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The following companies had notified the Company of shareholdings of 3% or more in the issued share capital of the Company at 28th February 2011. We believe that these major shareholders are fully supportive of the current strategic developments and direction of the group.

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Table 7: Major shareholders

Shareholder	No of ordinary shares	%
Sector Omega "Sector"	35,196,681	31.79
EuroTrans- "Seatrans"	31,634,890	28.57
East Hill Hedge Fund "East Hill"	18,402,359	16.62

Source: Bloomberg/FoxDavies

Table 8: Fundraising history

Date	Type	Amount raised (£m)- gross
September 2009	New issue; 14,030,171 @ 21.52p	Charter liability removal- $3.019M
September 2009	New issue: 12,023,572	£2.6M
April 2010	New issue: 3,475,000 @16.00	£0.56M
April 2010	New issue: 17,525,000 @16.00p	£2.8M
October 2010	New issue: 9,000,000 @10.00p	£0.9M
November 2010	New issue: 11,000,000 @10.00p	£1.1M
November 2010	Share options 192,567	£1,926

Source: Bloomberg/FoxDavies

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On 9 September 2009, the Company issued 14,030,171 ordinary shares of 1p each at a price of 21.52p to the owner of two vessels operated by OHM Limited in exchange for removing most of the future years' charter liabilities which were given an agreed value of $5,000,000 (£3,019,000). The Company also issued a further 12,023,572 ordinary shares of 1p each to three substantial shareholders at a price of 21.52 p for a total consideration of approximately £2.6 million

On 8 April 2010 the Company issued 3,475,000 ordinary shares of 1p each to one substantial shareholder at a price of 16.0p for a total consideration of approximately £0.56 million (before expenses of approximately £10,000). On 28 April 2010 the Company issued a further 17,525,000 ordinary shares each to the same substantial shareholder at a price of 16.0p for a total consideration of approximately £2.8 million (before expenses of approximately £99,000).

Subsequent to the year end on 14 October 2010 the Company issued 9,000,000 ordinary shares to two substantial shareholders at a price of 10.0p for a total consideration of approximately £0.9 million (before expenses of approximately £10,000). On 1 November 2010 the Company issued a further 11,000,000 ordinary shares to the same two substantial shareholders at a price of 10.0p for a total consideration of approximately £1.1 million (before expenses of approximately £108,000). On 22 November 2010 the Company issued 192,567 ordinary shares to ten employees on exercise of share awards under the Company's Share Award Plan.

These share issues brought the Company's total allotted, called up and fully paid share capital to 110,710,256 ordinary shares of 1p each at 3 February 2011.

Risks/Sensitivities – Highly cyclical but technology developments offer mitigation

The oil service industry is highly cyclical and one of the most volatile and unpredictable of traditional industries with the reservoir/seismic sector being one of the more cyclical sub-sectors. The industry's performance and RSI's financial results will vary significantly from year to year as a result of a variety of factors. These factors include general global economic conditions, conditions specific to the oilfield services industry and conditions specific to each company.

Economic cyclicality: the primary determinant of oil services activity is hydrocarbon demand. This historically correlated with global GDP growth. If global economic growth were to slow materially, demand for oil services, contract drilling and refining is more than likely to suffer.

Commodity prices: a downturn and prolonged weakness in oil or US natural gas prices, coupled with increasing raw material costs, could result in a period of underinvestment and low capital spending in the oil and gas industry and consequently weak demand for oil service company services and providers.

Weather: the industry is sensitive to global weather/climatic conditions. The oilfield services companies operating in the Gulf of Mexico may be subject to weather related seasonality as well as hurricane related disruptions.

Credit risk: many clients of oil service firms need financing to start construction of large-scale projects. Access to credit may affect the commitment to projects that are at risk of being cancelled.

Overcapacity: the oil services and contract drilling sectors have traditionally been highly cyclical industries characterized by global expansion and contraction phases. If industry participants do not exercise some discretion with respect to capital expenditures and capacity expansion plans, excess capacity could hinder utilization and profitability.

Geopolitical: RSI, with its relative high exposure to the US and OECD countries is generally less at risk. Many companies in the oil services sector have operations and/or customers domiciled in politically unstable regions or countries. As such, unforeseen events could interrupt commercial activity and negatively impact revenues, earnings and/or cash flow. Nationalisation of assets is a low probability occurrence, but carries a high impact risk. We have seen countries such as Venezuela nationalise oil and gas assets, including onshore and offshore oil service equipment. National governments, particularly in non-OECD countries are now pressuring companies to use local, national employees rather than expatriates While the use of local labour force can provide a competitive advantage, changes in local content requirements can significantly reduce the ability of a contractor to extract sufficient returns from a contract.

Backlog cancellation or adjustments: significant reductions in backlog could adversely affect the financial condition and growth prospects of oil service companies. If cancellation occurs, a company can generally recover costs incurred, settlement expenses and profits.

Intellectual Property: In the past there have been challenges to the group's freedom to operate in the (now divested) field of CSEM acquisition, resulting from a competitor attempting to enforce intellectual property rights. The group invests in top quality legal advice to ensure its freedom to operate, and constantly monitors the patent landscape around its technologies. To date, the group has prevailed in these actions and there are no current proceedings against any of the group's companies, although if proceedings emerged which lead to adverse rulings in this area there could be restrictions on the group's operations. #

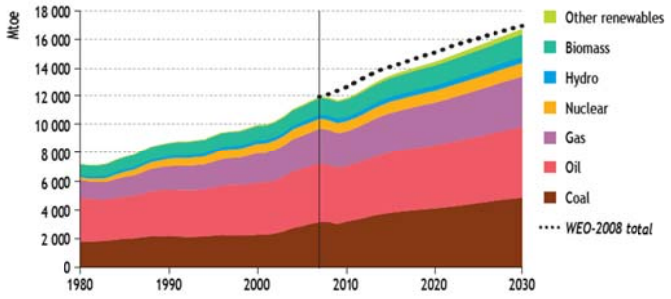
General oilfield service industry drivers still very much in place

The fundamental drivers of oilfield services and drilling activity are energy demand, the economic cycle and levels of oil and gas exploration and production activity together with upstream capital expenditures by oil and gas companies. Historically, the level of exploration and production (E&P) capital expenditure has been primarily driven by expectations of future oil and natural gas prices.

Energy demand – hydrocarbons will continue to dominate energy demand

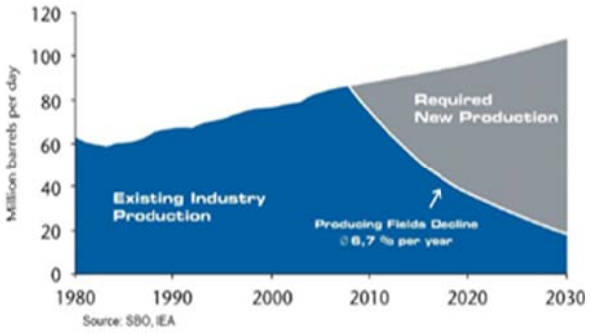
The recovery in world demand for oil from the nadir of the economic and financial crisis has been reasonably robust, driven by non-OECD energy demand. In the medium/longer term, the International Energy Agency (IEA) in recent reports suggests that world energy demand will grow by some 40% by 2030, with hydrocarbon fuels continuing to dominate the global energy mix, with coal, oil and natural gas supplying almost 80% of primary energy needs. The IEA suggests that to match this demand growth, around $350bn has to be invested in upstream activity every year over the next twenty years, to enable such growth in oil and natural gas supplies. Furthermore, the IEA estimates that approximately half of the conventional oil production needed by the end of the next decade has yet to be developed or found. By 2030 that figure may have increased to approximately two thirds. The era of obtaining relatively cheap oil is over. New supply is relatively costly and the challenges of matching energy demand and supply and are not likely to decrease.

Exhibit 12: World Energy Demand



Source: IEA

Exhibit 13: World Oil Supply



Source: SBO, IEA

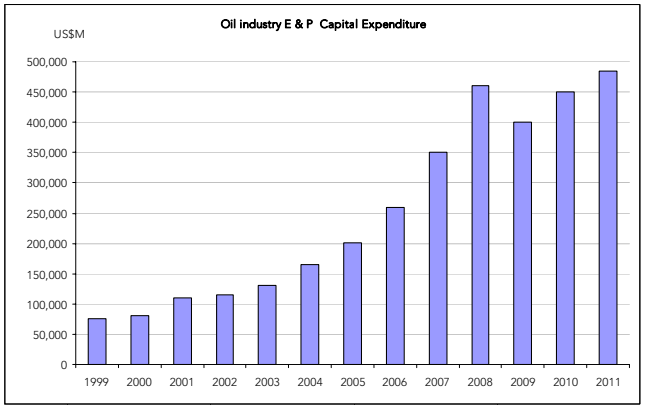
Oil Industry capital expenditure – to rise further in 2011 and through to 2014

The capital expenditure of oil and gas companies, both NOCs and IOCs, decreased significantly in 2009, after the rise in 2007-08, as a result of the economic and financial crisis and lack of cash and access to capital. 2010 saw a resurgence in capital expenditure with preliminary estimates suggesting an overall rise in excess of 10%. This increase in investment was led by the general expectation that crude and natural gas prices had reached their nadir in 2009 and that over the medium term, prices would remain at current elevated levels. Large NOCs generally led the way (Brazilian company Petrobras, is investing heavily as it seeks to exploit reserves in the Santo and Rio de Janiero areas) as their governments wish to use future oil revenues to develop their economies and infrastructure.

Looking at 2011 and further ahead, several oil companies have given indication of their capital investment plans for 2011 and beyond. On average the international supermajors are expected to increase their E & P expenditures by at least 15%. Chevron has indicated that its expenditure will rise some 20% to around $26Bn. Preliminary expectations suggest that Total and Conoco may increase their expenditure by around 25% and RDS and Exxon Mobil both by around 10%. In Latin America Petrobras and Pemex have indicated capital expenditure increases of around 20% and in the Middle East and South East Asia, some of the NOCs have suggested that their E & P capital expenditure budgets will increase by at least 15%. For example China National Offshore Oil Corp has just announced that it will spend close to $150Bn over the next five years in offshore oil exploration.

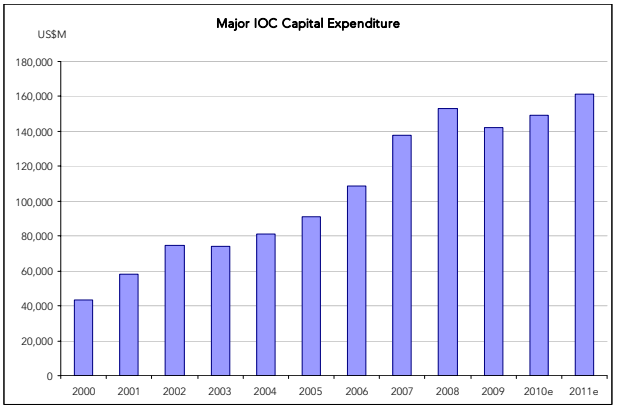
We remain optimistic that as a whole we will continue to see rising levels of expenditure. Our assumptions are that capital expenditure will rise between 5-10% per annum. Other commentators are suggesting that E&P expenditure could see as much as 11% CAGR through 2010-14.

Exhibit 14: Oil Industry CAPEX



Source Industry Data, FoxDavies

Exhibit 15: Oil Majors CAPEX



Source: Industry data, FoxDavies

Crude oil prices higher for longer, natural gas to remain weaker

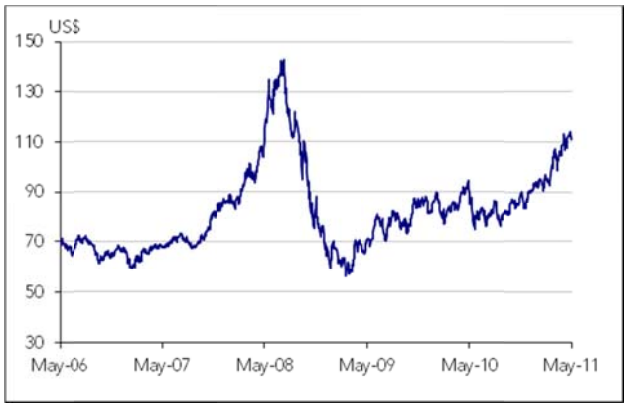
Table 9: Crude Oil Prices – Brent $/bbl

2009	2010	2011e	2011-12e
$61.5/bbl	$77/bbl	$80-85/bbl	$75-90/bbl

Source: FoxDavies

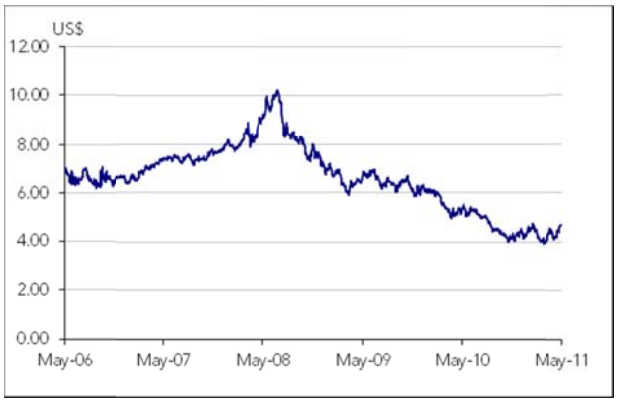
Crude oil prices were volatile during 2010 but on an upward trend in Q4 buoyed by favourable supply/demand fundamentals and expectations of healthy global economic growth in 2011. Most recently the geopolitical risk premium has risen significantly. We assume that prices will remain close to current levels in the short term- with an elevated risk premium- before easing as the year progresses. Average yearly prices are though estimated to be higher in 2011 than for 2010 and be on a rising trend into 2012. These expectations are primarily based upon details and comments from recent available energy/oil reports published by the IEA and OPEC.

Exhibit 16: WTI/Brent Oil price chart



Source: FoxDavies

Exhibit 17: Natural Gas price chart



Source: FoxDavies

Fundamental oil price expectations reflect market anticipation of a general improvement in global economic activity in 2011. Non-OECD countries will remain the key contributors to economic growth, led by China, India, the Middle East and Latin America. Overall we are expecting the world economy to see growth close to 4.0% in 2011. World oil demand growth in 2011 is expected to be at around 1.3mb/day, not too dissimilar to that seen in 2010. More than 90% of this year's oil demand growth is attributed to the non-OECD countries, whereas the OECD, mainly North America, will show a much more moderate demand increase of 0.2 mb/d.

Table 10: Crude Oil market dynamics

Demand	Inventory levels	Non–OPEC supply	OPEC supply
Global demand should remain robust, led by non-OECD countries. Current evidence of some demand destruction	OECD stocks at healthy levels- but levels can change very rapidly	Healthy near term but growth is limited with mature field production declines of at least 4% per annum	Spare capacity under pressure and can quickly disappear. Middle East tension still concerning

Source: FoxDavies

From a supply perspective we believe that supply growth from non-OPEC sources remains somewhat limited and will remain so over the medium term. Supply from non-OPEC sources such as Brazil, Canada, Azerbaijan, and Kazakhstan are seen to be major contributors to growth in 2011, while Norway, Mexico and the UK are set to continue to decline. Risks remain high owing to natural decline, as well as technical, political and environmental factors. In the medium term, whilst further new production is scheduled to come on stream, it is taking longer to come into production than initially envisaged. Also, with production from mature fields declining at least around 4% per annum, but more likely close to 10%, overall supply growth from non-OPEC sources will remain constrained. In the case of OPEC there appears to be ample spare capacity to meet 'its call' and consequently there should be no significant supply disruptions. The recent political tensions in North Africa and the Middle East are obviously concerning. Furthermore, the markets can never be certain of OPEC's supply policy and strategy, despite recent comments that its members are 'happy' with fundamental

crude oil prices around the $80 level. Whilst we are confident there will be no major supply disruptions, we remain concerned that the recent lack of oil investment in some OPEC countries could lead to concerns about OPEC supply over the medium/longer term.

Natural gas prices – US prices to stay soft

US natural gas prices peaked in mid-2008 at around $11/mmBtu and amidst volatility have been on a downward trend since and currently languish at around $4.7/mmBtu.

Table 11: US Natural Gas prices – Henry Hub $/mmBtu

2008	2009	2010	2011e	2012e
$8.9/mmBtu	$3.95/mmBtu	$4.7/mmBtu	$4.7/mmBtu	$4.8/mmBtu

Source: FoxDavies

Table 12: US Natural Gas – Market dynamics

Inventory levels	Demand	Supply
Levels currently at relatively high levels from a historical perspective	IEA expectations are for overall flat growth in demand	Ample supply driven by abundant and economically competitive shale gas resources. Production economics becoming marginally unattractive

Source: FoxDavies

Current market dynamics suggest that demand will remain flat but much depends upon the weather and general levels of power consumption and industrial activity in the US. With inventories generally at high level and with more than ample supply – a 10% reduction in the current US gas rig count number would be predictive of higher prices, we are not expecting any significant change in US gas pricing from current levels over the short/medium term.

Oil rig count – activity to remain at high levels

One of the most important indicators for the oilfield service industry is the global rig count. This tracks the number of active drilling rigs in the world. The global rig count reached its cyclical peak in September 2008 with 3,557 active rigs. As a result of the macro economic turmoil and declining oil prices, the rig count fell for eight consecutive months to reach its low point in May 2009 with 1,983 active rigs. Since then, there is a visible upwards trend in the global drilling activity with the December 2010 count reaching 3,233 up from 2,509 in December 2009. The drilling moratorium in the Gulf of Mexico seems to have had no visible effect on the drilling activity in total, as exploration and production shifted towards other locations instead, in particular other US regions. The North American rig count currently stands at 2,287 compared with 1,805 a year ago.

US Rig count to drive market higher

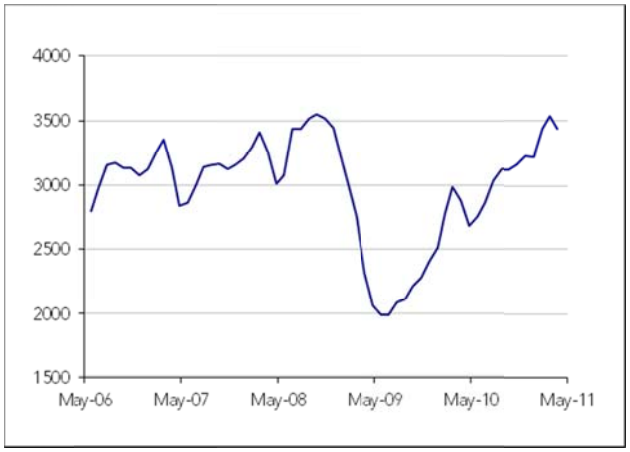
Looking forward we expect drilling activity in 2011 to increase worldwide with particularly robust activity in the Americas and Far East. The rig count in the US will see continued growth amid the ending of the GoM drilling moratorium although regulatory demands are high. We see the oil rig count increasing, the natural gas rig count at similar levels to 2010, with the horizontal/directional rig count outpacing the number of new vertical drilling rigs. Baker Hughes recently forecasted that the worldwide rig counted would increase by around 9% for 2011 on a yearly basis.

Table 13: Worldwide Rig Forecast

Area	2010 Actual	2011 Forecast	% change
US	1545	1740	12.4
Canada	348	340	-2.3
N. America	1896	2080	9.7
RoW	1094	1180	7.9
Total	**2990**	**3260**	**9.0**

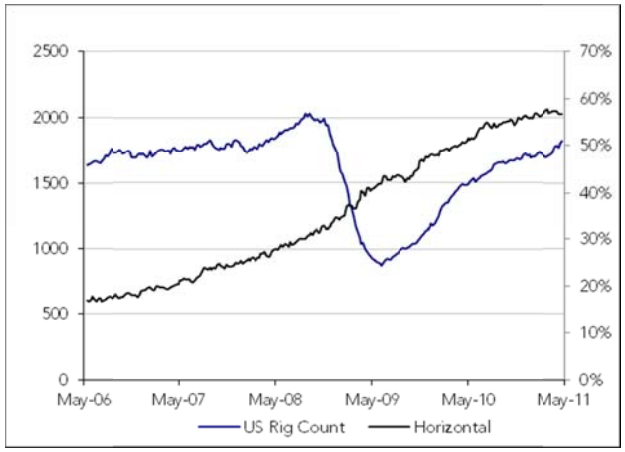
Source: Baker Hughes

Exhibit 18: World Rig Count



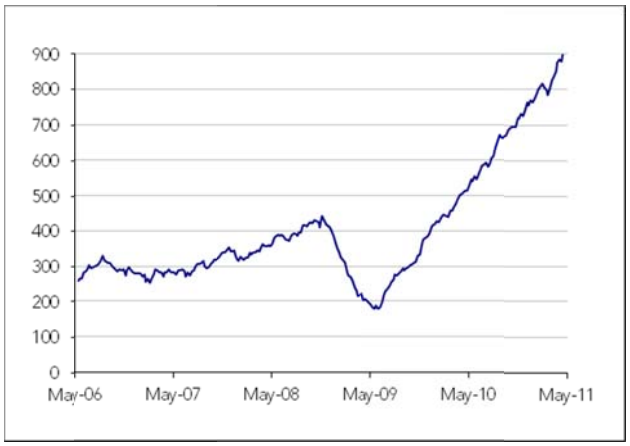
Source: Baker Hughes, FoxDavies

Exhibit 19: USA Rig Count



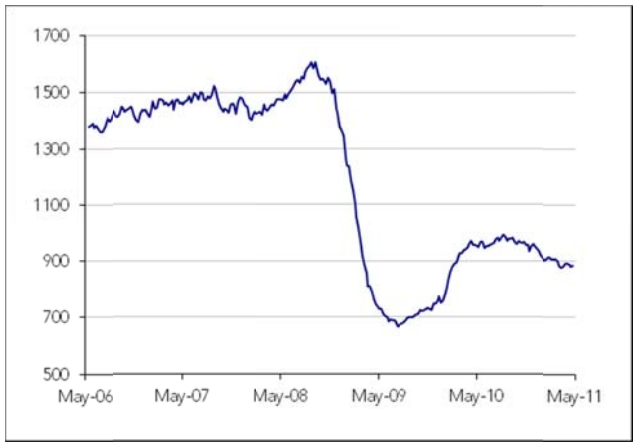
Source: Baker Hughes, FoxDavies

Exhibit 20: US Oil Rig Count



Source: Baker Hughes, FoxDavies

Exhibit 21: US Gas Rig Count



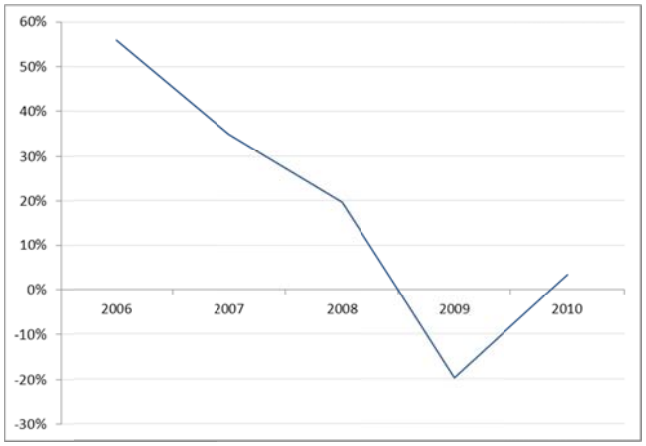
Source: Baker Hughes, FoxDavies

Seismic

Reservoir/seismic subsector financials

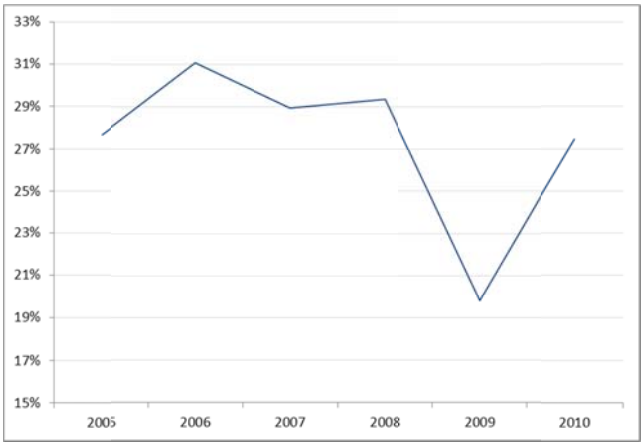
The reservoir/seismic subsector of oil service industry is one of the most cyclical of a notoriously highly cyclical sector. Results of reservoir/seismic service companies have been significantly affected by the recent economic and financial crisis. In 2010 revenues started to improve and margins were also on an improving trend although some companies were still seeing the impact of the downturn. Not-withstanding, the recent downturn of the industry and weakening of margins, cash generation for the industry was healthy and most companies remain financially very solid with low gearing ratios.

Exhibit 22: Industry Revenue growth



Source: FoxDavies

Exhibit 23: Industry EBITDA margins



Source: FoxDavies

M&A history

The recent downturn in the reservoir/seismic subsector of the industry, increasing competitive pressures and weakening cashflow generation of many reservoir/seismic service companies has led to several consolidation moves as companies try to further strengthen their competitive positions. Transaction multiples have not always been readily available but we estimate that the range has been from an 8-10x EV/EBITDA multiple, or close to a 50% premium to the prevailing share price. We expect this trend to continue over the coming years as companies seek to further strengthen their competitive position; to be at the forefront of new technology developments; to service ever-increasing contract sizes better and develop further economies of scale. Most companies are cash generative with strong balance sheets so securing finance for such deals should not be too problematic.

Table 14: Seismic M&A transactions

Year	Target	Acquirer	Assets	Price (US$M)	Revenue Multiple	EBITDA Multiple
2002	A2D	TGS-Nopec	Well-log Data & s/w	25	5	50
2002	Advanced Data Solutions	Corelab	Imaging services &SW	8	1	8
2002	Hampson-Russel	Veritas-DGC	Reservoir software	25	4	50
2002	Paradigm	Tfox-Paine	Broad range of s/w & services	100	1	20
2002	Technoguide	Schlumberger (GeoQuest)	Reservoir modeling software	140	7	70
2003	PetCom	Furgo-Geoteam (Jason)	Well-log software	3.1	2	10
2003	RC2	SeismicMicro Technology	Reservoir services and software	2	1	10
2003	VoxelVision	Schlumberger (GeoQuest)	Vizualization software	10	10	50
2004	Corelabs (RTD)	Paradigm	Broad range of s/w & services	22	1	11
2004	GXT	IO	Depth imaging services/sw + data	150	3	30
2006	Roxar	Arcapita (Bahrain bank)	Reservoir software, hardware & services	22	4	22
2006	Odegaard	Schlumberger (WesternGeco)	Inversion software and services	200	2	20
2006	Veritas	CGG	Integrated full service	3200	5	26
2006	Earth Decision Science	Paradigm	Gocad modeling software	58	3	580
2007	Parallel Data Systems	TGS-Nopec	3D depth imaging	72.5	4	
2007	EMGS	IPO	CSEM profiling	1800	18	
2007	MTEM	PGS	EM profiling	275	55	
2007	Apllied Geophysical Services	PGS	Depth imaging services	55	3	6
2007	Rock Solid Images	OHM	Reservoir services and software	22	4	
2008	GMI	Baker Hughers	Borehole services			
2008	Weinman	Global Geophyscial Services	Time processing, interpretation	22		
2008	Screen Imaging Technologies Inc.	Halliburton (Landmark)	Depth imaging services and software			
2008	Tierra Geophyscial	Halliburton (Landmark)	Depth imaging services and software			
2010	4-th Wave Imaging	Fugro	Reservoir services and software			
2010	Nexus Geosciences Inc.	Schlumberger (WesternGeco)	Depth imaging services and software	24		

Source: Bloomberg/Fox Davies

Key terms (Seismic)

Seismic Techniques: Seismic surveying is a method of gathering information about the Earth's subsurface by measuring the reflection properties of acoustic energy transmitted through the subsurface layers. The principal method geologists use to explore for oil and gas, besides the direct and expensive process of drilling, is through the use of sound waves. Sound waves traveling through the earth are called seismic waves. Seismic waves are used to map out the geological structures of the earth. Seismic surveys use low frequencies and long wavelengths that penetrate many kilometers into the earth. A controlled pulse is sent into the ground and a range of detectors or listening devices pick up the reflected signals as they come back to the surface. In the marine environment the main source of energy is a group of pistons which let out a pulse of compressed air. On land vibrating trucks are the most common acoustic source. These send a controlled sweep of sound through a vibrating plate pressed onto the ground.

Onshore Seismic: Onshore seismic covers operations that occur on land. Seismic sensors (geophones) have to be laid out by hand at specific locations. The logistics of land operations can be complex, time consuming and expensive, particularly in mountainous, jungle or remote terrain where materials often have to be moved by helicopter or carried by a large number of workers. In deserts and arctic areas specialized vehicles have to be used to cope with the terrain and the extremes of temperature.

OBC Seismic: Ocean Bottom Cable or OBS seismic is a method of recording seismic data in which receiver cables are placed on the seabed. The OBC method allows the recording of seismic data in shallow or obstructed areas, without access for towed streamer vessels. This method uses both geophone and hydrophone sensors, to record both p-wave and s-wave data.

Marine Seismic Recording Cable: A device which records reflected seismic waves. It consists of a several kilometer long cable sometimes called a streamer, and contains many hundreds of pressure sensitive recording instruments.

Land Seismic Recording Cable: A specifically designed cable in sections used to connect individual seismic sensors and to transmit the data collected to a central recording system.

Seismic Source: A device that sends out acoustic energy. In onshore seismic this signal may be created by a buried dynamite charge, or a by vibration of metal plate placed on the ground. The plate is mounted on a source vehicle referred to as a Vibrator or Vibe. The size and characteristics of the source vehicle may be highly specialized to favor the area of operation and to minimize environmental footprint.

Seismic sensors: **Geophone** This is a type of seismic sensor (or receiver) that is placed on land or on the seafloor. It records seismic waves by detecting particle movement. Geophones can be made to record both P-wave and S-wave data.
Seismic sensors: Hydrophone A marine seismic receiver that records seismic waves by detecting pressure changes. It only records P waves.

Prospect: An exploration area in which the existence of an economic quantity of hydrocarbon is predicted. Prospects are usually identified using low-resolution electromagnetic or seismic surveying methods, and are then ranked and de-risked using higher resolution surveys.

P-waves Pressure waves are generated and recorded by seismic survey equipment. P-waves are the only form in which acoustic energy propagates in liquids.

S-waves Shear waves are a form in which acoustic energy can travel through solids and fluid bearing formations.

Multi-Client Data: A survey acquired by a seismic contractor, where the contractor retains ownership of the data. The survey may cover licensed acreage, unlicensed acreage, or a combination of both. Licenses for the use of the data are sold to a number of clients on a non-exclusive basis, hence the name 'MultiClient'

Source: Industry

Seismic Industry Overview

Since the 1930s, oil and gas companies have sought to reduce exploration risk by using seismic data to create an image of the Earth's subsurface. Seismic data is recorded when listening devices placed on the Earth's surface or seabed floor, or carried within the streamer cable of a towed streamer vessel, measure how long it takes for sound vibrations to echo off rock layers underground. For seismic acquisition onshore, the acoustic energy producing the sound vibrations is generated by the detonation of small explosive charges or by large vibroseis (vibrator) vehicles.

In marine acquisition, the energy is provided by a series of air guns that deliver highly compressed air into the water column. The acoustic energy propagates through the subsurface as a spherical wave front, or seismic wave. Interfaces between different types of rocks will both reflect and transmit this wave front. Onshore, the reflected signals return to the surface where they are measured by sensitive receivers which may be analog coil-spring geophones or digital accelerometers based on MEMS (micro-electro-mechanical systems) technology; offshore, the reflected signals are recorded by either hydrophones towed in an array behind a streamer acquisition vessel or by multicomponent geophones or MEMS sensors that are placed directly on the seabed.

Once the recorded seismic energy is processed using advanced algorithms and workflows, images of the subsurface can be created to depict the structure, lithology (rock type), fracture patterns, and fluid content of subsurface horizons, highlighting the most promising places to drill for oil and natural gas. This processing also aids in engineering decisions, such as drilling and completion methods, as well as decisions affecting overall reservoir production. Typically, an E&P company engages the services of a geophysical acquisition company to prepare site locations, coordinate logistics, and acquire seismic data in a selected area.

The E&P company generally relies upon third parties to provide the contractor with equipment, navigation and data management software, and field support services necessary for data acquisition. After the data is collected, the same geophysical contractor, a third-party data processing company, the Company's data processing service or the E&P company itself will process the data using proprietary algorithms and workflows to create a series of seismic images. Geoscientists then interpret the data by reviewing the images and integrating the geophysical data with other geological and production information such as well logs or core information.

During the 1960s, digital seismic data acquisition systems (which converted the analog output from the geophones into digital data for recording) and computers for seismic data processing were introduced. Using the new systems and computers, the signals could be recorded on magnetic tape and sent to data processors where they could be adjusted and corrected for known distortions. The final processed data was displayed in a form known as "stacked" data. Computer filing, storage, database management, and algorithms used to process the raw data quickly grew more sophisticated, dramatically increasing the amount of subsurface seismic information.

Until the early 1980s, the primary commercial seismic imaging technology was two-dimensional, or 2-D, technology. 2-D seismic data is recorded using straight lines of receivers crossing the surface of the Earth. Once processed, 2-D seismic data allows geoscientists to see only a thin vertical slice of the Earth. A geoscientist using 2-D seismic technology must speculate on the characteristics of the Earth between the slices and attempt to visualize the true three-dimensional (3-D) structure of the subsurface.

The commercial development of 3-D imaging technology in the early 1980s was an important technological milestone for the seismic industry. Previously, the high cost of 3-D seismic data acquisition techniques and the lack of computing power necessary to process, display, and interpret 3-D data on a commercial basis had slowed its widespread adoption. Today's 3-D seismic techniques record the reflected energy across a series of closely-spaced seismic lines that collectively provide a more holistic, spatially-sampled depiction of geological horizons and, in some cases, rock and fluid properties, within the Earth.

3-D seismic data and the associated computer-based interpretation platforms are designed to allow geoscientists to generate more accurate subsurface maps than could be constructed on the basis of the more widely spaced 2-D seismic lines. In particular, 3-D seismic data provided more detailed information about and higher-quality images of subsurface

structures, including the geometry of bedding layers, salt structures, and fault planes. The improved 3-D seismic images allowed the oil and gas industry to discover new reservoirs, reduce finding and development costs, and lower overall hydrocarbon exploration risk. Driven by faster computers and more sophisticated mathematical equations to process the data, the technology advanced quickly.

4D seismic (the fourth dimension is time) refers to the process of taking further seismic shoots on an area already surveyed, typically months or years following the initial survey. The purpose of these surveys is to detect the movement of liquids within reservoirs, enabling oil companies to optimise recovery from an existing reservoir or conduct further drilling. Normally, the receivers themselves need to be maintained in the same location, so the receiver array needs to be a permanent installation on the relevant oilfield, although advances in the accurate positioning of receivers makes non-fixed 4D seismic possible.

As commodity prices decreased in the late 1990's and the pace of innovation in 3-D seismic imaging technology slowed, E&P companies slowed the commissioning of new seismic surveys. Also, business practices employed by geophysical contractors impacted demand for seismic data. In an effort to sustain higher utilization of existing capital assets, geophysical contractors increasingly began to collect speculative seismic data for their own account in the hopes of selling it later to E&P companies. Contractors typically selected an area, acquired data using generic acquisition parameters and generic processing algorithms, capitalized the acquisition costs, and attempted to sell the survey results to multiple E&P companies. These generic, speculative, multi-client surveys were not tailored to meet the unique imaging objectives of individual clients and caused an oversupply of seismic data in many regions.

From 2004 to 2008, commodity prices increased and E&P companies again increased their capital investment programs, which drove higher demand for seismic products and services. The global recession that began in 2008 reduced the demand for (and associated prices of) hydrocarbons. However, we are now seeing increased levels of capital spending related to E&P activity and we believe that current conditions exist that favour increased seismic spending for the years ahead. These conditions include the following:

The clear potential for large undiscovered or underdeveloped reservoirs in offshore locations should continue to drive demand by E&P companies and seismic contractors for improvements in marine equipment technology and offshore seismic data libraries; and E&P companies are focusing more on hydrocarbon reservoirs that are located in deeper waters or deeper in the geologic column, which should increase demand for newer and more efficient imaging processing and equipment technology solutions.

The complex hydrocarbon reservoirs that have been developed in recent years generally have more subtle characteristics than the reservoirs that were discovered in prior decades and these unconventional reservoir types include tar sand deposits or shale gas or oil formations. As a result, the process of finding and developing these hydrocarbon deposits is proving to be more challenging, which in turn results in escalating costs and increasing demands for newer and more efficient imaging technologies. Also, producers are increasingly using seismic data to enhance production from known fields by repeating time-lapse seismic surveys over a defined area. We believe that this trend should benefit seismic companies such as ION by extending the utility of subsurface imaging beyond exploration and into production monitoring, which can continue for decades.

We believe that E&P companies will, in the future, increasingly use seismic technology providers who will collaborate with them to tailor seismic surveys that address specific geophysical problems and to apply advanced imaging technologies to take into account the geologic peculiarities of a specific area. In the future, we expect that E&P companies will rely less on undifferentiated, mass seismic studies created using analog sensors and traditional processing technologies that do not adequately identify geologic complexities.

Over the past decade, a majority of all new oil and gas reserves discovered worldwide were located offshore and we believe that offshore E&P activity will continue to grow in an effort to meet global energy demands. Meanwhile, interest in oil shale opportunities is increasing and developments in the technology to locate and extract oil shale reserves are progressing.

Almost 60% of new U.S. onshore natural gas production is now coming from the shale gas plays, which exhibit first year decline rates of 65% to 85%. We expect that exploration and production expenditures will continue to recover as E&P companies and seismic contractors continue to see recovery in activity levels related to their business.

Seismic can be divided into two distinct processes: the acquisition, as carried out by offshore vessels with streamers (cables with built-in sensors) or by onshore arrays of geophones, and the processing of the data sets acquired. Although the two components are frequently bid for as a package, it is also possible to divide them. Barriers to entry in acquisition are generally modest, as it is relatively easy to acquire new offshore seismic vessels and begin bidding for work. Barriers to entry in data processing are somewhat higher, owing to the need for proprietary algorithms, specialised and highly skilled staff, and data processing centres.

Acquired seismic is typically sold as a package of the original data set. The seismic companies also generally offer processing, although processing can be offered as a distinct service on a data set acquired. This co-selling of data and interpretation is particularly important with more recent technologies, as the seismic company designs the survey to its own data interpretation capabilities, and may be wary of allowing third parties access to the detail of the survey design. Data – whether interpreted or not – is generally sold as an entire package, enabling the seismic company to get full value for all the survey, not just the specific areas that are likely to contain hydrocarbons – a key point for the seismic company.

Processing acquired seismic is a distinct business, where there are typically higher barriers to entry. In general, the process requires massive computing power, specialised algorithms and personnel, and the major companies involved typically have data centres spread worldwide, with high bandwidth connections between them. The price of seismic processing is in continuous fall, led by improvements in the algorithms and faster computing power. However, lower prices have, to date, been accompanied by rising activity levels, leading to net growth in processing revenue.

Source: Industry

Key terms (Electromagnetic)

Controlled source electromagnetic (CSEM) surveying: In the marine environment, a survey or method in which an electromagnetic field is generated in the substrate using a controlled source and measured at different offset locations using surface/seabed receivers. In principle, CSEM techniques cover all geophysical, electromagnetic surveys with an active source. The CSEM method when applied offshore may be known as marine CSEM, mCSEM or seabed logging (SBL).

Electromagnetic (EM) field: In the case of controlled-source electromagnetic surveying, the EM field is generated by a controlled source,whereas in Magneto-Telluruc (MT) surveys, the source fields are naturally generated in the atmosphere and ionosphere. EM fields have electric and magnetic components, either or both of which can be recorded at the receiver stations.

Electromagnetic (EM) surveying: A group of methods for measuring natural or generated electromagnetic fields at the surface/seabed or in boreholes to map variations in subsurface electrical properties, most notably resistivity.

Integration: The combination of two or more datasets. Electromagnetic data are typically integrated with seismic and well data so that the most-informed interpretation can be made.

Interpretation: Drawing conclusions from data. Electromagnetic data are usually integrated with seismic and other subsurface data to enable the best-informed interpretations to be made.

Inversion: A mathematical process that uses data to generate a model that is consistent with that data. For CSEM or MT methods, inversion is used to convert electromagnetic data into resistivity values located in space. The underlying models can be simplified to save time, for example, by making the resistivity constant in one dimension. In 3D inversion, the resistivity is allowed to vary in all directions.

Modelling: In controlled-source electromagnetic surveying, simulation of the propagation of electromagnetic fields in a resistivity model. Forward modelling is used to test geo-model hypotheses in the survey-planning and interpretation stages. In CSEM surveying, modelling is often used informally for the process of "model building", or constructing a rock property model of the earth, such as a resistivity model. A modelling study includes both model building and forward modelling, followed by misfit analysis to assess the accuracy of the model or the effect of structures of interest on the EM response to be measured.

Magnetotelluric (MT) surveying: an electromagnetic surveying method used to map subsurface resistivity variations by measuring naturally occurring electric and magnetic fields on the seabed or the Earth's surface. Low-frequency natural electromagnetic fields are generated in the Earth's atmosphere and isonosphere. Because MT surveys have relatively low resolution but excellent depth penetration, the measurements are used to help interpret regional geology. The MT method is particularly useful in areas where topography, high-impedance volcanic rocks or salt make other geophysical methods difficult. MT data are acquired without additional effort during electromagnetic surveys when the controlled source is inactive.

Processing: Preparing data for inversion. Processing starts with raw data from the receivers and transforms it into interpretable responses, taking into account, for example, system responses, receiver calibration and navigation information.

Receiver: Devices used on the seabed or surface of the Earth to measure and record electromagnetic signals. Controlled-source electromagnetic and magnetotelluric (MT) surveying depend on recording high-quality electric and magnetic fields from high-sensitivity, low-noise receivers. The receivers need to measure field strengths that vary greatly in magnitude, from weak naturally occurring MT signals to strong signals when the source passes over the receiver

Source: A device that emits a controlled electromagnetic signal with a frequency distribution and waveform designed to meet the needs of each survey. The source is towed above the seabed during electromagnetic surveys. An

electromagnetic field is generated by the source and its propagation through the Earth is a function of the resistivity of the surroundings. Controlled-source electromagnetic surveying methods measure and map subsurface resistivity, and are particularly sensitive to the presence of resistive features, for example hydrocarbon bearing sediments (among other things).

Survey design: Setting the survey parameters, such as receiver spacing, source frequency mix and towing geometry. For example, widely spaced receiver grids are used for large-scale surveys designed to find new leads, whereas more densely spaced receiver grids are used where detailed 3D resistivity datasets are required for reservoir appraisals.

Target: the focus of an electromagnetic survey. The objective in most EM surveys has been to assess the resistivity of a predefined prospect(s). In this case, the prospect(s) is/are the targets of the survey.

Target model: A model that includes a target resistive body, whether a hydrocarbon reservoir or another resistor. Forward modelling is used to produce simulated receiver responses that can be compared with measured data to assess competing hypotheses.

Time series: An array of data representing the readings of the electromagnetic field by a channel on a receiver at regular and densely sampled time intervals.

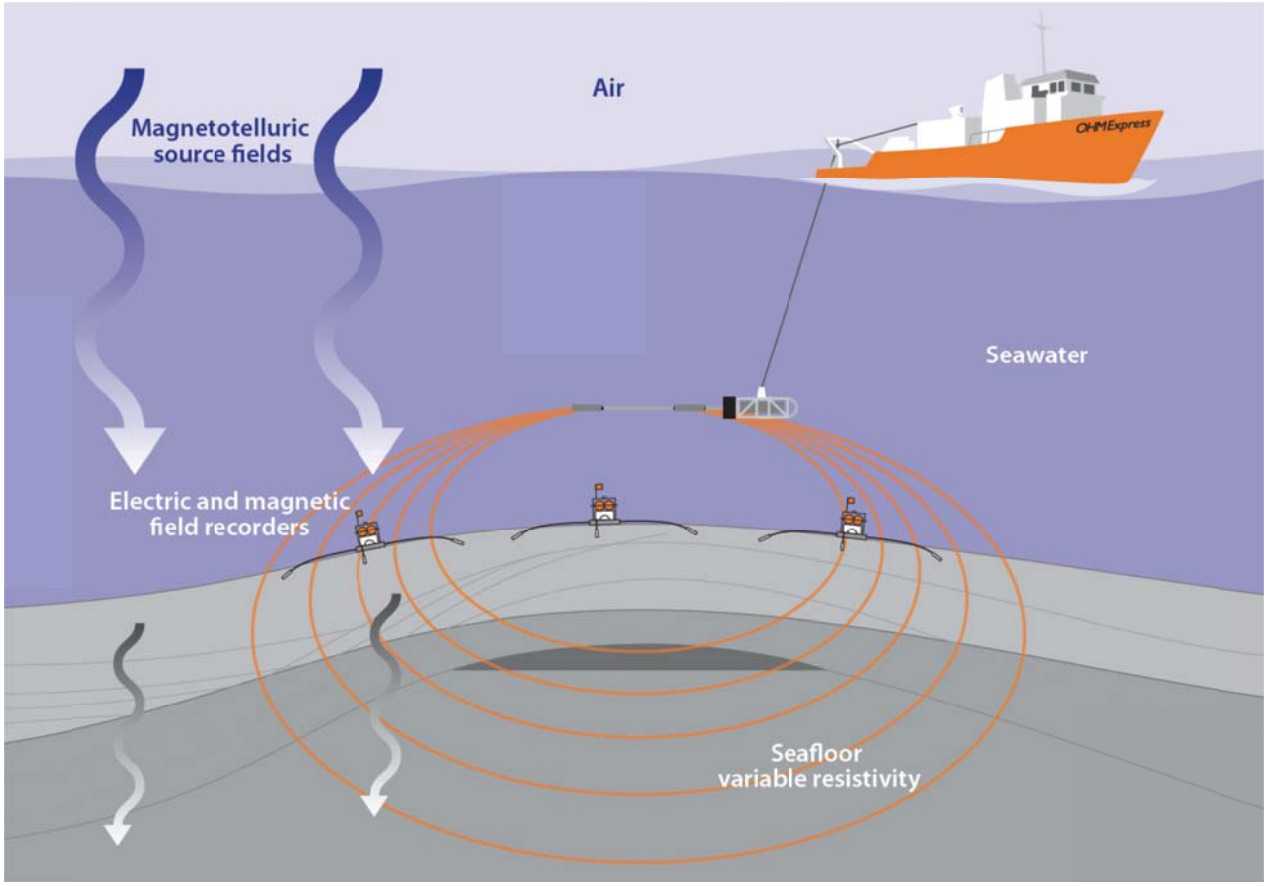
Source: Industry data and EMGS

Electromagnetic surveying

Electromagnetic surveying is a different way of capturing information about the subsurface, compared to the acoustic method used in seismology. EM surveying relies on the varying electrical resistivity of materials whereas seismic relies on the different speeds that sound waves travel through the earth and contrasts in acoustic properties between adjacent layers. One of the key problems with seismic imaging is that, in general, there is only a small difference between the speed of P-waves in a water saturated rock and in an oil-saturated rock. As a result, it is difficult to distinguish between water-saturated rock and hydrocarbon-saturated rock (payzones), creating substantial risk of 'dry' holes.

However, there is a sharp difference between the resistivity of hydrocarbon saturated rock and water-saturated rock. Electromagnetic surveying transmits a very low frequency (<10Hz) EM signal through the earth's surface to measure electrical resistivity directly. By carefully interpreting the measured resistivity, the presence (or otherwise) of hydrocarbons in the sub-surface may be inferred. However, EM surveying has a number of drawbacks, including lower structural resolution (compared to seismic methods), and potential ambiguities in the interpretation of resistivity anomalies when taken in isolation (high resistivity zones may be caused by hydrocarbon, but can also be caused by other geological formation, for example volcanics or tight limestones) which cannot be distinguished on the basis of resistivity alone. . There are two main electromagnetic technologies.

Exhibit 24: CSEM surveying



Source: RSI

CSEM: A marine controlled-source EM survey uses a single vessel to tow an EM source close to the seafloor, from which low-frequency signals (high current, low voltage) are emitted. The resulting signals are gathered by a network of recoverable receivers placed on the seabed. CSEM surveys have been acquired globally, for both oil majors and smaller independent operators, in water depths from 20m to 3km.

MT: A marine MT survey uses seafloor receivers (the same instruments as used for CSEM surveys) to measure EM fields that are naturally generated in the Earth's atmosphere and ionosphere. Typically these fields are measured at frequencies between about 0.1 Hz and 0.0001 Hz. Such low frequency data gives MT superior depth penetration compared to CSEM methods (typically to tens of km or more). However it also results in the MT method lacking resolution of finer scale resistivity structures. As a result MT data are complementary, both operationally and technically, to CSEM data.

In order to acquire and deliver a valuable CSEM dataset, three key steps must be performed: survey design, data acquisition and data processing, interpretation and integration.

Survey design is very important for CSEM: improper placing of receivers and/or use of inappropriate source parameters may result in a survey with little or no target sensitivity. Survey design therefore involves building a model of the area to be surveyed using any available seismic, well and geological information, and using this model to optimise the acquisition strategy through a processing of forward modelling.

Data acquisition takes place at sea. Receivers are deployed in the pattern defined in the survey design phase at the start of the survey. These receivers log electric and/or magnetic field autonomously throughout the survey. The source is then towed across the receiver array. At the end of the survey the receivers are recovered and the data downloaded for analysis.

Data processing takes the raw time series recorded by the receivers and converts it to interpretable EM responses. These are interpreted using a combination of forward modelling and inversion techniques to recover a robust resistivity model of the earth. The analysis typically includes an integration phase in which seismic data are used to condition structure in the EM inversion, and also, when combined with the resistivity result, to assist in the assessment of rick and fluid properties.

CSEM was first commercialised in 2002 being marketed as a replacement for seismic with enormous market opportunities. However CSEM technology developments suffered a major setback in 2005 when the industry realised that the technology whilst still very useful was not quite the game changer originally predicted.

While the technology was considered very promising, experience of difficult to interpret results and in some instances false positive/negatives has significantly reduced expected takeup of the method when it is considered in isolation. In general, EM is complementary to seismic rather than a replacement.

Source: Industry and FoxDavies

Well Logging

Well logging is the practice of making a detailed record (a well log) of the geologic formations penetrated by a borehole. The log may be based either on visual inspection of samples brought to the surface (geological logs) or on physical measurements made by instruments lowered into the hole (geophysical logs). Well logging is done during all phases of a well's development; drilling, completing, producing and abandoning.

The logging procedure consists of lowering a 'logging tool' on the end of a wireline into an oil well to measure the rock and fluid properties of the formation. An interpretation of these measurements is then made to locate and quantify potential depth zones containing hydrocarbons. Logging tools measure the electrical, acoustic, radioactive, electromagnetic, nuclear magnetic resonance, and other properties of the rocks and their contained fluids. Logging is usually performed as the logging tools are pulled out of the hole. This data is recorded either at surface (real-time mode), or downhole (memory mode) to electronic data format and then either a printed record or electronic presentation called a "well log" provided to the client. Well logging is performed at various intervals during the drilling of the well.

Open hole operations, or reservoir evaluation, involves the deployment of tools into a freshly drilled well. As the toolstring traverses the wellbore, the individual tools gather information about the surrounding formations. A typical open hole log will have information about the density, porosity, permeability, lithology, presence of hydrocarbons, and oil and water saturation. Cased hole operations, or production optimization, focuses of the optimization of the completed oil well through mechanical services and logging technologies. A typical cased hole log may show cement quality, production information, formation data.

There are many types of electric/electronic logs and they can be categorized either by their function or by the technology that they use. "Open hole logs" are run before the oil or gas well is lined with pipe or cased. "Cased hole logs" are run after the well is lined with casing or production pipe. Electric/electronic logs can also be divided into two general types based on what physical properties they measure. Resistivity logs measure some aspect of the specific resistance of the geologic formation. There are about 17 types of resistivity logs.

Porosity logs measure the fraction or percentage of pore volume in a volume of rock. Most porosity logs use either acoustic or nuclear technology. Acoustic logs measure characteristics of sound waves propagated through the well-bore environment. Nuclear logs utilize nuclear reactions that take place in the downhole logging instrument or in the formation. Nuclear logs include density logs and neutron logs, as well as gamma ray logs which are used for correlation.

The basic principle behind the use of nuclear technology is that a neutron source placed near the formation of which the porosity is required to be measured will result in neutrons being scattered by the hydrogen atoms, largely those present in the formation fluid. Since there is little difference in the neutrons scattered by hydrocarbons or water, the porosity measured gives a figure close to the true physical porosity whereas the figure obtained from electrical resistivity measurements is that due to the conductive formation fluid. The difference between neutron porosity and electrical porosity measurements therefore indicates the presence of hydrocarbons in the formation fluid.

Source: Industry and FoxDavies

Research Disclosures

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Paul joined the Fox-Davies Capital research team July 2010. Prior to this, Paul became an equity analyst in 1986 after a decade in the oil & chemical industries, with BP and ARCO Chemical (division of Atlantic Richfield), where his roles included scientific research and strategic planning respectively. He has worked on the sell-side for Credit Lyonnais, Enskilda, Metzler and Morgan Stanley, the latter for seven years. He was rated for pan-European chemicals research and has also assisted in the coverage of metals and oil & gas. More recently he worked on the buy-side for Barclays as a senior global resources equity and commodity analyst for six years. He joins us from Edison Investment Research, where he was responsible for their coverage of industrials and oil & gas support services. Paul has an MBA from Cranfield School of Management and Bachelor of Science Honours in Chemistry from Southampton University.
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Company Name	Disclosure
Rock Solid Images (RSI)	2, 7, 8

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Baker Hughes	BHI UN Equity	HOLD	26.01.11	$68.77	
Cape	CIU LN equity	HOLD	21.01.11	£5.01	
Capital Drilling	CAPD LN Equity	BUY	16.03.11	£1.03	
Hunting	HTG LN equity	BUY	07.03.11	£7.33	
KBC Advanced Technologies	KBC LN Equity	HOLD	21.01.11	£0.73	
Kentz	KENZ LN Equity	BUY	29.03.11	£4.26	
Lamprell	LAM LN Equity	HOLD	30.03.11	£3.53	
Newpark Resources	NR US Equity	BUY	09.05.11	$8.82	
Petrofac	PFC LN Equity	BUY	21.01.11	£14.75	
Rock Solid Images	RSI LN Equity	BUY	17.05.11	£0.05	£0.13
Technip	TEC FP Equity	HOLD	21.01.11	70.53 €	
Schoeller-Bleckmann	SBO AV Equity	BUY	09.02.11	64.25 €	
Wood Group	WG/ LN Equity	BUY	22.02.11	£6.44	

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