Beyond the Shale: Aboard the Price Rollercoaster

Carbon Tracker Initiative

April 2016

Contents

Executive Summary 4

Findings 6
Discussion 9

1. Introduction 10

Potential for stranded assets 10
The importance of U.S. onshore oil and gas 11
Diminishing resilience 11
Five sample companies 13
Structure of this report 14

2. Market outlook in 2016 15

Lower oil and gas prices 15
Impacts of lower prices on our sample E&P companies 16

3. Sensitivity analysis: impact of lower prices on leverage ratios 19

Leverage ratio 19
A sensitivity analysis 21
Findings 22
Comparison with 2015: Two examples 24

4. Impacts for investors 25

Debt exposure 25
Falling appetite 25
Losses 28
Outlook 30

About Carbon Tracker

The Carbon Tracker Initiative is a team of financial specialists making climate risk real in today's financial markets. Our research to date on unburnable carbon and stranded assets has started a new debate on how to align the financial system with the energy transition to a low carbon future.

You can download this report from:

http://www.carbontracker.org/report/beyond_the_shale/

Acknowledgements

This report was authored by Gerard Wynn, Energy Analyst, Research Advisor to Carbon Tracker.

Edited by James Leaton and Andrew Grant and revised by Stefano Ambrogi from Carbon Tracker.

Typeset and designed by Margherita Gagliardi from Carbon Tracker.

Cover photo via Shutterstock

Executive summary

Potential for stranded assets

Carbon Tracker has produced its Carbon Supply Cost Curves which identify the higher cost, higher carbon supply options which do not fit within a 2˚C scenario. Marginal production regions like Canadian oil sands and U.S. shale are firmly in the frame for cuts in capex if the industry misreads demand. As with any region, not all barrels are the same, hence we are conducting this more detailed analysis to understand the variation in exposure to oil price volatility. The highly leveraged business model of many of the smaller shale operators also means that the ability of these companies to sustain operations and service debt if oil prices do not recover is in question.

Debt burden too great for some

Shales are medium cost sources of production in the US which are marginal at recent oil and gas prices, even after significant cost-cutting. Survival is predicated on an effective hedging strategy and carrying lower debt levels. Creditors have growing influence at the companies most exposed, which are struggling to raise cash to meet debt payments. Many U.S. E&P companies are burdened with high levels of debt, having out-spent income even while times were good, and prices high, to build up acreage and increase production.

Sensitivity analysis exposes risks

In this analysis, we consider leverage ratios as one indicator of company performance. We use a ratio of net debt to adjusted earnings (EBITDAX). EBITDAX is defined as earnings before interest expenses, income taxes, depreciation, amortisation and exploration expenses. Creditors often use such leverage ratios to define borrowing conditions, or covenants, under E&P debt facilities. We undertake a sensitivity analysis of the leverage ratios of five large pure-play U.S. E&P companies at a range of oil and gas prices: Chesapeake; Concho Resources; Continental Resources; Energen; and Whiting Petroleum. This study updates our previous report, "U.S. shale oil and gas: Going over the hedge", which last May found risks for investors in E&P companies at oil and gas prices below $50 and $2.25 respectively. Those risks have been borne out, with significant losses in value for equity and bond investors.

Splitting the pack

Last year's report found that Chesapeake and Whiting Petroleum had the highest leverage ratios, among these five companies. We note that these two companies have performed weakest by many benchmarks, since publication of that report. Whiting shares are down around 75% from their offer price in a $1.1 billion rights issue 12 months ago. And Chesapeake now has the lowest Standard & Poor's credit rating among these five companies (CCC), followed by Whiting Petroleum (B+). Chesapeake and Whiting have both suspended the total leverage ratios in their financial covenants under their creditor agreements. This shows that the U.S. shale operators should not be treated as a homogenous group as there is significant variation in exposure.

Findings

Production and revenues coming down

The five companies selected here forecast, on average, 10% lower output in 2016, compared with 2015; collectively they expect to produce 420 million barrels of oil equivalent in 2016, down from 465 mboe in 2015. On average, they project 20% lower revenues in 2016, and 62% lower hedging revenues; in aggregate, their total revenues fall by $4.2 billion, and their hedging revenues by $1.6 billion (assuming 2016 WTI crude oil price of $45, and natural gas price of $2.6).

Hedges trimmed but still important buffer

The sample companies indicate that the E&P playing field has spread out, during the recent oil price collapse, as more indebted companies suffer disproportionately from falling revenues, while less indebted companies benefit from falling costs; in addition, some had put in place far more robust long-term hedging than others. Creditors use a leverage ratio of four as an upper limit in the borrowing conditions, or covenants, at several E&P companies. This is also the threshold applied by the US Office of the Comptroller of the Currency to determine 'sub-standard' bank loans. At Chesapeake and Whiting Petroleum, net debt is more than four times EBITDAX at any foreseeable oil and gas price this year; by contrast, at Concho Resources and Energen, net debt remains below four times EBITDAX.

U.S. E&P debt and equity fell further over last year

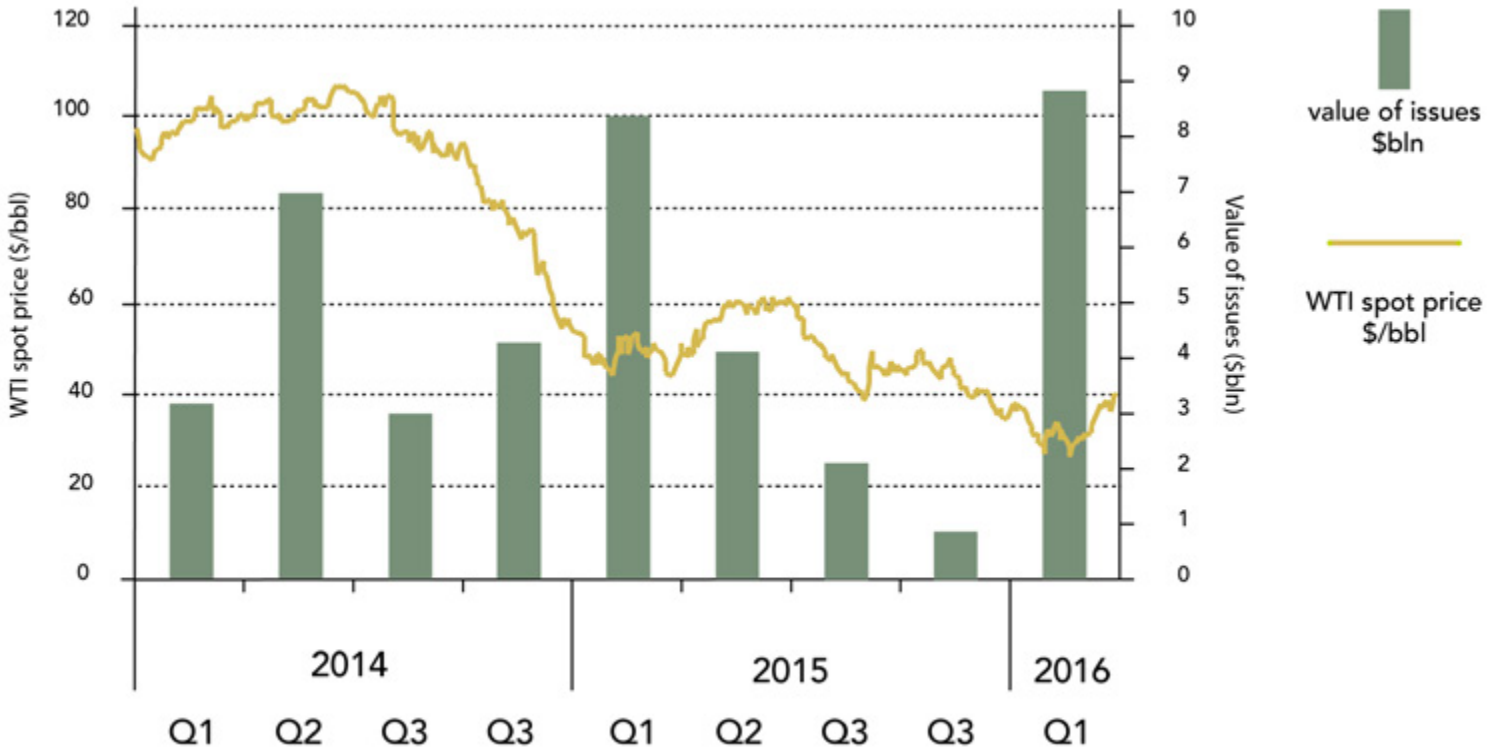
Debt exposure: the U.S. E&P sector has total outstanding bond and loans borrowings of $353 billion; some 36% of this, or $128 billion, is sub-investment grade, or junk; E&P accounts for more junk debt than any other economic sector, at 8% of total U.S. junk lending of $1.6 trillion.

Loss of value: this falling confidence in turn damaged asset values, leading to massive loss in wealth; the market capitalisation of U.S. E&P companies fell by $340 billion, from May 2015 to March 2016; U.S. energy-related junk bond values fell by an estimated $76 billion in the eight months to February 2016.

Rollercoaster ride anyone?

Falling confidence: falling oil and gas prices undermined investor confidence in the E&P sector; share issuance fell by a quarter in the second half of 2015, to $2.9 billion, from $12.4 billion in the first half; bond issuance almost halved, to $25.8 billion from $47.3 billion. But – in the first three months of 2016, share issuance leapt more than tenfold on the previous quarter, to the highest quarterly value at least since 2011, as the oil price rollercoaster dipped again. That dip seems to be picking up many new passengers, hoping that the only way is up. The risk is that history repeats itself, given the similarity with the last time investors called the bottom of the oil market, in early 2015. Equity issuance also surged then, before braking sharply in the wake of further oil price falls, leading to massive equity losses. It is striking that creditors are far more cautious, with quarterly bond issuance falling again, in Q1 2016, to its lowest level in at least two years. If this is a loop-the-loop scenario for oil prices, cycling round sub-$50, then some investors will be feeling pretty sick.

Figure 1. Chart of US E&P equity issuance and WTI oil price since January 2014



Source: Bloomberg, EIA

Default and demand

Rising default rates: Some 25 U.S. oil and gas companies defaulted on their debt last year, pushing general U.S. corporate defaults to the highest level since the financial crisis, according to Moodys. Rating agencies expect more defaults in 2016. Credit default swaps indicate an implied risk of default of 27% across the 25 largest U.S. E&P companies, according to BofAML. The fortunes of these companies link to global trends around supply and demand, the dynamic between costs, taxes and prices. U.S. producers may face further headwinds if demand disappoints for example due to decoupling of economic growth from energy demand, improved vehicle efficiency, and rapid take-off of electric vehicles. Costs have already been squeezed and further investment may be required to meet the U.S. EPA's methane target to cut emissions by 45% by 2025.

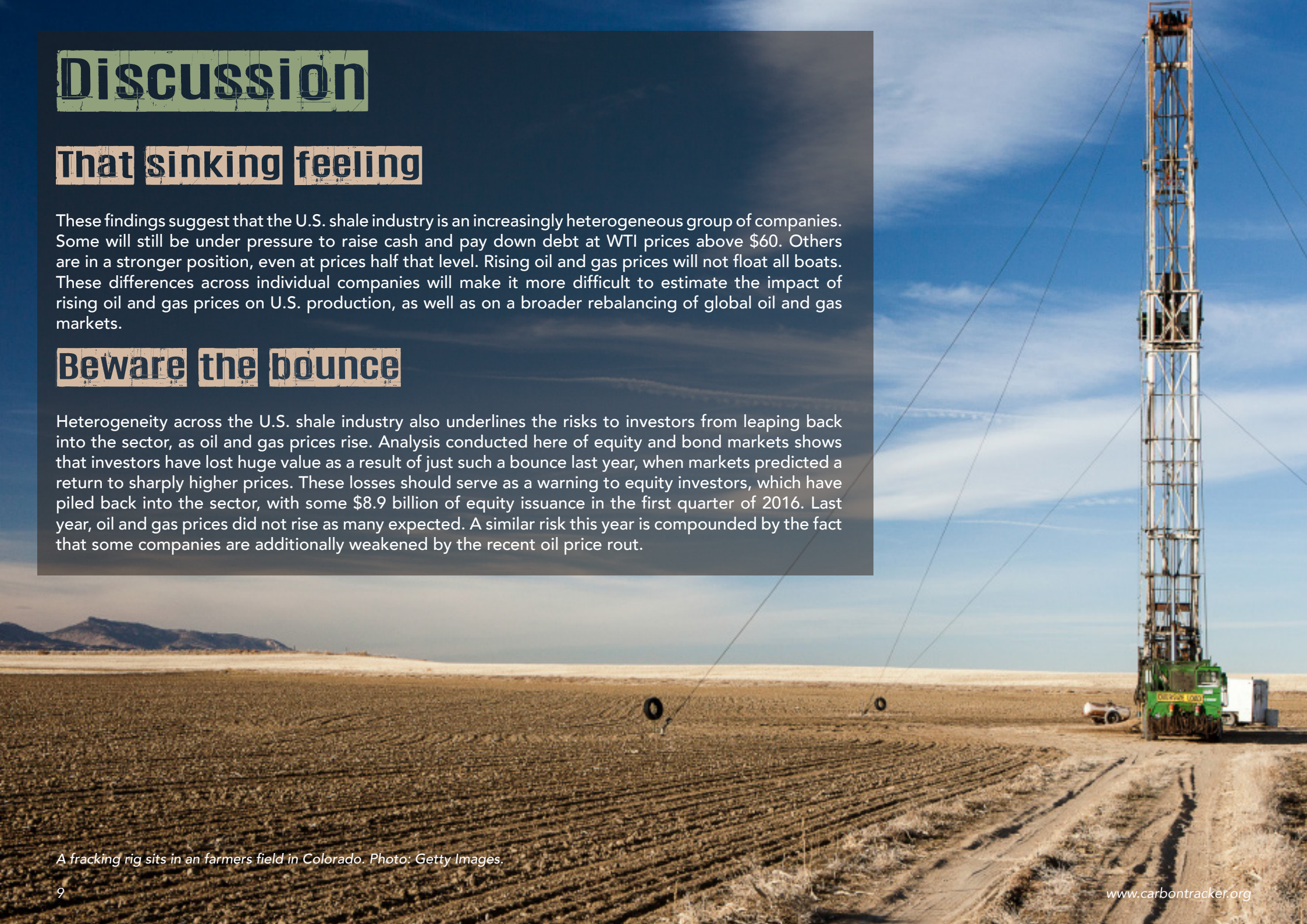
Discussion

That sinking feeling

These findings suggest that the U.S. shale industry is an increasingly heterogeneous group of companies. Some will still be under pressure to raise cash and pay down debt at WTI prices above $60. Others are in a stronger position, even at prices half that level. Rising oil and gas prices will not float all boats. These differences across individual companies will make it more difficult to estimate the impact of rising oil and gas prices on U.S. production, as well as on a broader rebalancing of global oil and gas markets.

Beware the bounce

Heterogeneity across the U.S. shale industry also underlines the risks to investors from leaping back into the sector, as oil and gas prices rise. Analysis conducted here of equity and bond markets shows that investors have lost huge value as a result of just such a bounce last year, when markets predicted a return to sharply higher prices. These losses should serve as a warning to equity investors, which have piled back into the sector, with some $8.9 billion of equity issuance in the first quarter of 2016. Last year, oil and gas prices did not rise as many expected. A similar risk this year is compounded by the fact that some companies are additionally weakened by the recent oil price rout.



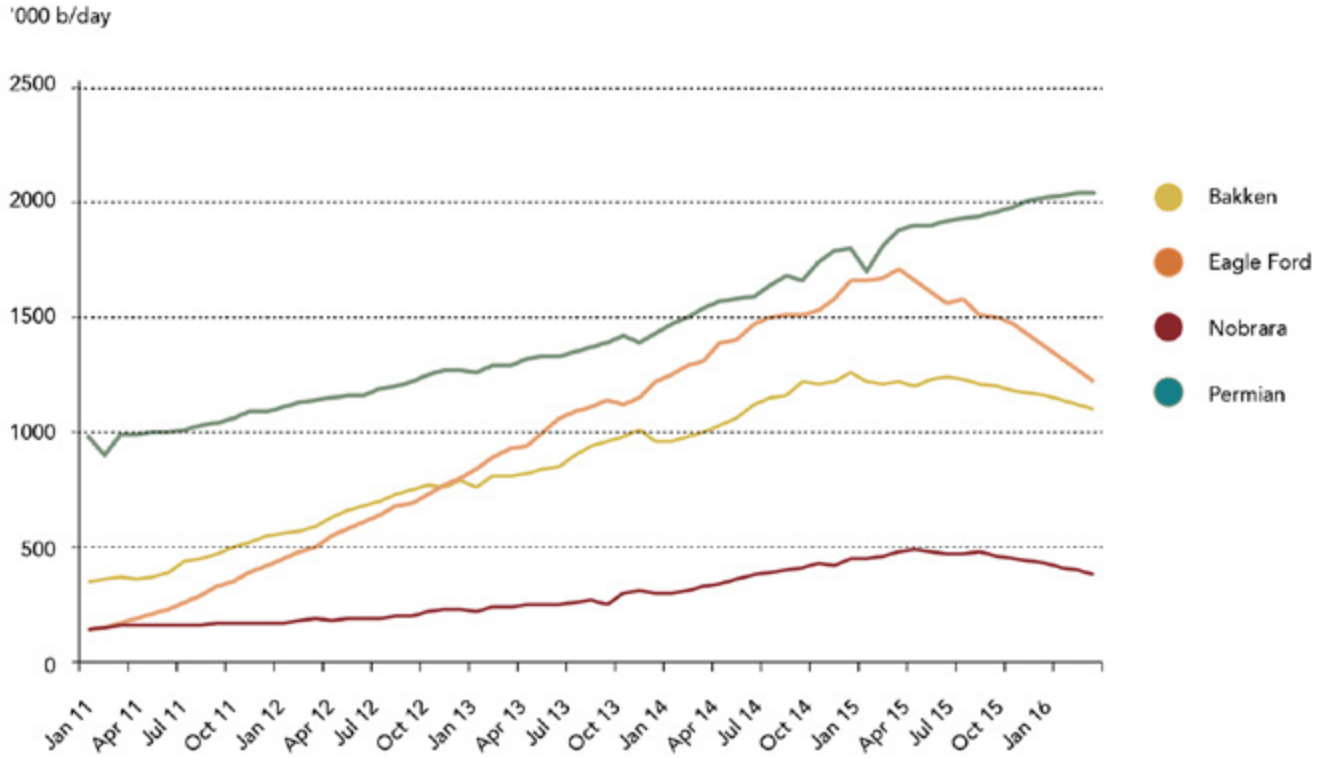
A fracking rig sits in an farmers field in Colorado. Photo: Getty Images.

1. Introduction

Potential for stranded assets

Carbon Tracker has produced its Carbon Supply Cost Curves which identify the higher cost, higher carbon supply options which do not fit within a 2˚C scenario. Marginal production regions like Canadian oil sands and U.S. shale are firmly in the frame for cuts in capex if the industry misreads demand. As with any region, not all barrels are the same, hence we are conducting this more detailed analysis to understand the variation in exposure to oil price volatility. The highly leveraged business model of many of the smaller shale operators also means that the ability of these companies to sustain operations and service debt if oil prices do not recover is in question.

Figure 2. U.S. tight oil production, barrels per day, by month, main plays, 2011-2016



Source: EIA[3]

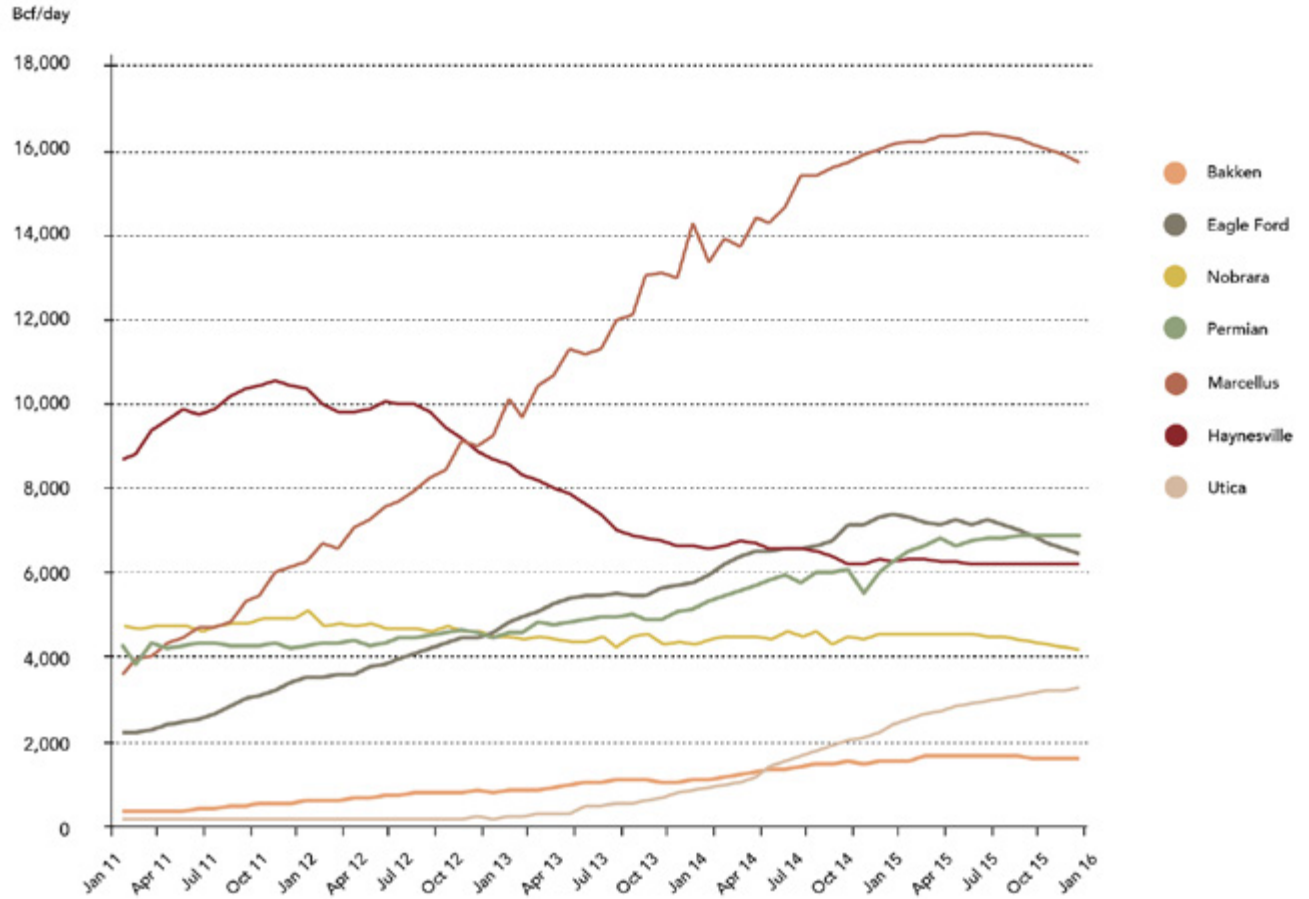
The importance of U.S. onshore oil and gas

Tight oil production from shale plays accounted for 45% of total U.S. crude production last year. Shale gas wells account for nearly half of total U.S. dry natural gas production. Growth in U.S. crude output is one of the factors contributing to an imbalance in oil markets and a collapse in the price of the West Texas Intermediate (WTI) benchmark, from a peak near $108 in June 2014, to a low of $26 in early February 2016.[1] Onshore U.S. tight oil production peaked at 4.3 mb/d last year, at 10 times 2010 levels, according to the International Energy Agency (IEA).[2]

Diminishing resilience

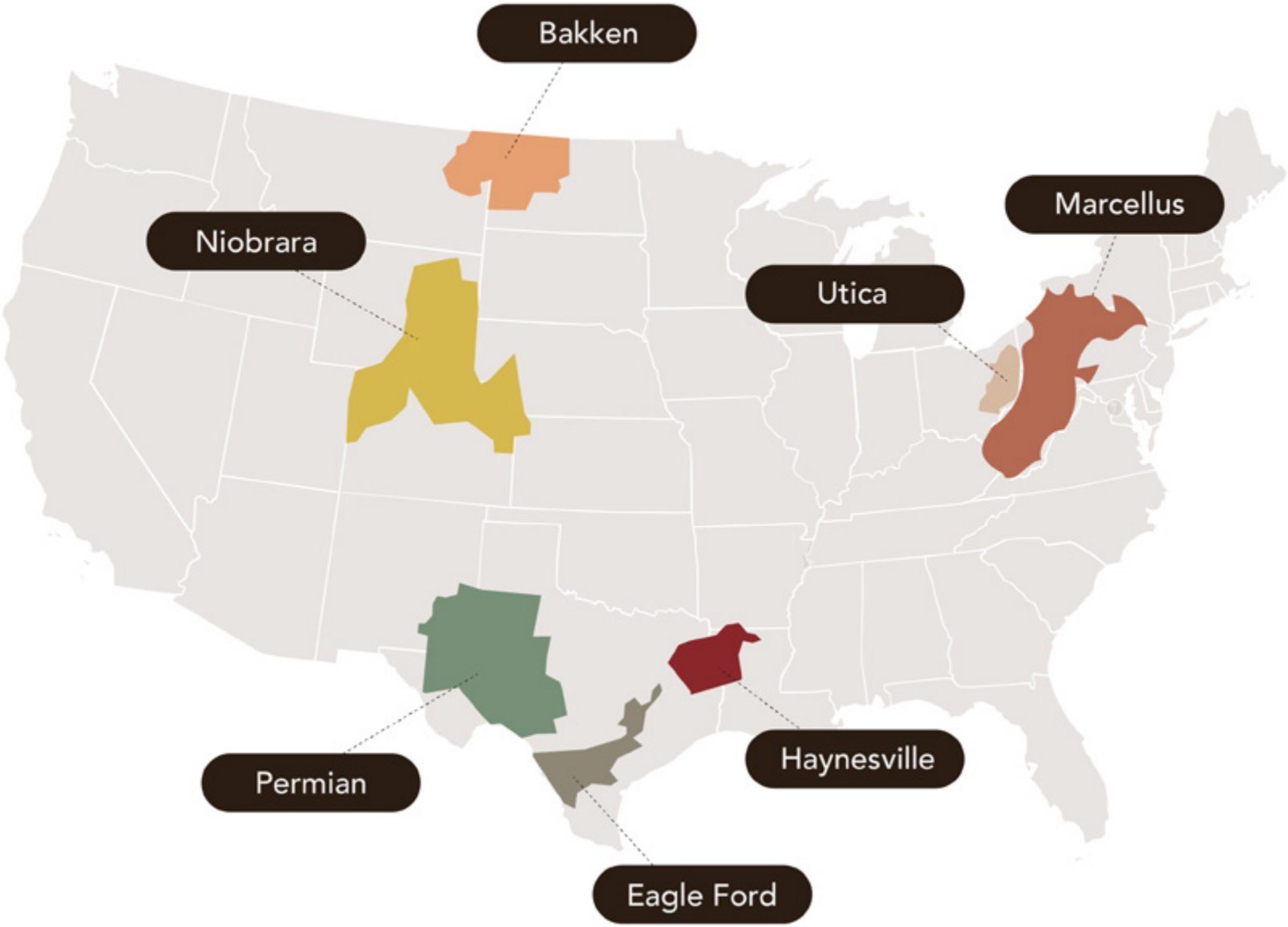
One of the surprises of the recent oil price collapse has been the resilience of U.S. onshore production. However, output is now starting to fall in most plays (see Figure 2 on previous page). Experts have offered a range of predictions for price levels that will drive a return to growth. Our analysis from last year, "U.S. shale oil and gas: Going over the hedge", showed how the protection of oil price hedges had delayed the impact of the lower price environment for many producers.[4] Other factors will determine economics going forwards, including the scope for cost cuts, better understanding of core, performing areas, and access to finance. However if production is falling and prices do not recover, then it is clear that the highly leverage business models of many shale operators are not sustainable.

Figure 3. U.S. shale gas production, bcf per day, by month, main plays, 2011-2016



Source: EIA

Figure 4. Map of key U.S. tight oil and shale gas producing regions



Source: EIA

Five sample companies

These companies were selected for this analysis on the basis that they were large, pure-play U.S.-based E&P companies focused on onshore oil and gas production.

Chesapeake

Chesapeake was founded in 1989, is based in Oklahoma, and has assets throughout the United States. It is recognized for having very productive assets in the Marcellus shale. The company is the second-largest producer of natural gas in the United States. Chesapeake also owns oil and natural gas marketing and natural gas gathering and compression businesses. Standard & Poor's (S&P) presently ranks the company as junk status, with a CCC rating, which it defines as "currently vulnerable to non-payment".[5]

Concho Resources

Concho Resources was formed in 2006 and is headquartered in Midland, Texas. The company is an independent oil and natural gas company with assets centred on the Permian Basin of Texas and New Mexico. S&P ranks Concho Resources junk status with a BB+ rating.

Continental Resources

Continental Resources was founded in 1967 based in Oklahoma City. It has assets distributed through North, South and East of the United States. The company is most focused on crude oil production. It is one of the largest producers in the biggest shale oil basin, the Bakken play of North Dakota and Montana. Standard & Poor's downgraded Continental Resources from investment grade to junk status, with a BB+ rating, in Feb. 2016.

Energen Corp.

Energen was founded from Energen Resources in 1978 headquartered in Birmingham Alabama. It is an almost pure play Permian Basin company, targeting oil, natural gas liquids and natural gas. Standard & Poor's ranks Energen junk status (BB).

Whiting Petroleum

Whiting Petroleum was founded in 1980 and is based in Denver Colorado. It is an oil and natural gas exploration and production company with assets primarily in the Rocky Mountains and Permian Basin regions of the United States. Standard & Poor's ranks Whiting junk status, B+ with a negative outlook.

Structure of this report

Chapter 2 provides an overview of the impact on these companies of lower commodity prices, in 2015 and 2016. We review the impact on production, hedging and revenues; 2016 estimates are based on company filings published in February. Chapter 3 presents the findings of a sensitivity analysis of leverage ratios at a range of oil and gas prices. Chapter 4 presents published data on investor exposure to the U.S. E&P sector, and the performance of public equity and bonds over the past 12 months.

Methodology Notes

Leverage ratio was defined as the ratio of net debt to EBITDAX, as detailed above. A sensitivity analysis of this leverage ratio was conducted across a range of WTI crude oil ($20-60/bbl) and Henry Hub spot gas prices ($1.5-3/mcf). Calculations of EBITDAX were based on financial projections and hedging positions, as published by the companies in February 2016. A mid-point was selected, where these projections supplied a range. Net debt was taken from median analyst forecasts as reported by Bloomberg. More generally, static estimates for 2016 hedging revenues were based on assumptions of a 2016 average WTI crude oil price of $45, and natural gas price of $2.6, as forecast by Bank of America Merrill Lynch in February 2016, (noting that both of these average prices are above levels seen so far in 2016).

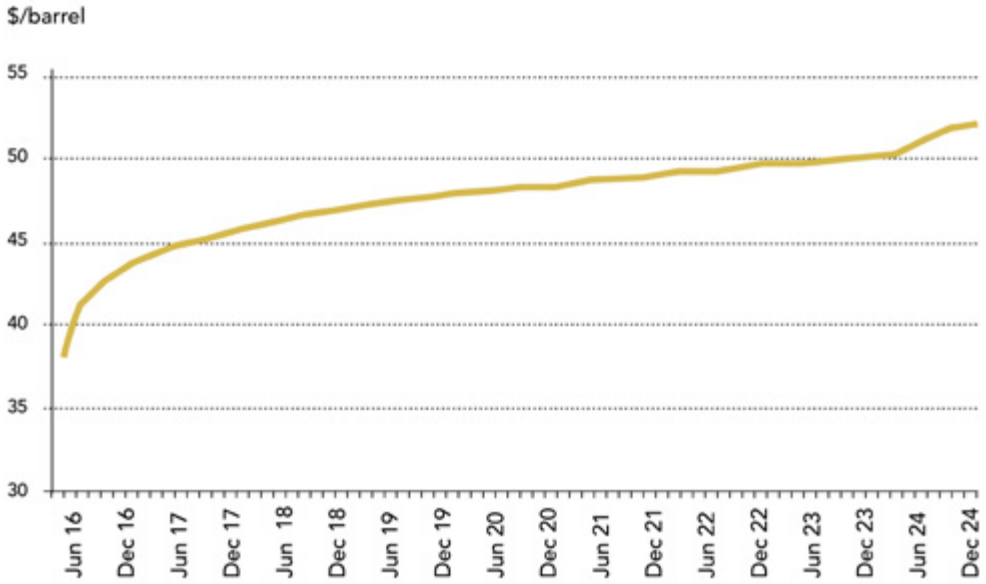
Photo: Ty Wright—Bloomberg/Getty Images

2. Market outlook in 2016

Lower oil and gas prices

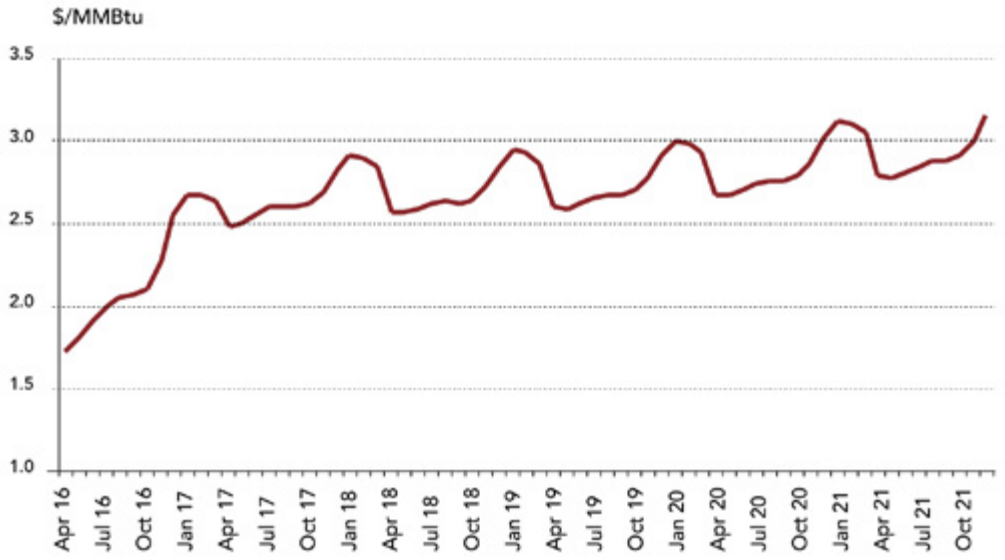
Oil and gas prices have fallen strongly in the past year, and oil prices, in particular, are now expected by some to stay 'lower for longer'. Futures prices for West Texas Intermediate (WTI) crude oil rise from $44 by the end of this year to $50 in 2021 (see Figure 5 below), and U.S. natural gas futures prices rise from $2.5/ MMBtu by the end of this year, to $3 in 2021 (see Figure 6 below). In its latest Short-Term Energy Outlook, the U.S. Energy Information Administration (EIA) sees annual average WTI prices rising from $36 in 2016 to $47 in 2017, and natural gas spot prices rising from $2.6 in 2016, to $3.2 in 2017.[6]

Figure 5. Forward curve for WTI crude oil, as of March 8 2016



Source: Bloomberg

Figure 6. Forward curve for Henry Hub natural gas price, as of March 8 2016



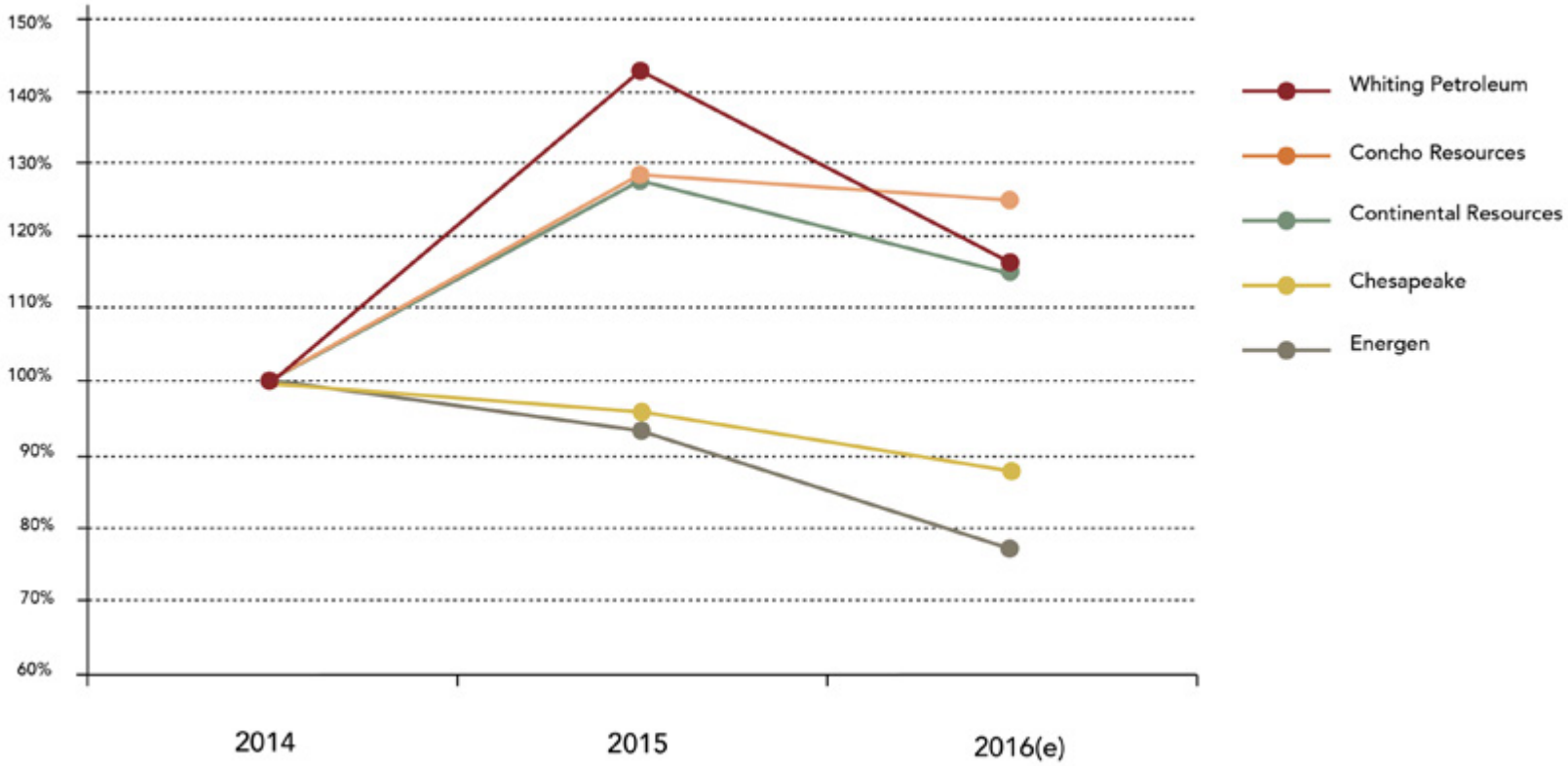
Source: Bloomberg

Impacts of lower prices on our sample E&P companies

Production cuts

In 2015, these companies strived to survive falling prices by cutting costs and maintaining or increasing output. In 2016, they now all plan capex cuts and resulting lower output. Figure 7 shows this flat or rising output in 2015, followed by cuts across the board in 2016.

Figure 7. Total output, millions of barrels oil equivalent, 2014-2016 (2014=1)



Source: Company filings

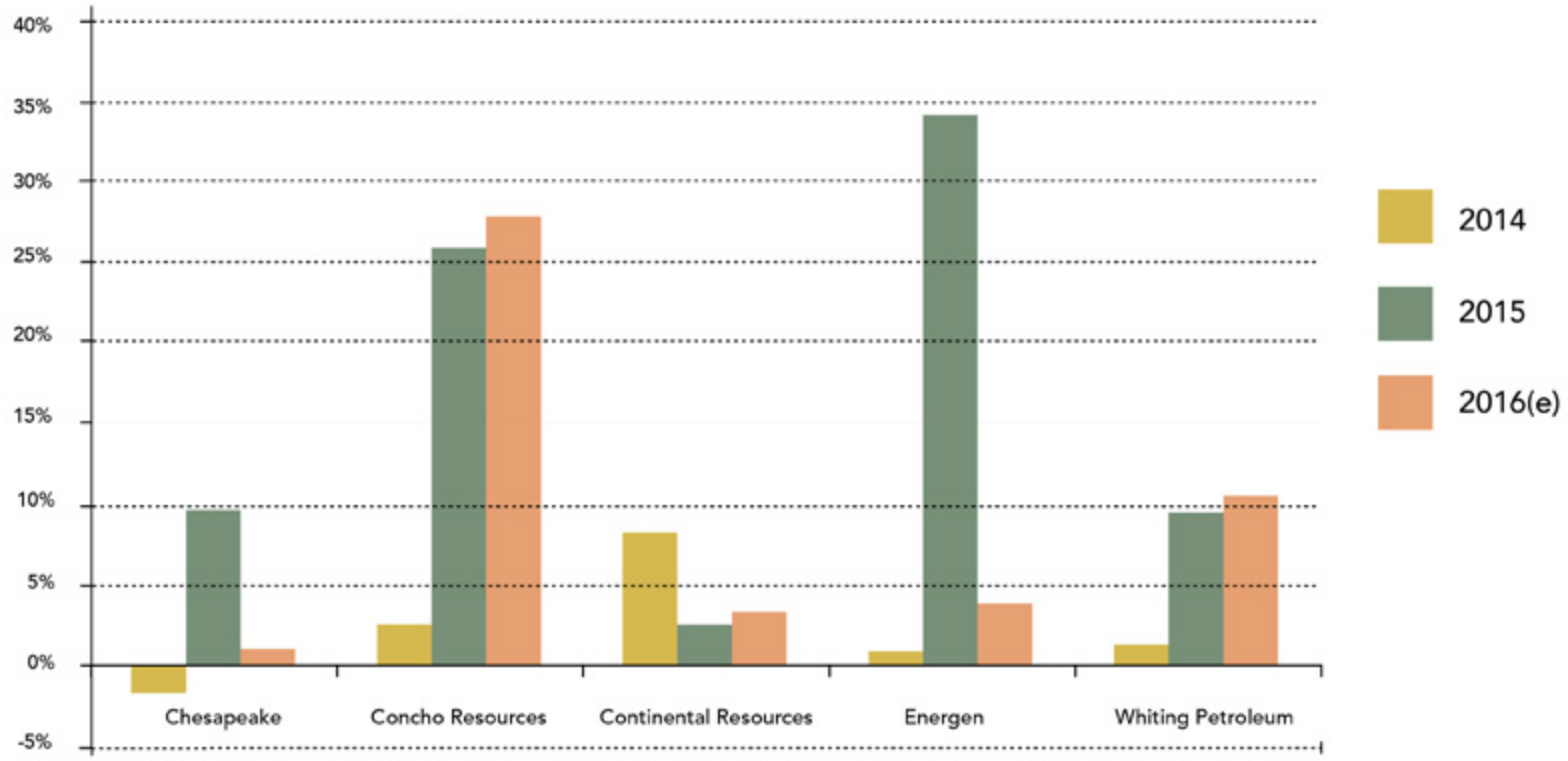
Expiring hedges

Companies can offset the impact of falling oil and gas prices by buying hedges which guarantee a particular sale price. As oil and gas prices fall, the cost of hedging at any given price rises. In 2015, among these five companies all but Continental Resources significantly benefited from hedges. We can estimate 2016 hedging revenues, using company filings data for hedges presently in place, and making certain assumptions about oil and gas prices this year.

We assume 2016 average WTI oil and Henry Hub gas prices of $45/bbl and $2.6/mcf respectively. Concho Resources and Whiting Petroleum maintain their hedge revenues in 2016, although Whiting at a much lower level. They have achieved this by hedging greater volumes in 2016, even though at a lower strike price. Chesapeake and Energen see their hedging revenues collapse. Continental Resources remains all but un-hedged.

Beyond our sample companies, U.S. E&P companies with a speculative-grade rating and those rated "B" or lower by Standard & Poor's have 28 percent and 37 percent of their 2016 oil production hedged, compared with 51 percent and 62 percent, respectively, in 2015, according to Deloitte.[7]

Figure 8. Oil and gas hedging revenues, as a % of total revenues, 2014-2016

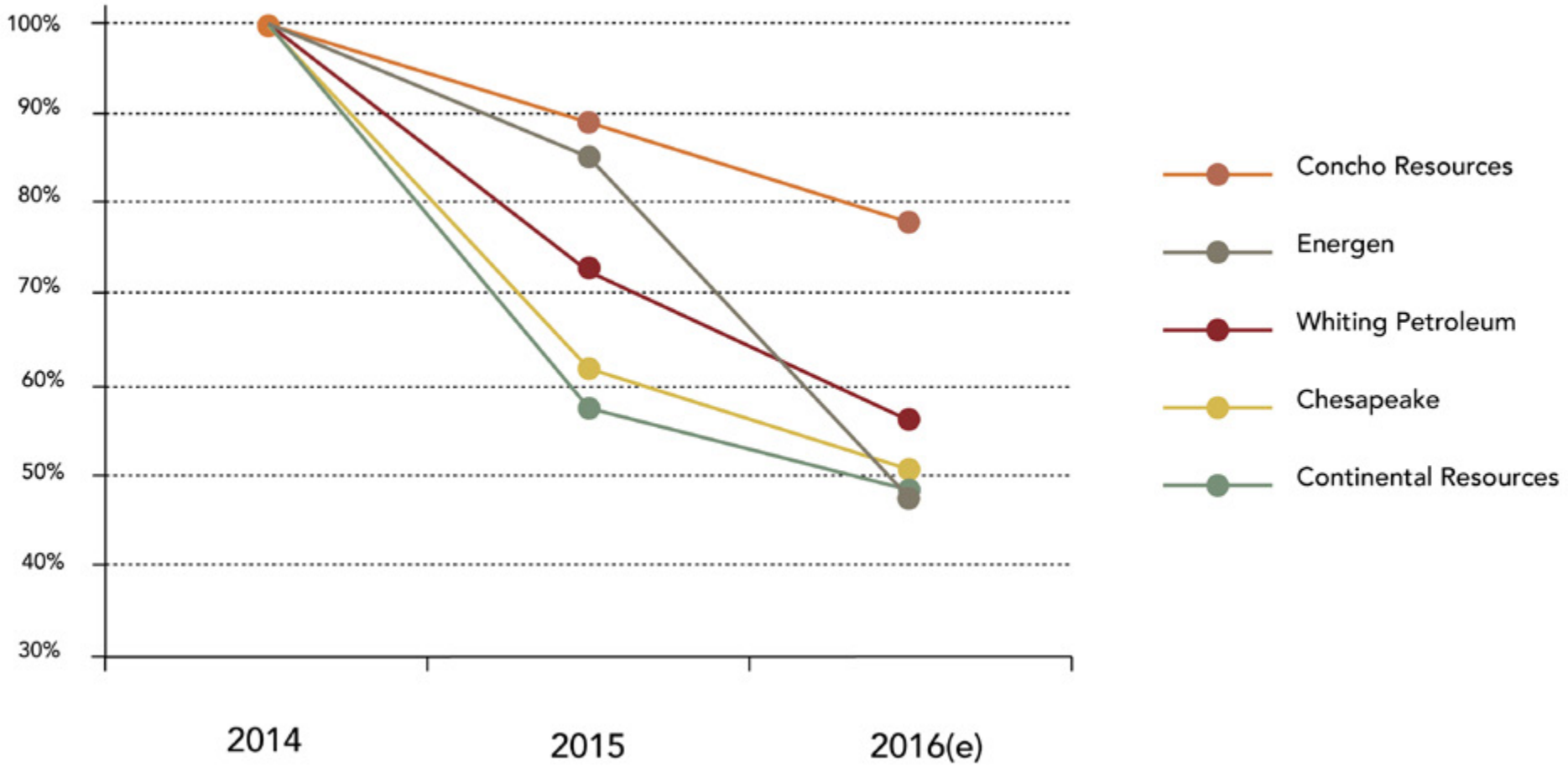


Source: Carbon Tracker Initiative analysis; company filings

Falling revenues

The oil price collapse has led to falling revenues for these five companies. Based on company projections for output, hedging and price differentials in 2016, and central projections for oil and gas prices, we estimate total revenues falling by a group average of 20% in 2016, compared with last year (see Figure 9 below).

Figure 9. Percent change in revenues in 2015 and 2016 versus 2014, selected E&P companies



Source: Carbon Tracker Initiative analysis; company filings

3. Sensitivity analysis: impact of lower prices on leverage ratios

Leverage ratio

A convenient benchmark for measuring performance against oil and gas prices is the leverage ratio, defined here as net debt to EBITDAX. Creditors commonly use this ratio to define borrowing conditions, or covenants, in the debt facilities of E&P companies. Creditors have agreed such ratios in the debt covenants of Concho Resources and Energen, while Chesapeake and Whiting Petroleum recently agreed with creditors to suspend such thresholds. As Table 1 below shows, a typical negotiated covenant threshold value for net debt/ EBITDAX is 4:1. This 4:1 ratio is also the threshold applied by the US Office of the Comptroller of the Currency to determine 'sub-standard' bank loans.[9]

Exceeding financial covenants technically can be classed as a default. Companies do have options, however, either to head off problems by taking pre-emptive action, for example through sale of non-core assets which raises cash and so reduces net debt, or to re-negotiate covenant terms with creditors. Naturally, when renegotiating terms, creditors may extract increasingly cautious terms in other areas, for example demanding greater hedging, higher fees, more collateral or a lower ceiling on credit lines. Such changes may reduce a company's room for manoeuvre and long-run competitiveness.

Performance against net debt to EBITDAX is used in this report as a convenient way to view financial performance according to a range of oil and gas prices; to compare companies with each other; and to make general conclusions regarding the pressures they may be facing. It is not intended as a predictive tool to estimate the probability of default.

Table 1. Financial covenants as agreed in the senior creditor facility of selected companies

Company	**Debt/ EBITDAX covenant ratio**	
	Definition	**Threshold value which should not be exceeded**
Chesapeake	Suspended as of 2016 – previously net debt/ consolidated EBITDA	Previously 4.00
Concho Resources	Total debt/ EBITDAX	4.25
Continental	N/A	N/A
Energen Corp.	Total debt/ EBITDAX	4.00
Whiting Petroleum	Suspended to 2018, or until achieves investment grade rating – Total debt/ EBITDAX	Previously 4.00

Source: Company filings

A sensitivity analysis

Following are the results of a sensitivity analysis of the ratio of net debt to EBITDAX. As discussed above, a ratio of around "4" is used by creditors to define the borrowing conditions in the debt facilities of some E&P companies. The shaded areas in the tables indicate the pricing scenarios where this ratio is exceeded.

Table 2. Scenario analysis of Chesapeake, 2016, Net debt/ consolidated EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	2.00	2.50	3.00
Oil price, Nymex WTI, $/ bbl	20	33.6	19.8	14.0	10.8
	30	22.3	15.2	11.5	9.3
	40	16.6	12.4	9.8	8.2
	50	13.3	10.4	8.6	7.3
	60	11.1	9.0	7.6	6.5

Source: Company filings; Bloomberg; CTI analysis

Table 3. Scenario analysis of Concho Resources, 2016, Net Debt/ EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	2.00	2.50	3.00
Oil price, Nymex WTI, $/ bbl	20	1.8	1.8	1.7	1.7
	30	1.7	1.7	1.7	1.6
	40	1.7	1.6	1.6	1.6
	50	1.6	1.6	1.6	1.5
	60	1.6	1.5	1.5	1.5

Source: Company filings; Bloomberg; CTI analysis

Table 4. Scenario analysis of Continental Resources, 2016, Net Debt/ EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	2.00	2.50	3.00
Oil price, Nymex WTI, $/ bbl	20	12.6	12.6	12.5	12.5
	30	7.0	7.0	7.0	7.0
	40	4.8	4.8	4.8	4.8
	50	3.7	3.7	3.7	3.7
	60	3.0	3.0	3.0	3.0

Sources: Company filings; Bloomberg; CTI analysis

Table 5. Scenario analysis of Energen, 2016, Net Debt/ EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	2.00	2.50	3.00
Oil price, Nymex WTI, $/ bbl	20	16.4	13.8	11.9	10.5
	30	4.2	4.0	3.8	3.7
	40	2.4	2.3	2.3	2.2
	50	1.7	1.7	1.6	1.6
	60	1.3	1.3	1.3	1.2

Source: Company filings; Bloomberg; CTI analysis

Table 6. Scenario analysis of Whiting, 2016, Net Debt/ EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	**2.00**	**2.50**	**3.00**
Oil price, Nymex WTI, $/ bbl	**20**	34.3	31.3	28.8	26.6
	30	11.3	11.0	10.6	10.3
	40	6.8	6.6	6.5	6.4
	50	4.8	4.8	4.7	4.6
	60	3.8	3.7	3.7	3.6

Source: Company filings; Bloomberg; CTI analysis

Findings

Through the present downturn, E&P companies have focused on core assets, driving efficiencies, deleveraging and cutting capex, to shore up cash flows. All five of our sample companies project lower output in 2016 versus 2015.

The sensitivity analysis presented here shows how hedging has played a key role in reducing leverage ratios, even in the present circumstances of lower gas and oil prices. This finding is perhaps best illustrated through a comparison between Whiting Petroleum and Concho Resources. The two companies project almost identical production in 2016, at around 50 million barrels of oil equivalent. The analysis here indicates vastly different leverage ratios, however, with Concho a fraction of Whiting. Critically this year, Concho has an estimated $400 million higher hedging revenues than Whiting; a narrower differential between sale price and Nymex oil and gas prices; and a forecast net debt at the end of 2016 of $2.9 billion, compared with Whiting's $5.4 billion. Analysts expect net debt to fall slightly at both companies in 2016, compared with last year.[i]

i Findings by company follow. Note static estimates for 2016 hedging revenues are based on BofAML forecasts for annual average oil and gas prices of $45 and $2.6 respectively.

Chesapeake

In its forward guidance, Chesapeake forecasts 0-5% lower production compared with last year. The company's projections imply about $1.2 billion lower hedging revenues in 2016. Chesapeake has 56% oil production hedged this year, at an average price below $48, compared with comparative figures this time last year, for 42% of 2015 oil production hedged at prices up to $95. The company has all but zero oil price hedging from 2017. Similarly, the attractiveness of the company's gas price hedges deteriorates in 2016. The company's projections imply a near halving in EBITDAX, while net debt rises by around 20%, according to a Bloomberg poll of analyst forecasts. Chesapeake leverage ratio would exceed a value of 4 by some distance at any level of oil and gas price expected this year. It is no surprise, therefore, that Chesapeake has agreed with its creditors to suspend this ratio. The company has also agreed with creditors to secure against its oil and gas properties its previously unsecured $4 billion credit line. The company's assets are now on the line.

Concho Resources

Concho forecasts 0-5% lower production in 2016. The company benefits from strong hedging. In the first quarter last year, Concho had already hedged 12.5 million barrels of 2016 output, at an average $83 per barrel.[9] It has since increased that position to 23 million barrels, or 73% of projected oil production this year, at an average $70. Going forward, Concho has already hedged 16 million barrels of 2017 production. The leverage ratio of Concho Resources appears most resilient among these five companies to withstand sustained low oil and gas prices in 2016. According to the analysis presented here, the company may remain comfortably within its stated leverage ratio covenant of 4.25 at any conceivable oil and gas price, reflecting a combination of robust hedging, lower costs and low net debt.

Continental Resources

Continental projects around 10% lower production this year. The resulting lower revenues are mostly responsible for a slightly higher leverage ratio compared with last year, assuming similar oil and gas prices. Continental's oil production is entirely un-hedged in 2016, as it was in 2015. As a result, its leverage ratio rises rapidly as oil prices fall. The company has increased its volume of hedged gas, but at a lower price than 2015 ($3.17 compared with around $4 last year), meaning that overall hedging revenues this year will probably be at similar levels, below $100 million. Continental Resources has no leverage ratio in its covenants. The findings suggest that oil prices would have to rise above $50 for the company to achieve a leverage ratio below 4.

Energen

Energen expects to cut production by more than 15% this year. The company's leverage ratio appears rather resilient to low oil and gas prices, staying below 4 at oil and gas prices above around $30 and $2/mcf. That is partly because of Energen's comparatively low net debt. The company's sharply higher leverage ratio at oil prices below $30 reflects its poor hedging. The company may lose around $300 million in hedging revenues this year compared with 2015. Last year, Energen hedged more than half its oil output, and this year less than 10%.

Whiting Petroleum

Whiting Petroleum projects around a tenth lower output in 2016, after announcing it would slash its capital budget by 80% and suspend well completions, contributing to lower revenues and EBITDAX. The company has hedged more of its oil production compared with last year, but largely through three-way collars which offer limited protection below a $44 oil price. As a result, the company may broadly maintain its oil hedging revenues last year of around $200 million. As discussed above, the company has a high net debt, above $5 billion in 2016. In all, Whiting Petroleum's leverage ratio may only fall below 4 as oil prices rise above around $60. It is unsurprising that Whiting, like Chesapeake, has suspended this leverage ratio, under its debt covenants. Whiting has agreed to re-introduce the leverage ratio into its debt covenants by 2018 at the latest.

Comparison with 2015: Two examples

A comparison with our findings last year shows how leverage ratios are changing. Companies with the highest ratios have risen, in the case of Chesapeake, as a result of falling hedging revenues and rising debt. Companies with lower leverage ratios have seen these maintained or fall further, in the case of Concho Resources, because of projected operating cost reductions in 2016 and robust hedging.

Table 7. Scenario analysis of Chesapeake, 2015, Net debt/ consolidated EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	**2.00**	**2.50**	**3.00**
Oil price, Nymex WTI, $/ bbl	**20**	N/A	N/A	N/A	N/A
	30	N/A	6.5	5.0	4.1
	40	N/A	5.4	4.4	3.7
	50	N/A	4.7	3.9	3.3
	60	N/A	4.1	3.5	3.0

Source: Company filings; Bloomberg; CTI analysis

Table 8. Scenario analysis of Concho Resources, 2015, Net debt/ consolidated EBITDAX Ratio

		Natural gas price, Henry Hub, $/mcf			
		1.50	**2.00**	**2.50**	**3.00**
Oil price, Nymex WTI, $/ bbl	**20**	N/A	N/A	N/A	N/A
	30	N/A	2.4	2.3	2.3
	40	N/A	2.3	2.2	2.2
	50	N/A	2.2	2.1	2.1
	60	N/A	2.0	2.0	2.0

Source: Company filings; Bloomberg; CTI analysis

4. Impacts for investors

This analysis only covers a subset of the listed oil industry , with a focus on U.S. E&P companies, and so is not designed to indicate system level risk. However the financial problems of U.S. coal mining companies, and some North American focused oil companies demonstrates that there is the potential for some regional concentration of risk.

Debt exposure

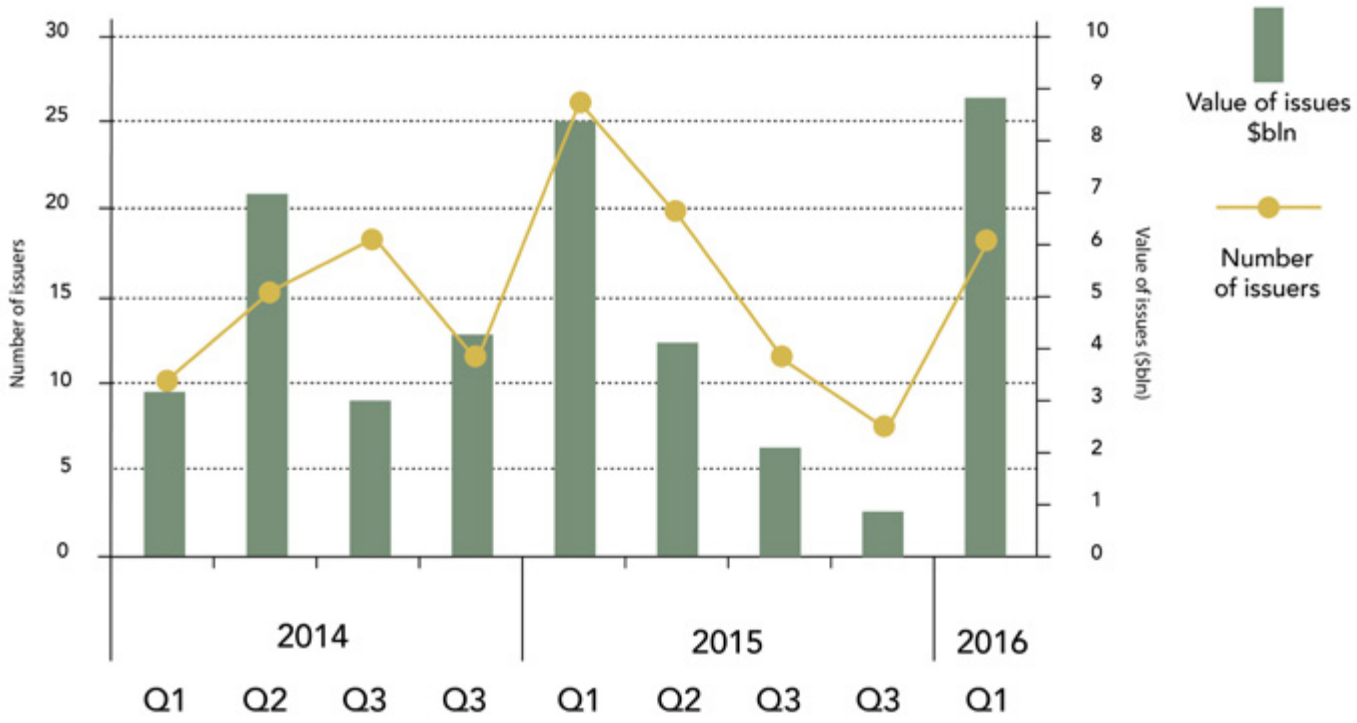
U.S. E&P companies have some $326 billion outstanding bonds and loans, Bloomberg data show. A large portion of this debt is sub-investment grade, or junk, at $128 billion. The E&P sector accounts for 8% of total U.S.junk debt of $1.6 trillion, making it the single largest sector with junk exposure, followed by consumer finance, at $78 billion.

Falling appetite

Equity raising

E&P equity issuance contracted sharply in the second half of last year compared with the first half, to $2.9 billion versus $12.4 billion. Interestingly, however, equity issuance has returned with a vengeance in Q1 2016. Issuance rose to $8.9 billion, more than tenfold the previous quarter, and the highest level at least since 2011. That return raises a question whether investors sense bargains at the bottom of the commodity cycle, and if so, whether such optimism is justified. This suggests increased activity in the equity markets if there is a suggestion the bottom of a cycle has been reached – as suggested in early 2015. Until it is clearer how cyclical/structural the changes in the oil market are, the increased volatility should be reflected in a higher risk assessment of the sector.

Figure 10. Public equity offerings by quarter, U.S. energy E&P companies, 2013-2016 (as of March 24 2016)

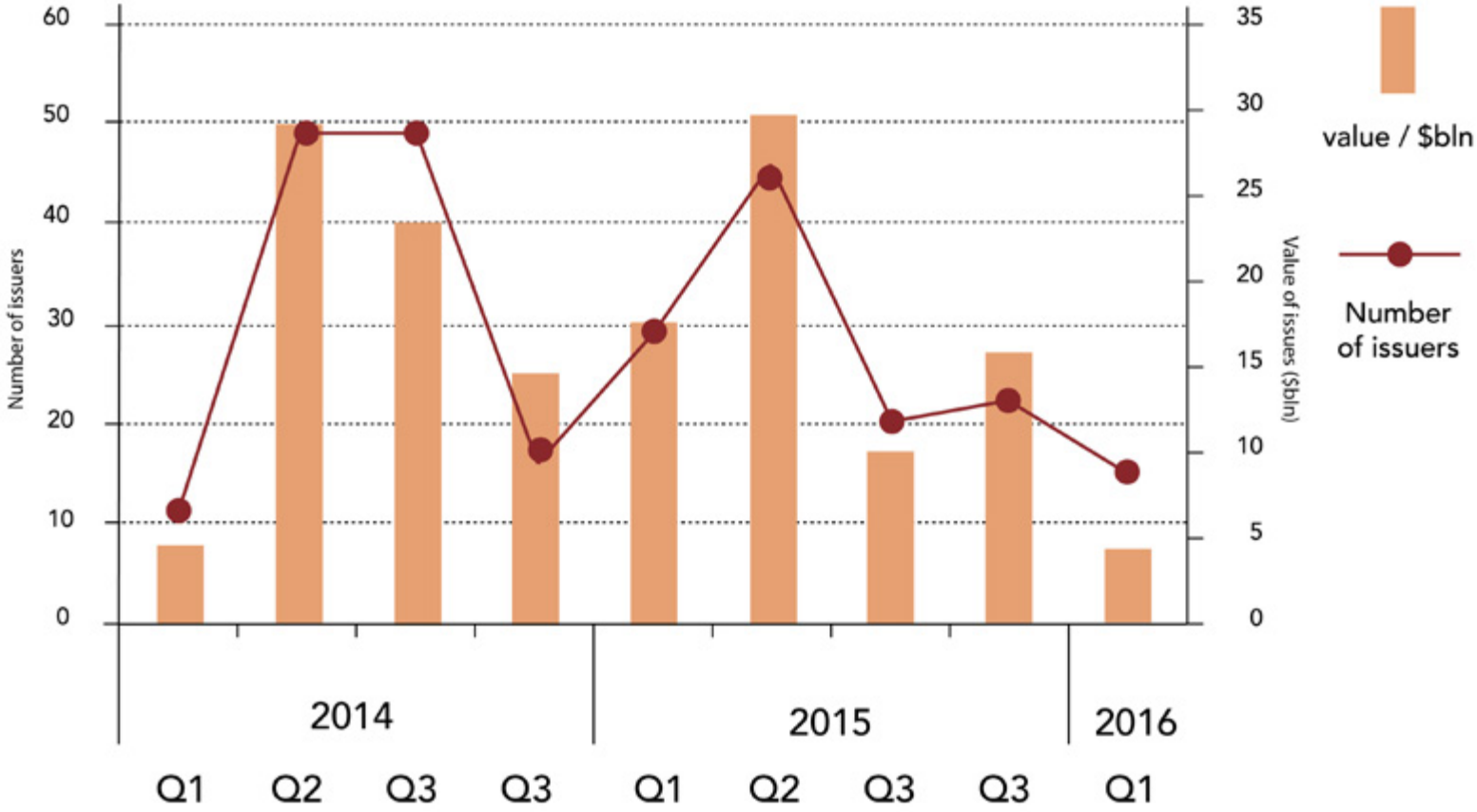


Source: Bloomberg

Bond issuance

E&P bond issuance nearly halved in the second half of last year compared with the first half, to $25.8 billion from $47.3 billion. Unlike equity raising, however, there has been no return in Q1 2016, with quarterly bond issuance falling to a new low over the past two years of just $4.3 billion.

Figure 11. Bond issuance by quarter, U.S. energy E&P companies, 2014-2016 (as of March 8 2016)

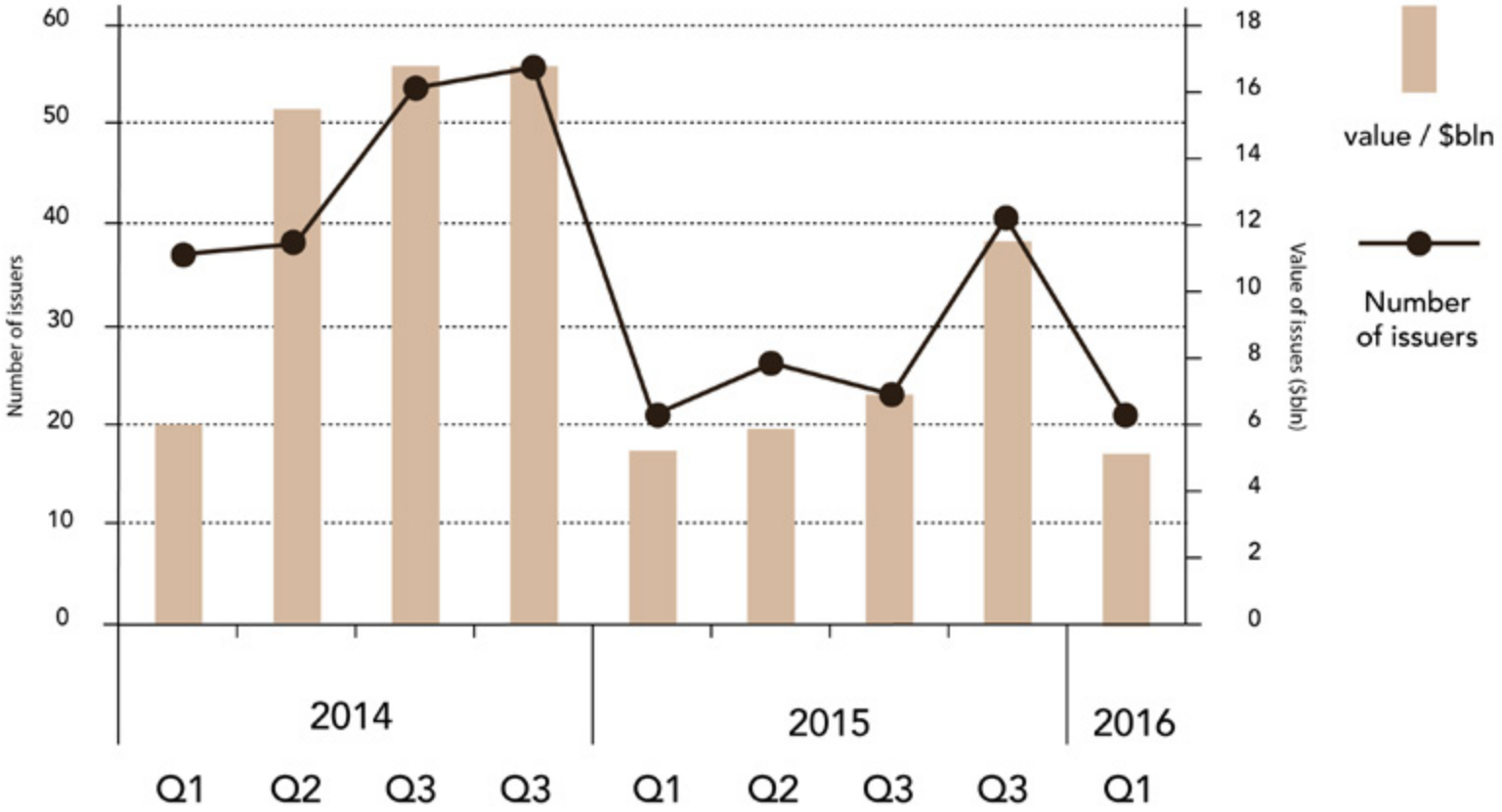


Source: Bloomberg

Loan issuance

Quarterly issuance of new loans to the S&P industry group of E&P companies has remained low through 2015 and Q1 2016, at below half levels immediately before the start of the oil price collapse in 2014.

Figure 12. Loan issuance by quarter, U.S. energy E&P companies, 2014-2016 (as of March 8 2016)



Source: Bloomberg

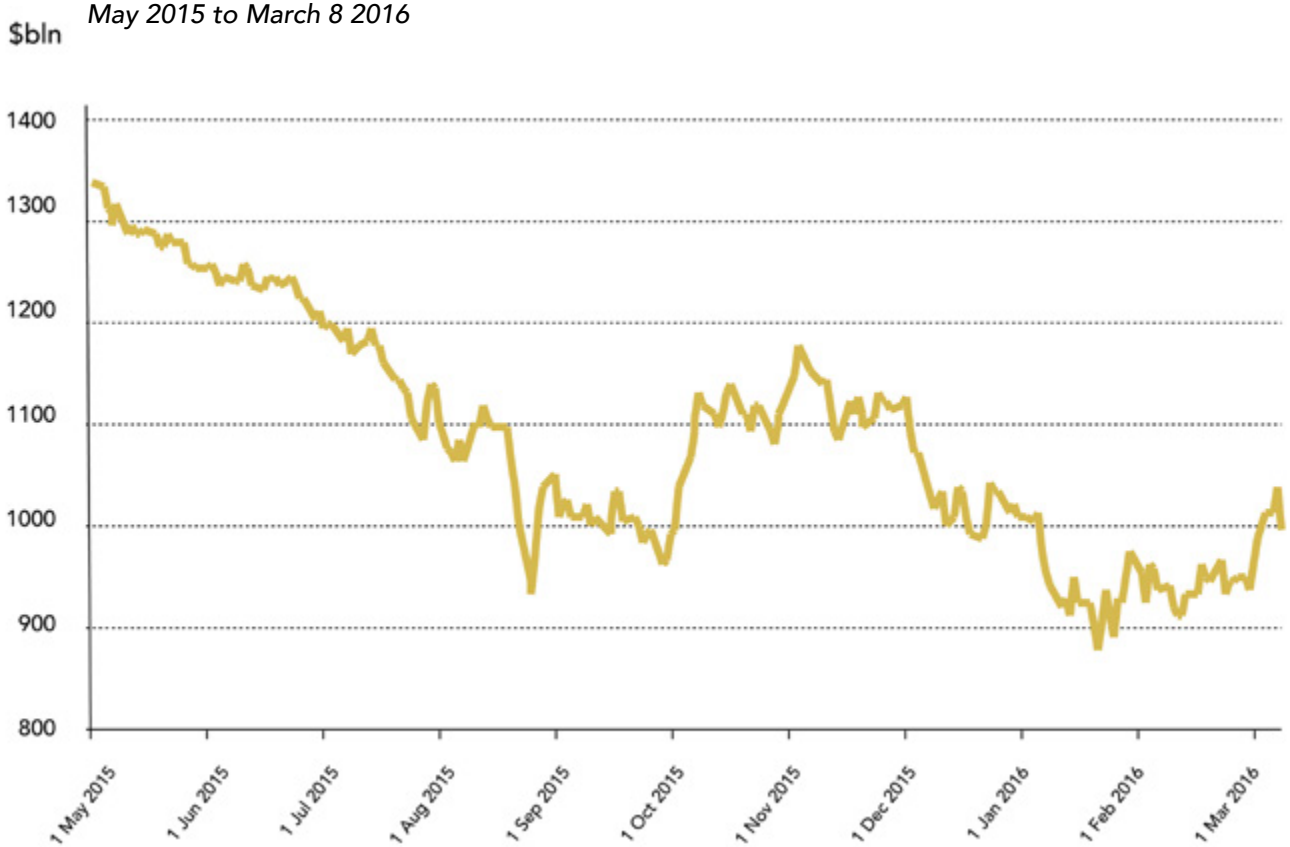
Lower market cap

An S&P "select industry" index tracks 60 U.S. oil and gas E&P companies.[ii] The index indicates that investors in these companies have lost $340 billion through reduced market capitalisation in the past 10 months, since the publication of our previous report in May 2015.

Rather than providing growth for investors, these companies have lost around a quarter of their value (see Figure 13 below). More broadly, falling oil prices have wiped about $1.8 trillion off the value of shares in the energy sector worldwide, from July 2014 to February 2016, according to Bank of America Merrill Lynch.[10]

Regarding our sample of five companies, Energen, Concho and Whiting have all raised equity capital in the last 18 months. At the time of publication, Whiting's shares were trading at around $7, down more than 75% from an offer price of $30 in a $1.1 billion rights issue in March 2015. Shares in Energen and Concho are both trading above offer prices in 2015 and 2016 respectively.

Figure 13. Market capitalisation of S&P Oil & Gas Exploration and Production Select Industry Index, May 2015 to March 8 2016



ii S&P Oil & Gas Exploration and Production Select Industry Index

Lower bond values

U.S. E&P companies exploited an ultra-low interest rate environment, and the appetite of investors seeking higher bond yields, in the run-up to the oil price collapse in the second half of 2014. The question is whether these creditors will now be left holding stranded assets in a sustained, low oil price environment. The value of outstanding global energy sector corporate bonds has dropped by about 18%, or $170 billion, since July 2014, according to research by Bank of America Merrill Lynch.[12] Most of that reduction is a result of falling value of outstanding bonds, although lower issuance also plays a part. Regarding U.S. E&P, Bloomberg estimates that energy-related junk bonds issued by these companies lost some $75.7 billion in value, from mid-2015 to the first week in February.[13]

Kern River Oil Field, California. Photo: Hamish Reid

Outlook

Rising default rates

Some 35 U.S.-based E&P companies with a cumulative debt of around $18 billion filed for bankruptcy protection between mid-2014, and end-2015, according to Deloitte.[14] Some 21 of those companies filed for bankruptcy in the second half of last year. U.S. law firm Haynes and Boone estimates a corresponding value of 42 U.S. and Canadian oil and gas producers that filed for bankruptcy in 2015 through January 2016, with a cumulative debt worth $17.3 billion.[15] Moody's reported 25 U.S. oil and gas defaults in 2015, pushing corporate defaults to the highest level since the financial crisis, a trend Moody's saw continuing in 2016.[16]

Looking forwards, at present, the 25 largest U.S. oil producers, comprising 4.1 mb/d output, face an implied risk of default of 27%, based on their credit default swaps (CDS), according to Bank of America Merrill Lynch.[17] According to that analysis, Chesapeake has a 100% implied risk of default, Whiting Petroleum more than 80% and Continental Resources more than 50%. Standard & Poor's Ratings Services reports that of 95 speculative-grade E&P companies in the United States, half are rated "B-" or lower. S&P defines a B rating as "vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments."[18]

Supply-demand dynamic

Lower than expected oil demand, as a result of potential low-carbon policies, efficiencies, the digitalisation of energy use and the rise of electric vehicles could surprise those expecting demand to keep rising. Even a plateauing of demand over the next few years would create a downside risk for those expecting unerring growth.

Increased oil supply from non-OECD producers despite ongoing Middle East tensions has also surprised many commentators, and the option to freeze output by Saudi Arabia and Russia has only been mooted after a significant ramp up to record production levels.[19] Domestic regulations in the United States also threaten to tighten up methane emissions, with a target to reduce these to 45% below 2012 levels by 2025, which may put further pressure on operators to invest in improved production technology rather than cut costs.[20]

If the view that oil prices could be lower for longer comes to pass then this will put a sustained period of stress on the more leveraged U.S. E&P companies, which would be negative for the financial institutions and shareholders with most exposure to these high-risk activities. U.S. producers may face further headwinds if low prices are sustained, with recent experience suggesting that the mismatch of supply and demand does not need to be that large to cause price volatility.

Disclaimer

Carbon Tracker is a non-profit company set-up to produce new thinking on climate risk. The organisation is funded by a range of European and American foundations. Carbon Tracker is not an investment adviser, and makes no representation regarding the advisability of investing in any particular company or investment fund or other vehicle. A decision to invest in any such investment fund or other entity should not be made in reliance on any of the statements set forth in this publication. While the organisations have obtained information believed to be reliable, they shall not be liable for any claims or losses of any nature in connection with information contained in this document, including but not limited to, lost profits or punitive or consequential damages. The information used to compile this report has been collected from a number of sources in the public domain and from Carbon Tracker licensors. Some of its content may be proprietary and belong to Carbon Tracker or its licensors. The information contained in this research report does not constitute an offer to sell securities or the solicitation of an offer to buy, or recommendation for investment in, any securities within any jurisdiction. The information is not intended as financial advice. This research report provides general information only. The information and opinions constitute a judgment as at the date indicated and are subject to change without notice. The information may therefore not be accurate or current. The information and opinions contained in this report have been compiled or arrived at from sources believed to be reliable in good faith, but no representation or warranty, express or implied, is made by Carbon Tracker as to their accuracy, completeness or correctness and Carbon Tracker does also not warrant that the information is up to date.

End notes

1. *Energy Information Administration, n.d.. Cushing, OK WTI Spot Price FOB. Available at: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D*
2. *International Energy Agency (IEA), 2016. Medium-Term Oil Market Report 2016. IEA, Paris. Available at: https://www.iea.org/bookshop/718-Medium-Term_Oil_Market_Report_2016*
3. *Energy Information Administration, 2016. Drilling Productivity Report: Report data. Available at: https://www.eia.gov/petroleum/drilling/#tabs-summary-2*
4. *Carbon Tracker Initiative, 2015. U.S. shale oil and gas: Going over the hedge. CTI, London. Available at: http://www.carbontracker.org/wp-content/uploads/2015/05/CTI-Shale-Gas-Report-Designed-Web-v4.pdf*
5. *Standard & Poor's Ratings Services. Find a Rating. Available at: https://www.standardandpoors.com/en_US/web/guest/home*
6. *Energy Information Administration, 2016. Short-Term Energy Outlook. Feb 2016. Available at: http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf*
7. *Deloitte, 2016. The crude downturn for exploration and production companies: One situation, diverse responses. Available at: https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/energy-resources/us-er-crude-downturn.pdf*
8. *US Office of the Comptroller of the Currency http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/pub-ch-og.pdf*
9. *Concho Resources, 2015. Investor Presentation: March 2015.*
10. *Bank of America Merrill Lynch, 2016. Global Energy Weekly: Frozen oil*
11. *Energen, 2016. Energen discontinues dividend. Feb 11 2016. Available at: http://ir.energen.com/phoenix.zhtml?c=94826&p=irol-newsArticle&ID=2137859*
12. *Bank of America Merrill Lynch, 2016. Global Energy Weekly: Frozen oil*
13. *Bloomberg, 2016. Energy debt fuels broader malaise. Feb 10 2016. Available at: http://www.bloomberg.com/gadfly/articles/2016-02-10/power-dive-in-energy-debt-spills-over-into-broader-market*
14. *Deloitte, 2016. The crude downturn for exploration and production companies: One situation, diverse responses*
15. *Haynes and Boone, 2016. Oil Patch Bankruptcy Monitor. Available at: http://www.haynesboone.com/~/media/files/attorney%20publications/2016/energy_bankruptcy_monitor/oil_patch_bankruptcy_20160106.ashx*
16. *Moody's Investors Service, 2016. Moody's: US corporate defaults to hit six-year high in 2016 as commodity fallout continues. Feb. 1 2016. Available at: https://www.moodys.com/research/Moodys-US-corporate-defaults-to-hit-six-year-high-in--PR_343225*
17. *Bank of America Merrill Lynch, 2016. Global Energy Weekly: Frozen oil*
18. *S&P Capital IQ, 2016. Credit FAQ: S&P Analysts drill down into how our lower oil and gas price assumptions affect energy company ratings. Feb 17 2016. Available at: https://www.globalcreditportal.com/ratingsdirect/renderArticle.do?articleId=1579687&SctArtId=371708&from=CM&nsl_code=LIME&sourceObjectId=9523651&sourceRevId=2&fee_ind=N&exp_date=20260217-20:44:58*
19. *Bloomberg, 2016, Saudi Arabia, Russia to Freeze Oil Output Near Record Levels. Feb 16 2016. http://www.bloomberg.com/news/articles/2016-02-16/saudi-arabia-and-russia-agree-oil-output-freeze-in-qatar-talks*
20. *US EPA https://www3.epa.gov/gasstar/methanechallenge/goal.html*

Carbon Tracker Initiative

Find out more about the
Carbon Tracker Initiative:

www.carbontracker.org
@carbonbubble