Independent E&P Sector Update

Value Creation 2008 - 2015

University of Houston, C.T. Bauer College of Business

Student Research Project

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1. Introduction

1.1 Research Objectives

This report documents the findings of a research project undertaken by students in the C.T. Bauer College of Business MBA program at the University of Houston.

In 2013, student research classes investigating Independent Oil & Gas Exploration and Production Companies (Independents) found that highest total shareholder returns (TSR) from 2002-12 were delivered by those companies that invested most aggressively in organic growth, measured as Capital Expenditures/ Total Assets.

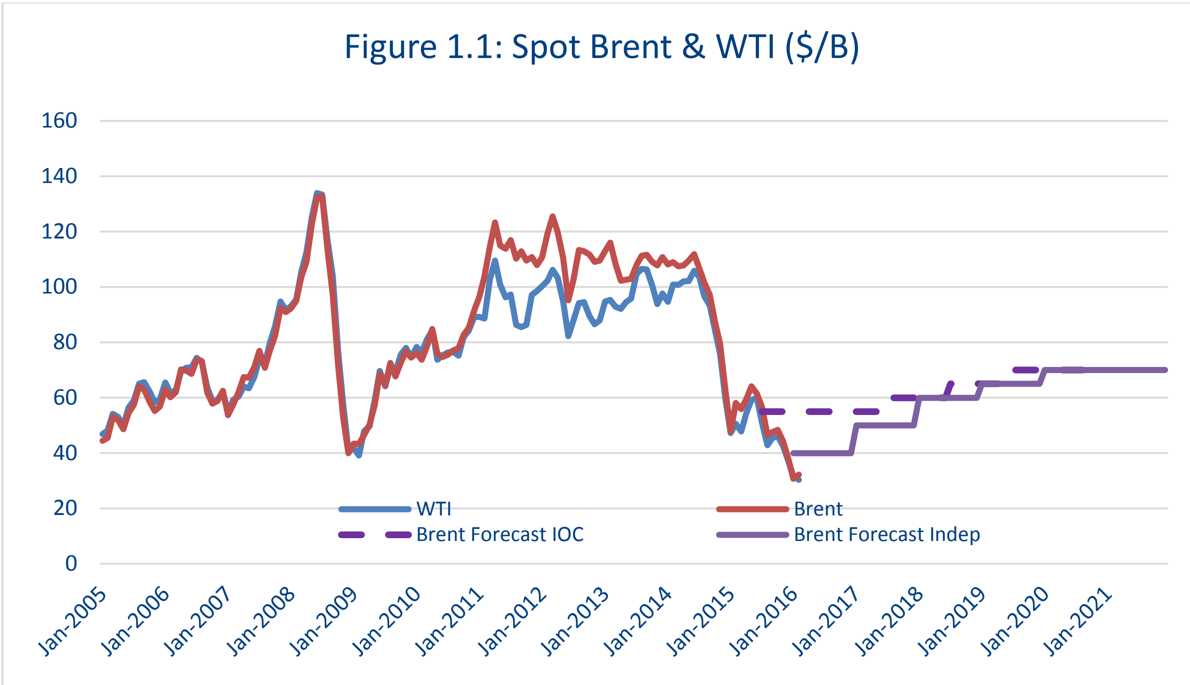
In August 2014, global oil markets began a collapse that took oil prices from above $100/Barrel to less than $50/ Barrel by the end of the first quarter of 2015; prices briefly recovered to $60/B then fell to below $40/B over the second half of 2015 and early 2016 (Figure 1.1).

Independents' share prices declined sharply, and their leaders drastically reduced capital spending and in several cases sold non-core assets in order to "get to the other side" of the price down-cycle with sufficient financial strength to again build shareholder value.

Accordingly, the C.T. Bauer College of Business convened a new research class to investigate what the new drivers of shareholder value might be, whether the companies were fairly valued at the end of 2015, and what strategic lessons should be learned from this most recent stage of the oil and gas commodity cycle. The purpose of the project was to update the findings of our earlier report to take into account the collapse of oil prices in 2014-15. It follows a similar update report on the Super-majors (IOCs) and National Oil Companies (NOCs).

We premise our analysis on "lower for longer" oil price projections; lower in the early years than for our update report of the IOCs and NOCs[1] (Figure 1.1).

[1] All prior reports are available on the U.H. C.T. Bauer College of Business GEMI web site



Prior to the price collapse, reports covered Super-majors and National Oil Companies, Independent Oil & Gas Producers, Independent Refiners, Oilfield Service and Midstream Companies, and Power Generators. The intent has been to create a vehicle that will complement the capabilities within the C.T. Bauer School of top tier academic research with experience-based knowledge of the challenges facing energy companies. Through this integration and our long time frame looking back and forward at least five years, we hope to provide a set of analyses and commentaries that will supplement existing reports available from financial institutions and will be useful both to financial institutions and to the companies studied.

We hope that these reports will deepen the relationship between the University of Houston and energy companies in Houston and beyond, creating opportunities for mutually beneficial dialogue.

1.2 The Independent Producer Sector

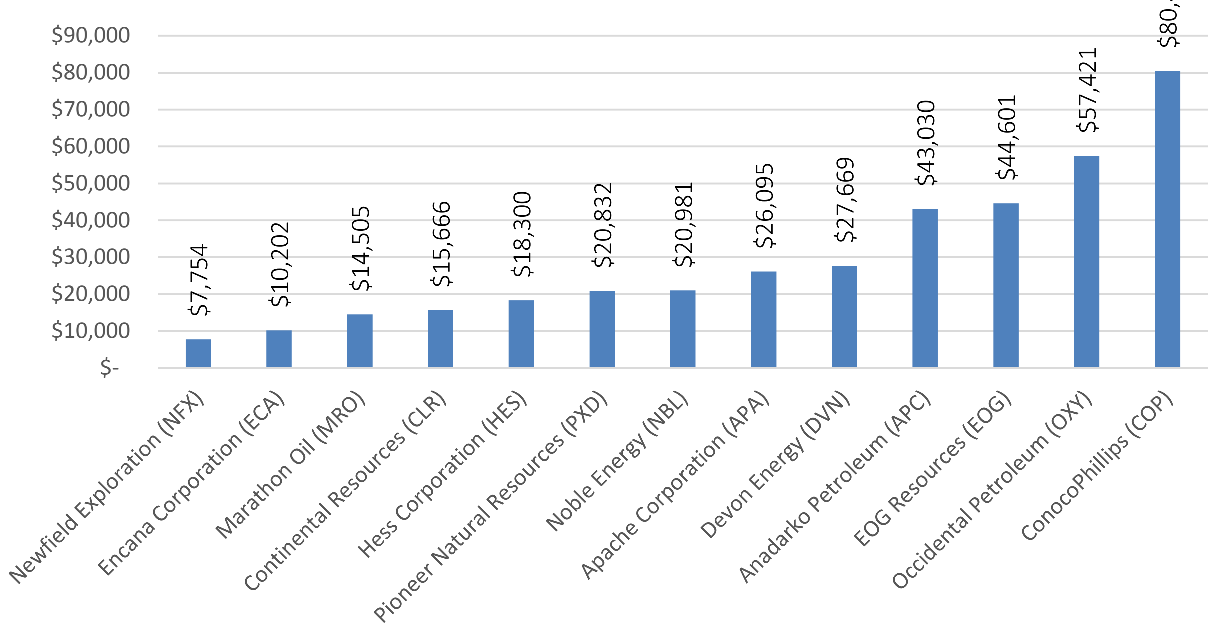
The Independents studied included thirteen companies based in North America in three teams covering:

- **Legacy** companies (Occidental Petroleum (OXY), Marathon Oil (MRO) and ConocoPhillips (COP)) historically acted as "mini-majors" with downstream as well as upstream assets and a broad international geographical footprint.
- **International** companies (Anadarko (APC), Apache (APA), EOG Resources (EOG) and Noble Energy (NBL)) with no history of operating downstream assets but with international as well as North American oil and gas exploration and production assets.

- **North American** companies exclusively operating in North America (Continental Resources (CLR), Devon (DVN), Encana (ECA), Newfield Exploration (NFX) and Pioneer Natural Resources (PXD))

The companies studied varied in end 2015 Total Enterprise Value, with ConocoPhillips larger by an order of magnitude than Newfield (Figure 1.2). For this update analysis, we dropped Canadian Natural Resources (high leverage to heavy oil), BG Group (being acquired by Shell) and Tullow (high leverage to Africa) and added Newfield and Pioneer (exposure to Anadarko and Permian Basins).

Figure 1.2: End 2015 Total Enterprise Value



Our 2013 report noted a discontinuity between the drivers of shareholder value from 2001-11 and the period from 2011-13. In the earlier period, rising oil prices “lifted all ships” and aggressive investment in organic growth was rewarded by high Total Shareholder Returns for all companies. In the later period, the market became more discriminating and, while confirming the value of growth as a driver of shareholder value for companies with strategic coherence, discounted the value of companies with less coherent portfolios.

Our conclusions in the 2013 report included:

> “The oil and gas industry is subject to price swings as global supply and demand move from periods of perceived shortage to abundance. When prices are rising, companies receive the economic signal to invest in growth, but history advises companies to be financially conservative on order to sustain their strategies through subsequent periods of low prices and revenues. The relative prices of oil and gas have also changed dramatically over the past decade, with particular impact on the value of light crude oil in North America relative to international prices,

> on the relative value of oil compared to natural gas and on the relative value of oil sands bitumen compared to light crude oils.
>
> Navigating these stormy price relationships has been challenging. Companies that recognized the shifting trade winds in the 2000s created substantial shareholder value by investing strongly in growth. However, those companies whose portfolios were highly weighted to low value resources (e.g., natural gas and oil sands) generally struggled to create shareholder value. Those with portfolios weighted to light crude oil and international LNG with prices linked to oil, generally did well."

The report went on to identify specific aspects of Shareholder Value Proposition, Leadership and Organization Traits, Strategic Choices and Aligned Capabilities that contributed to the success of individual companies.

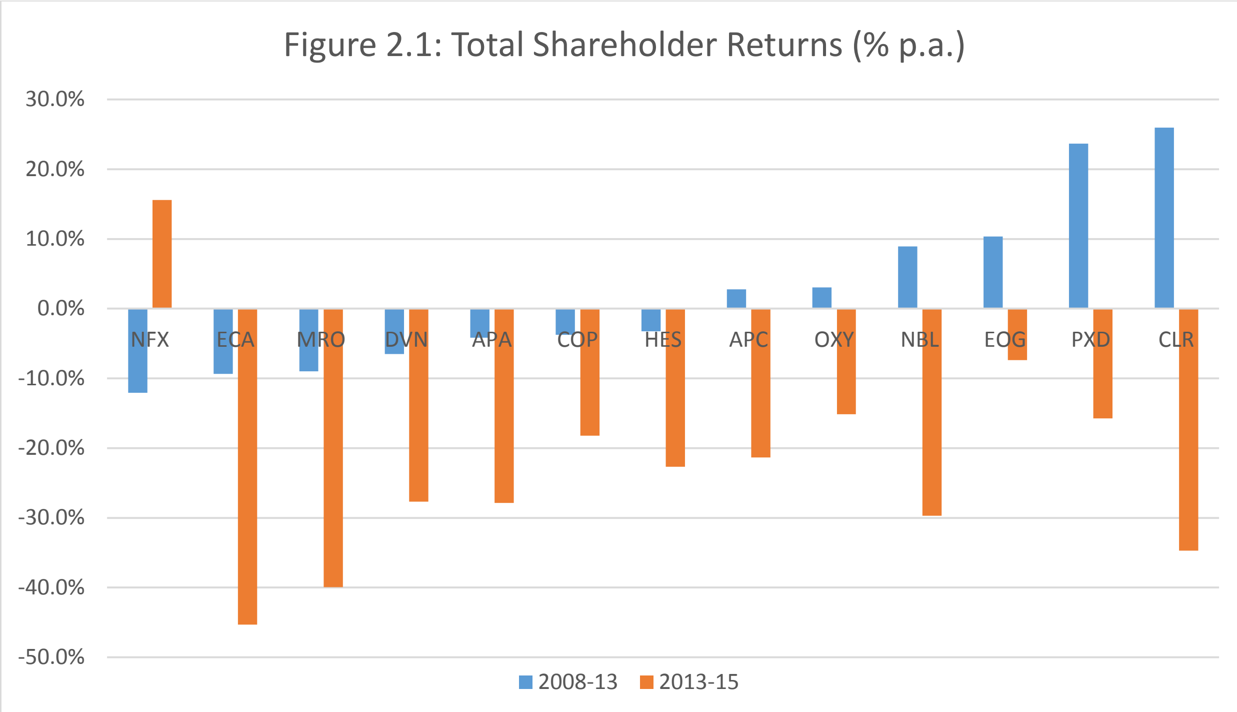
Our purpose in this update report has been to confirm the validity of the findings from our 2013 report by revisiting the drivers of shareholder value from 2008-13 and to examine in greater detail whether investment in growth still drives shareholder value for the independent sector or whether low oil prices have changed the game, by investigating the drivers of TSR over 2013-15.

2. Summary of Conclusions

The independents did not create much value from the beginning of 2008 to the end of 2013, in part because WTI oil prices were $99.64 per barrel at the start point and $93.14/B at the end point while upstream capital costs rose more than 10%[2]. Total Shareholder Returns (TSR) over this period averaged 2.1% p.a. increase for the group, while the S&P 500 Index rose at 4.0% p.a. over the same period. However, there was wide variation between the companies that provided high TSR and those that did not. Over the period from end 2013 to end 2015 as oil prices collapsed (Figure 2.1), all the companies studied except Newfield lost value with an average **loss** of 22.3% p.a. while the S&P 500 index gained 5.6% p.a.

The three companies that delivered highest TSR growth from 2008-13 lost value from 2013-15 (Figure 1.3), raising the question of whether the strategies that led to success in the former time period were also responsible to some extent for decline in the latter period. On the other hand, the companies that were less successful in the former period, with the exception of Newfield, also showed declines in the second period. So the task was to try to unpack the factors that were driving TSR for the whole group of studied companies and identify outliers that might inform discussion of strategies that were successful and those that were not.

[2] Source: IHS-CERA Upstream Capital Cost Index



The companies that achieved highest growth in shareholder value from 2008-13 were those that grew oil and gas production fastest by investing most in capital projects relative to their total assets, were perceived as relatively high risk (beta), were prepared to take on new debt and delivered lower finding and development costs. Returns on capital were less important, presumably because the studied companies had returns comfortably above their cost of capital while oil prices were high.

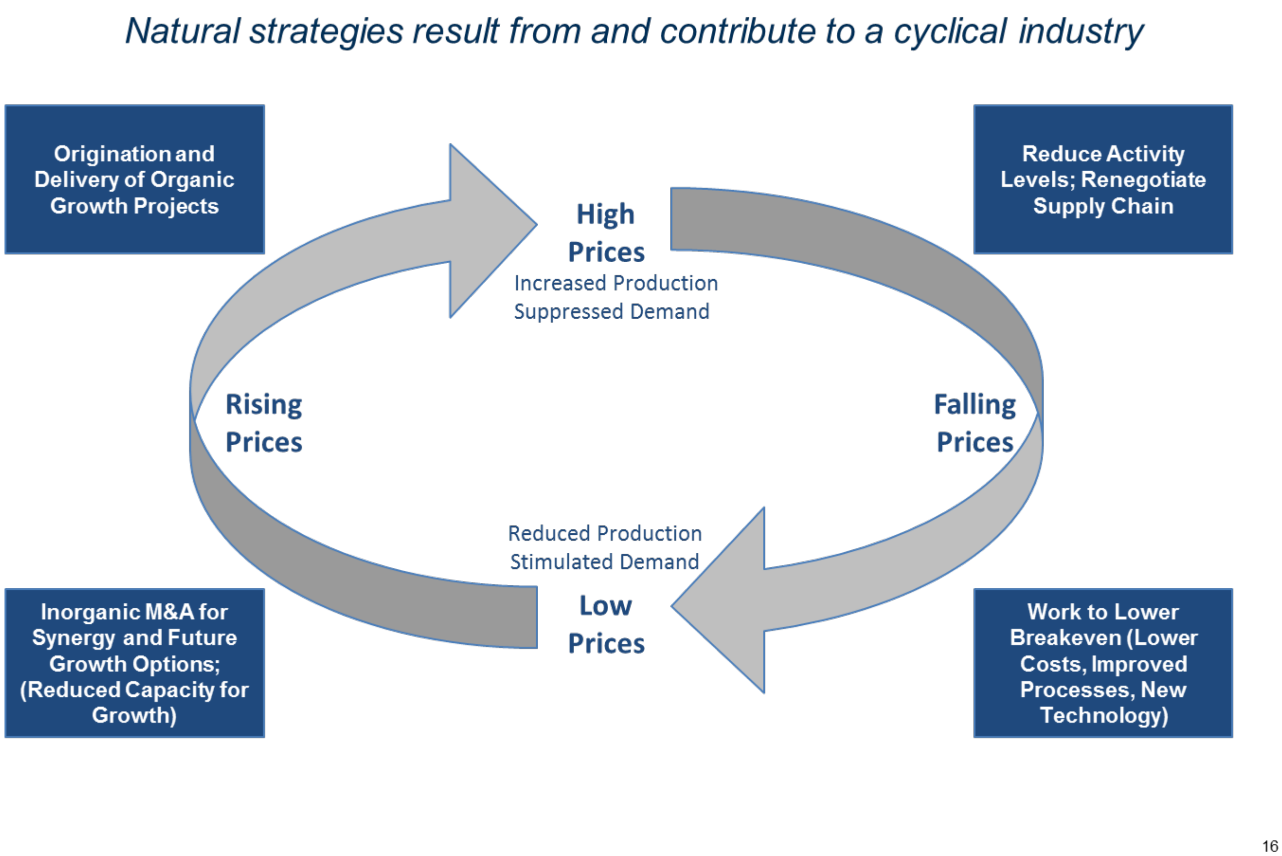
The companies that achieved highest growth in shareholder value from 2013-2015 were not necessarily those with the highest production growth, but were those that reinvested more than their rivals in preparation for future production growth, while sustaining high returns on total assets.

Overall, our analysis provides some interesting insights on the drivers of TSR for the independents as the price cycle evolves:

- **2001-11 Rising Oil Prices**: Investors reward leaders that capture new plays at low entry costs and invest vigorously in expanding production (see prior report) regardless of returns on capital
- **2008-2013 High Price Plateau**: Investors become more discriminating; activists attack companies with incoherent or low value portfolios while rewarding risk taking and growth by companies with strategic clarity but without much attention to their returns on capital.
- **2013-15 Price Collapse**: Investors withdraw from companies without strategic clarity or with low value portfolios; returns on total assets become as important as reinvestment in future growth.

Over the next five years, we expect gradually increasing oil prices, which will allow investment in production growth, though at a less torrid pace than in prior periods. Also, if and when companies reach a consensus on the future price trajectory, there will likely be increasing merger and acquisition transactions as has been the case in past cycles (Figure 2.2).

Figure 2.2: The Dynamics of Oil and Gas Price Cycles



3. Corporate Value Drivers

3.1. 2008-13

We investigated a number of possible drivers of 2008-13 TSR and found that those with greatest explanatory power (High R^2) were associated with organic growth in oil and gas production (Table 3.1).

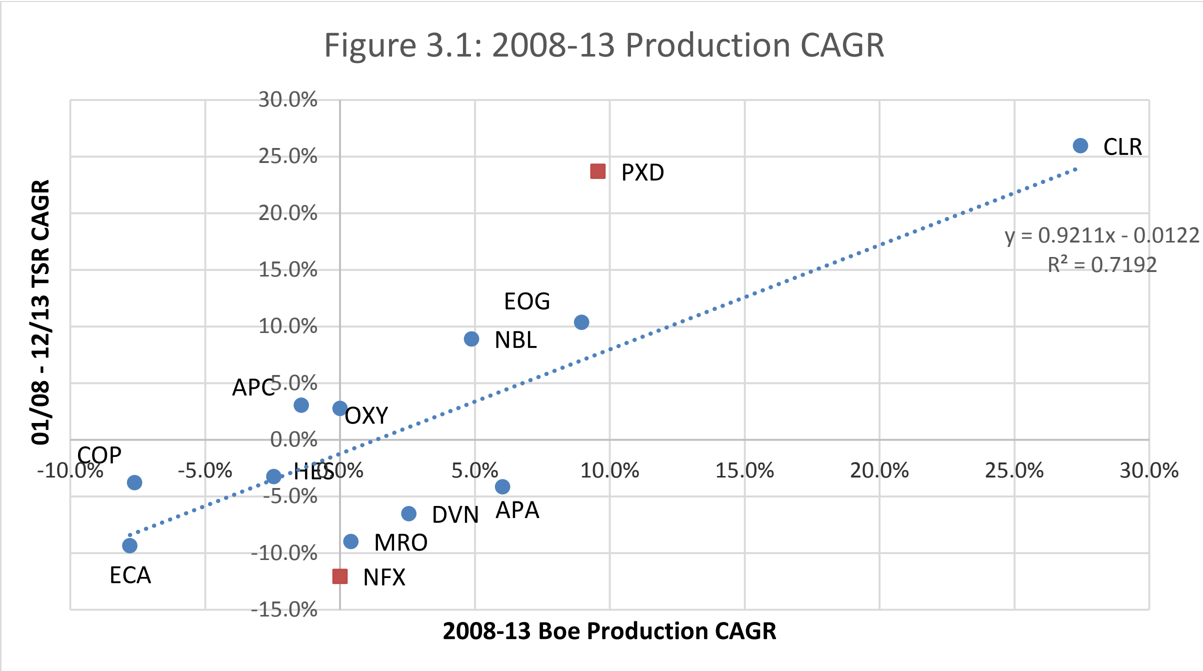
Table 3.1: Drivers of 2008-13 Total Shareholder Returns

2008-13	RSQ	SLOPE
Production CAGR	71.9%	0.84
Capex/ Total Assets	60.6%	1.11
Beta	52.4%	0.44
Change in Debt/ Total Assets	29.2%	0.86
Ave Finding & Development Costs ($/boe)	21.6%	(0.01)
EBITDA/ Total Assets	18.7%	1.74
End Period % Prodn Oil	13.0%	0.20
Average Prodn % Oil	8.5%	0.15
Change in LT Liabs. Total Assets	6.5%	0.15
Total Reserve Addition Costs ($/boe)	6.2%	(0.01)
Operating Costs ($/boe)	3.7%	(0.00)
Average Debt/ Total Assets	2.4%	0.16
Increase in % Oil Production	1.4%	0.09

The companies that achieved highest growth in shareholder value were those that grew oil and gas production fastest by investing most in capital projects relative to their total assets, were perceived as relatively high risk (beta), were prepared to take on new debt and delivered lower finding and development costs. Returns on assets were less important, presumably because the studied companies had returns comfortably above their cost of capital while oil prices were high.

Our analysis uncovered that Newfield and Pioneer appeared to be outliers and they were excluded from the TSR Drivers statistical analysis (Figure 3.1). Pioneer transformed itself from a mediocre performer with a mix of international and domestic assets into a true pioneer by divesting international assets and focusing its activities on developing its large Permian Basin acreage position by deploying horizontal drilling and fracking technologies. Its shareholder value soared but its overall production growth was lowered by assets divested. Newfield went through a similar process, but later, such that investors were not recognizing the importance of its transformation into a company focused on its positions in the

STACK and SCOOP plays of the Oklahoma Anadarko Basin and in the North Dakota Bakken play. As will be seen, investors gave Newfield full credit for its transformation in 2013-15.



In the spirit of Tolstoy's Anna Karenina "Happy families are all alike; every unhappy family is unhappy in its own way" we find that the companies with highest shareholder returns over 2008-13 are all focused on organic development of oil shale plays (though Noble, Anadarko and ConocoPhillips have important international positions). Those losing shareholder value were generally in a state of strategic flux in 2013:

- Apache made large acquisitions totaling about $15 Bn from 2010-12, which were not well received by investors, and began a process of portfolio rationalization in 2013. Eventually in 2015, Apache would replace CEO Farris with Christmann.
- ConocoPhillips spun off its downstream assets in 2011 and embarked on a portfolio rationalization process that reduced overall production.
- Encana was preoccupied with the spin-off of its oil sands to form Cenovus in 2009 and missed the window of opportunity to invest in liquids rich shales. By starting late, it paid premium prices to enter established plays and natural gas production fell faster than liquids increased as the company raised investment in liquids development at the expense of natural gas. The company still has the lowest realizations in the group per barrel of oil equivalent produced.
- Hess in 2013 was in the midst of conflict with activist investor Elliott Management on whether and how to split the company. The parties agreed on a settlement with John Hess remaining as CEO but relinquishing the Chairman position and a strengthened Board of Directors. Investors stayed on the fence while the company reconciled conflicting strategic moves.

- Marathon Oil spun off its downstream assets in 2011. CEO Clarence Cazalot retired in 2013 and was replaced by Lee Tillman, who began a program of divesting legacy international assets and buying back stock at what turned out to be the peak of crude oil prices. Investors were not inspired.
- Radical surgery on the portfolio changed the nature of Devon Energy. Investors that appreciated the broad portfolio of unconventional oil and gas with some exploration upside from deep water Gulf of Mexico and Brazil, likely moved their investments to companies with broader portfolios like Noble Energy and Anadarko. Devon's sale of a non-operated share of its natural gas plays to Sinopec helped the balance sheet, but Devon's average realizations per boe remain low compared to rivals. Its current portfolio, still over weighted to low priced oil sands and gas is distinctive but has yet to persuade investors of its value potential.

As oil and gas prices ceased their long upwards march, investors became more discriminating, withdrew from companies with a starting portfolio that lacked an inner logic or was intrinsically low value, but continued to drive up the value of companies with proven growth records in oil shale plays.

3.2. 2013-15

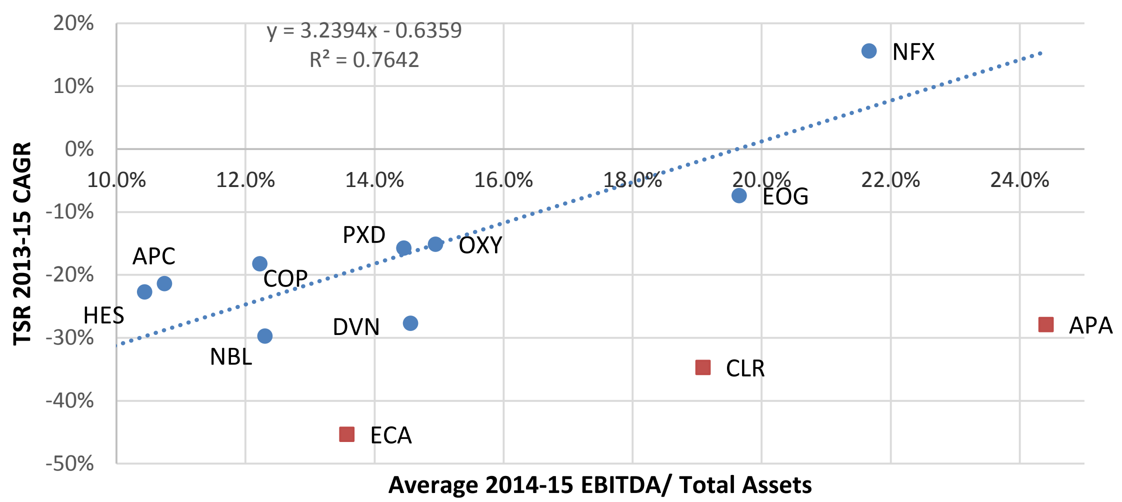
Moving on to the most recent period from end 2013 to end 2015, we found an interesting change in TSR drivers (Table 3.2) with returns on assets becoming a major driver. The companies that achieved highest growth in shareholder value were not necessarily those with the highest production growth, but investors continued to favor those that reinvested more than their rivals, while sustaining high returns on total assets.

Table 3.2: Drivers of 2013-15 Total Shareholder Returns

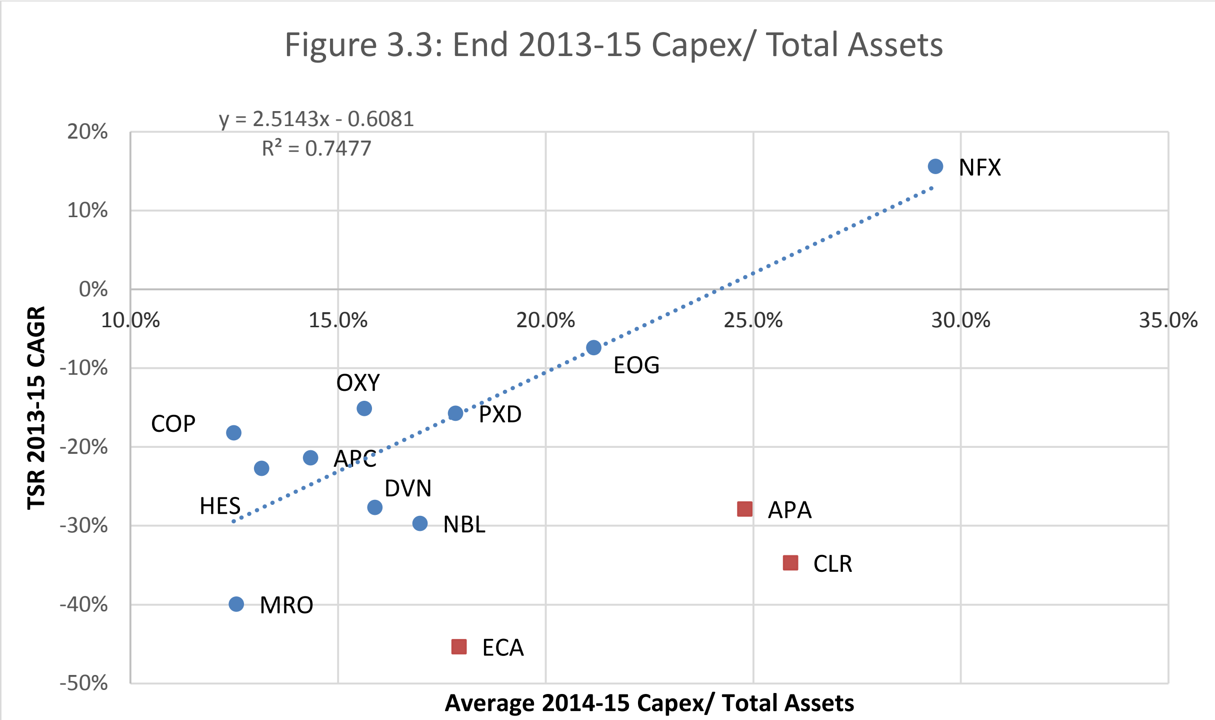
2013-15 High TSR Sub-Group	RSQ	SLOPE
EBITDA/ Total Assets	76.4%	3.24
Capex/ Total Assets	74.8%	2.27
Change in Debt/ Total Assets	19.5%	(1.27)
Increase in % Oil Production	16.1%	0.70
End Period % Prodn Oil	12.9%	0.45
Operating Costs ($/boe)	12.5%	(0.003)
Average Debt/ Total Assets	5.8%	0.29
Beta	5.0%	0.22
Production CAGR	3.0%	0.69
Change in LT Liabs. Total Assets	2.0%	(0.16)
Total Reserve Addition Costs ($/boe)	1.1%	0.00
Ave Finding & Development Costs ($/boe)	0.7%	0.00
Average Prodn % Oil	0.3%	0.07

EBITDA return on total assets became an important driver of shareholder value in the new context of low oil and gas prices (Figure 3.2). Here we see the superior returns generated by Newfield and EOG driving higher TSR than their rivals. Encana and Apache continued to be disfavored by investors for the reasons that caused them to be low performers in 2008-13. They were joined as outliers by Continental Resources, which was uniquely penalized for lifting its hedges just before the 2014 price collapse, then increasing production from 2013-15 at 27.7% p.a. and selling the oil at very low prices

Figure 3.2: End 2013-15 EBITDA/ Total Assets



We found that production growth was no longer a driver of TSR, but reinvestment in organic growth continued to be important (Figure 3.3). Newfield, EOG and Pioneer continued to reinvest aggressively in drilling plays, which they claimed would be profitable even at low prices, in preparation for fraccing and production when prices improved. They fared better in TSR than their more conservative rivals.



Overall, this analysis provides some interesting insights on the drivers of TSR for the independents as the price cycle evolves:

- 2001-11 Rising Oil Prices: Investors reward leaders that capture new plays at low entry costs and invest vigorously in expanding production (see prior report) regardless of returns on capital
- 2008-2013 High Price Plateau: Investors become more discriminating; activists attack companies with incoherent or low value portfolios while rewarding risk taking and growth by companies with strategic clarity and returns above their cost of capital.
- 2013-15 Price Collapse: Investors withdraw from companies without strategic clarity or with low value portfolios; returns on total assets become as important as reinvestment in future growth.

4. Corporate Financial Valuation

Each student built a financial model for a specific company, using the same structure and assumptions in order to allow direct comparisons across the studied companies:

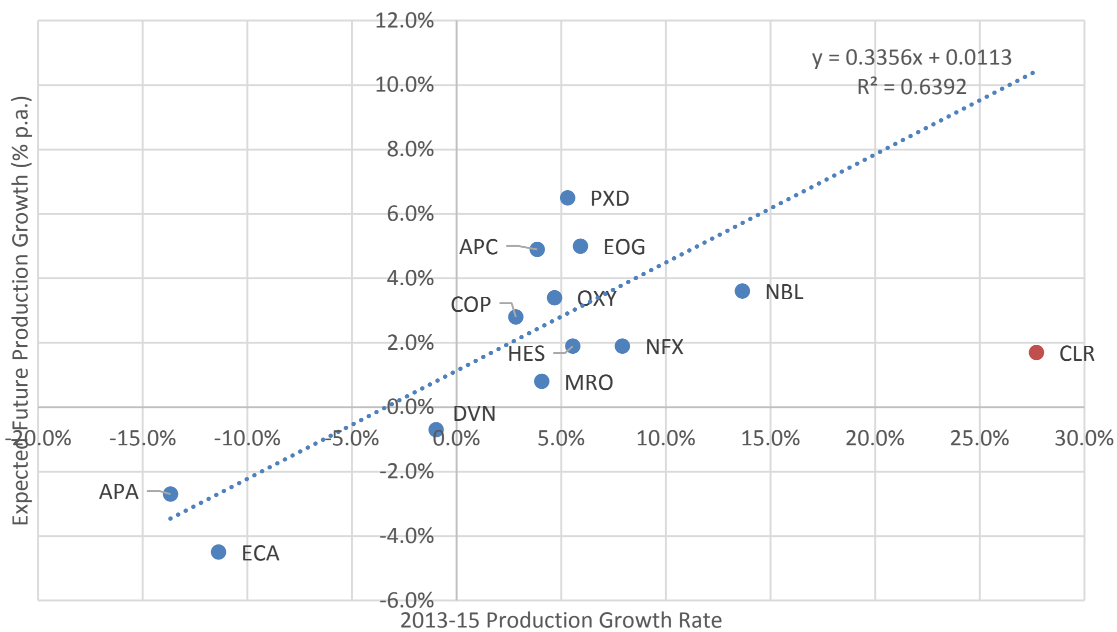
- Forecast slow increase in Brent crude oil price (Figure 1.1) and Henry Hub gas price (recovering to $3.00/mcf in 2017, then flat)
- 2010-15 average realized sales prices as a percentage of Brent (for oil and NGLs) and Henry Hub (for natural gas) marker prices assumed to continue into the future
- Operating costs as a percent of revenues based on the 2010-15 relationship with Brent as a constant less an amount related to the Brent price. Thus, operating costs increase as oil prices and revenues increase but decrease, as in the past, as a percent of revenues
- Reinvestment of operating cash flow into capex assumed at 70%

- Future production growth rate (solved so that Intrinsic Value as the NPV of future free cash flows discounted at the cost of capital equaled 12/31/15 Enterprise Value)
- Perpetuity Growth method for calculating terminal value with free cash flow growth at the same rate as production growth (so no further escalation in oil prices after 2021)

As mentioned above, we solved for the production growth rate that would be required for each company to produce an Intrinsic Value (NPV of future free cash flows discounted at the cost of capital) equal to the end 2015 Enterprise Value as reported by Capital IQ (Figure 4.1).

We then compared the implied future production growth rate with that actually achieved during 2013-15. The broken line indicates a best fit between the calculated growth rate in the future and that achieved in the past. On average, investors seem to be pricing in a production growth rate of approximately one third that achieved over 2013-15. Companies above the line incorporate higher than average production growth rates and those below the line incorporate lower than average production growth rates compared to the mean. Continental Resources end 2015 enterprise value seems to have been heavily discounted and is treated as an outlier.

Figure 4.1: Past and Expected BOE Production Growth



The market valuations of Pioneer, EOG and Anadarko are relatively optimistic. Pioneer and EOG both have access to superior resources and can probably meet expectations. Anadarko's relatively high valuation likely reflects its exploration successes.

Marathon, Newfield and Devon are finding considerable success in the SCOOP and STACK plays of the Oklahoma Anadarko Basin. It may be that investors had not recognized the full potential of these plays. Noble's value has been discounted due to disagreements with the Israeli government and Supreme

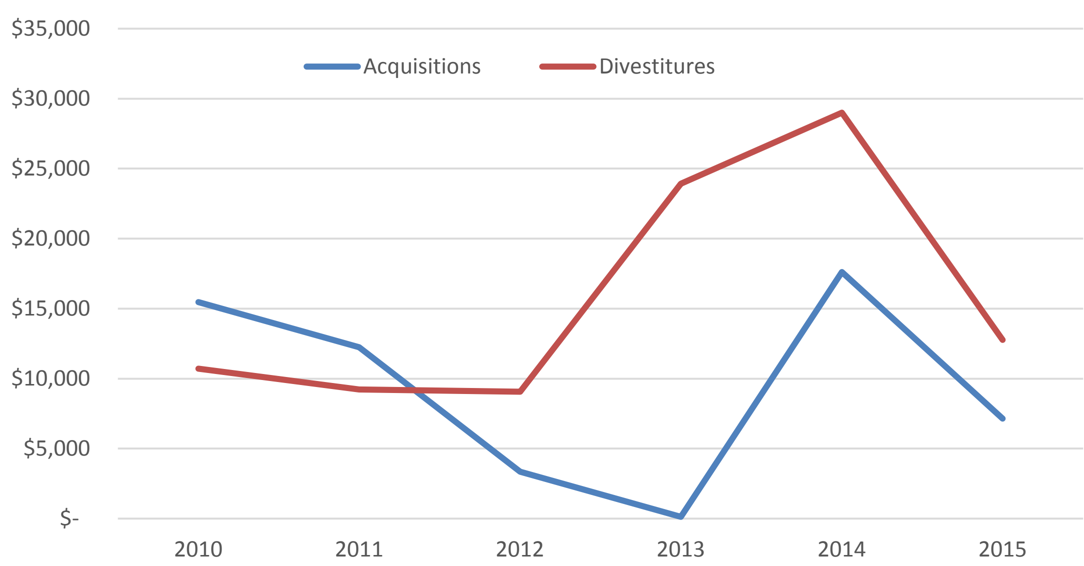
Court on the terms that will govern its development of massive offshore natural gas discoveries. Investors appear to have lost confidence in Encana, which is struggling as a late entrant into oil shale plays.

Our scenario of slowly improving oil prices will probably result in a decline in production for several companies in 2016 with moderate growth more likely in 2017 and beyond. The high 2008-13 growth rates required continuous increases in debt, as capital spending exceeded cash available from operations. As a result, the independent E&P sector will likely focus in the early years of recovery on repairing their balance sheets by paying down debt. The sector has already made substantial progress in reducing costs and increasing well productivity by being highly selective on drilling their most prospective wells and using high intensity fracking techniques, so will be able to increase production on a smaller budget than in the past. However, growth will likely proceed at a less torrid pace.

5. Strategic Implications

From 2008-13, shareholder returns were driven by production growth (both organic and inorganic). From 2013-15, however, production growth was not a driver of value; delivering high returns on assets were important and investment in existing properties to prepare for production growth later was also valued. To understand how our study group of companies responded to the drivers, we analyzed upstream acquisition and divestiture transactions from 2010-15. We found that aggregate dollar acquisitions exceeded divestitures in 2010 and 2011, but divestitures were more important after 2012[3] (Figure 5.1).

Figure 5.1: Study Group Upstream Acquisitions & Divestitures ($ Million)



[3] Annual totals by company can be found as Appendix 1

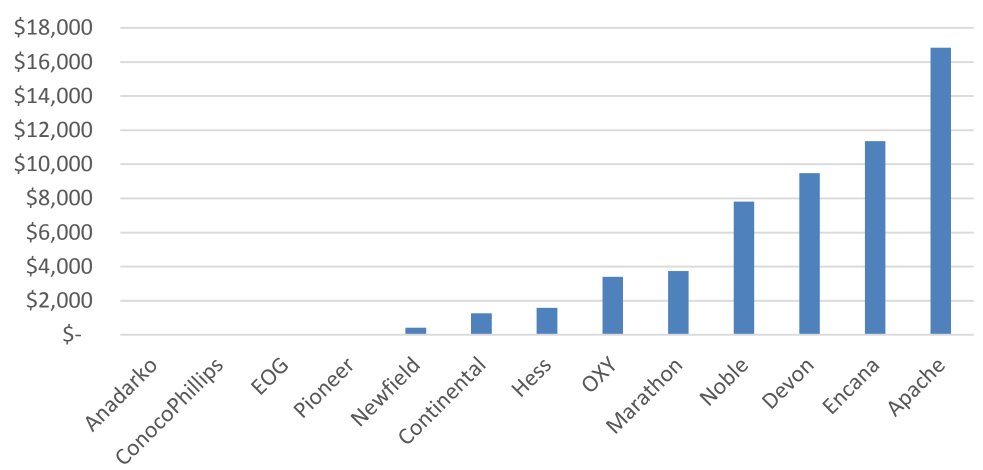
Most of the acquisitions in 2010 and 2011 were surgical:

- Hess added to its assets in the Bakken shale play and in the Norwegian North Sea.
- OXY added assets in the Bakken, South Texas and the Sacramento Basin
- Continental added to its already strong Bakken acreage
- Noble Energy added to its Niobrara acreage in the Rocky Mountains and diversified into the Marcellus play.
- Marathon entered, then strengthened its Eagle Ford position

By contrast between 2010-12, Apache completed seven acquisition transactions in the Gulf of Mexico and the Permian Basin, as well as adding to existing positions in Egypt and the UK North Sea for a total cost of $17 Billion, and would spend 2013-15 rationalizing its portfolio.

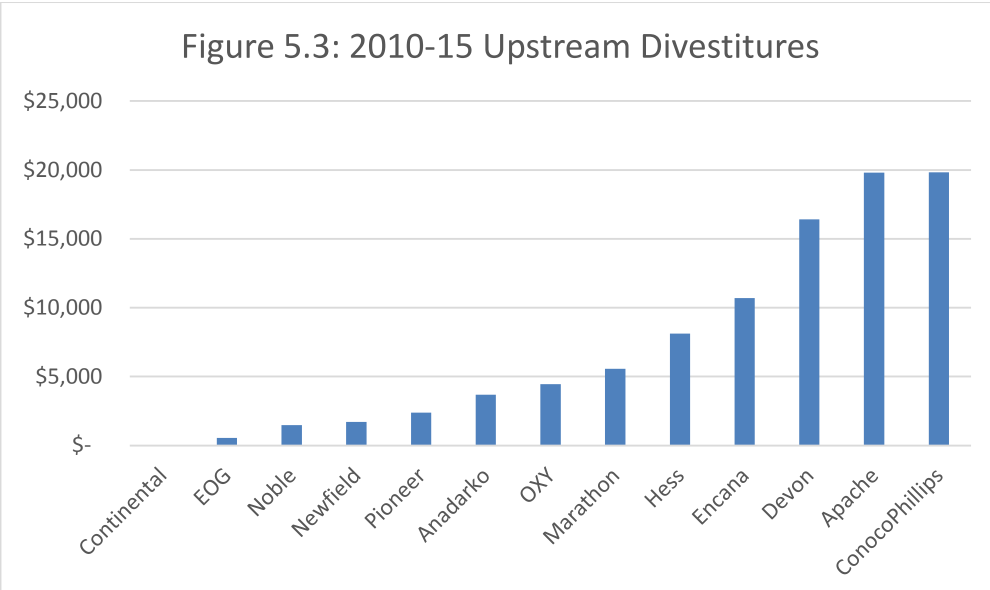
The other large acquirers were Encana, Devon and Noble Energy (Figure 5.2), which accounted for the transactions in 2014 and 2015.

Figure 5,2: 2010-15 Upstream Acquisitions



- Encana and Devon both were slow to respond to falling natural gas prices in the early 2010s, when their rivals captured large acreage positions in liquid rich shales. In 2014 and 2015, they were both playing catch-up: Encana completed large purchases in the Eagle Ford (Freeport McMoRan) and Permian (Athlon Energy); Devon acquired GeoSouthern Energy's assets in the Eagle Ford, and accumulated a significant position of liquids rich acreage in the Anadarko Basin.
- Noble Energy added positions in the Eagle Ford and Permian with its acquisition of Rosetta Resources.

Divestitures are a necessary part of strategy; well managed companies regularly examine whether they own assets of which they are no longer the natural owner because they may be worth more to others. However, the divestitures of 2010-15 went beyond this routine housekeeping (Figure 5.3):



- ConocoPhillips announced its spin-off of its midstream and downstream assets as Phillips 66 in July 2011 and completed the separation in May 2012. Prior to the spin-off, the upstream company divested its holding in Syncrude Canada and sold its Lukoil stock. Without the diversification of its midstream and downstream assets, the remaining portfolio carried too much risk and required radical reshaping by divestitures of holdings in Canadian Oil Sands, UK and Norwegian North Sea, Russia, Trinidad, Kazakhstan, Algeria and Nigeria. This resulted in a lower risk portfolio more heavily weighted to North America.
- Apache came under intense pressure from investors following its acquisition binge and made radical changes to its portfolio by selling down its interests in Egypt, exiting the Gulf of Mexico and Argentina and, following the January 2015 replacement of CEO Farris by Christmann, divesting its interests in LNG projects in Australia and Canada. The simplified portfolio is anchored by its huge acreage in the Permian, with profitable international businesses in the North Sea and Egypt.
- Devon sold its international and Gulf of Mexico businesses in 2010 and 2011, leaving a low value, predominantly dry natural gas and oil sands portfolio. It sold partial non-operating interests in its shale plays to Sinopec and Sumitomo in 2012, and divested a number of non-core conventional U.S. and Canadian assets in 2014. It is now focused on North American shales and Canadian Oil Sands.
- Encana completed its spin-off of its oil sands business as Cenovus in 2009. It found itself with a portfolio of predominantly dry tight gas assets. In the face of declining natural gas prices, it sold interests in a number of assets during 2012-16 and is focusing capital spending on liquids rich

properties four assets: in Canada, the Duverney and Montney shales and in the U.S. the Eagle Ford and Permian.

- Hess, under pressure from Elliott Management, completed divestiture of all its downstream businesses (not included in the upstream transaction database) in 2014 and sold upstream assets in Thailand, Indonesia, Russia and the North Sea as well as some dry Utica gas and Eagle Ford properties.
- Marathon completed the spin-off of its downstream assets as Marathon Petroleum in June 2011. In 2013 and 2014, Marathon Oil bought back stock for $1.5 Billion. Then the company divested its Angola and Norway interests for $4.2 Billion and is selling its Wyoming and deepwater Gulf of Mexico assets for a further $1.1 Billion. This leaves the company with investment plans in for unconventional oil resources in Bakken, Eagle Ford and Oklahoma plays, with Equatorial Guinea as a cash generator.

With these transactions, the studied companies appear to have settled on the portfolios they want to keep (Table 5.1). Only Anadarko and Noble Energy retain a robust international exploration program.

Table 5.1: Portfolio Shapes at end 2015

	U.S. Oil Shales Primary Basins				Other N. America	International						2015 Dividend/ Share
	Texas	Mid-Cont	Rockies	East		Europe	MENA	E. Africa	W. Africa	Asia	S. America	
Apache	Permian	Anadarko/ Arkoma				North Sea	Egypt					$1.00
Anadarko	Permian		DJ Basin		Alaska, GoM		Algeria	Mozambique	Ghana, Ivory Coast		Colombia	$1.08
ConocoPhillips	Eagle Ford	Anadarko/ Arkoma	Williston, DJ Basin		Alaska, Canada		(Libya)			Malaysia, Australia		$2.94
Continental		Anadarko/ Arkoma	Williston									$0.00
Devon	Permian, Eagle Ford	Anadarko/ Arkoma			Canada							$0.96
Encana	Permian, Eagle Ford				Duvernay Montney							$0.28
EOG	Permian, Eagle Ford		Williston									$0.67
Hess			Williston	Utica	GoM	North Sea	(Libya)		Eq Guinea	JDA		$1.00
Marathon	Eagle Ford	Anadarko/ Arkoma	Williston		Canada		(Libya)		Eq Guinea			$0.52
Newfield		Anadarko/ Arkoma	Uinta, Williston									$0.00
Noble Energy	Permian, Eagle Ford		DJ Basin	Marcellus			Israel		Eq Guinea			$0.72
Occidental	Permian				Permian EOR		Abu Dhabi (Yemen)				Colombia	$2.97
Pioneer Natural	Permian Eagle Ford											$0.00

The drivers of value during 2013-2015 were high EBITDA/ Total Assets returns and reinvestment in the business measured as capex/ Total Assets. Most of the companies studied continue to pay dividends to shareholders, which is consistent with these drivers.

Most companies will most likely embrace a value proposition that promises shareholders moderate rather than frenzied growth, with higher return on assets, a stronger balance sheet, increasing dividends as free cash flow grows and lower risks:

- Swap assets with rivals in certain basins to create scale economies such as longer laterals and reduce complexity.
- Plan capital investments that are comfortably within cash from operations to allow debt reduction.
- Be mindful of stakeholder demands: maximize safety and minimize emissions from drilling, gathering and processing to lower risks.
- Focus on being among the lowest cost producers, prioritize assets with stacked plays and those with the most productive wells.
- Use big data analytics to identify the most prospective drilling locations and optimize fracking geometries to fit the rock properties.
- Increase intensive fracking techniques, using more horsepower to inject more fluids and more proppants to increase total hydrocarbons recovery from each well.
- Use pad drilling to drill and complete multiple wells from each location.
- Reduce well costs by safely drilling faster and optimizing supply chains across multiple service and supply contractors.

However, Continental, Pioneer and Newfield are playing a different game, paying out no dividends and investing for production growth even in the current low price environment. They enjoy strong positions in the lowest cost resources, Permian and Anadarko Basin plays, and will be rewarded if prices strengthen as they will have built momentum while more conservative companies may be scrambling to mobilize equipment and crews.

As visibility improves on likely price pathways for oil and gas, buy-sell spreads will tighten and M&D transactions will become more feasible. Smaller companies may be acquired by our studied group of companies out of bankruptcy or from owners unable to finance growth. However, companies that execute well will generally be fully valued by the market and will require a considerable premium to justify a sale. Purchase of an asset or company could be justified if the acquirer is consolidating an already strong position in a basin and can leverage economies of scale, synergies and superior knowledge. There may also be a reduction in risk through ownership of shales in multiple basins, which could result in lower beta, lower cost of capital and higher intrinsic value, but a recent paper by McKinsey provides an important warning of the probability of value destruction in the low price stage of the cycle.

There is a real risk that herd behavior will again lead to a surge in drilling whenever oil prices can be hedged above $50/Barrel, and this might precipitate another price drop. However, declining conventional production in mature fields around the world will require continued growth from shale plays to meet even modest global demand growth. Shale oil is no longer the high cost source of oil as lower costs driven by increased productivity of shales has tunneled under the costs of other resources: oil sands, most enhanced oil recovery projects and deep water areas with unfavorable fiscal terms are now the high cost sources and must wait till the most attractive shales are depleted before they can attract significant capital.

6. Company Profiles

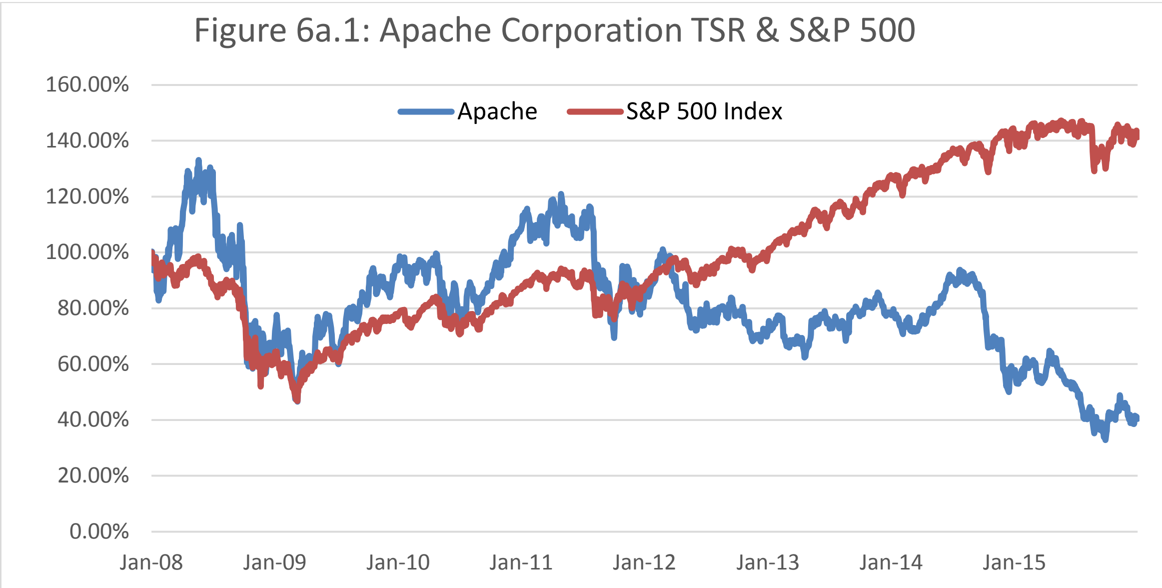
a. Apache Corporation

Apache was founded in Minneapolis, Minn., by Raymond Plank and partners in 1954. Apache was formed with $250,000 of investor capital and the simple goal of building a significant and profitable oil company. Today, Apache is one of the world's top independent E&P companies. The journey was propelled by Apache's strong culture and its adaptability when confronted with a changing environment. After acquiring a wide range of companies, the company sold off the diversified businesses; emerged as Apache Petroleum Company in 1981 and purchased Dow Chemical Company's oil and gas assets in 1982. This was followed by a long sequence of acquisitions (Table 1.0) as Apache honed two important capabilities: building strong relations with major oil companies to become a preferred buyer of (largely mature) properties as the majors continuously fine-tuned their portfolios, and perfecting a performance measurement and reward system that provided incentives at all levels to redevelop fields and extract value that had not been recognized by their former owners.

Table 6a.1: Apache Acquisitions

Year	Acquisition	Focus	Price ($M)
1993	Hadson Energy Resources	Australia	$ 58
1995	Dekalb Energy	Canada	$ 285
1996	Phoenix	Egypt	
1999	Royal Dutch Shell	Gulf of Mexico	$ 518
2001	Fletcher Challenge	Canada	$ 677
	Repsol	Egypt	$ 447
2003	Forties Field, GOM properties	UK North Sea, GOM	$ 1,300
	Shell	Gulf of Mexico	$ 200
2004	Anadarko	Gulf of Mexico	$ 525
2005	Exxon Mobil	West Texas, Canada, GOM	
2006	Amerada Hess	Permian Basin	
2010	Devon	Gulf of Mexico	$ 1,050
	BP	Permian, Canada, Egypt	$ 6,400
	Mariner	GOM, Permian	$ 2,700
2011	Beryl Field	UK North Sea	$ 1,750
2012	49% of Burrup Holdings	Australia	$ 439
2012	Cordillera Energy Partners	Oklahoma and Texas	$ 2,700
2013	50% of Kitimat LNG plant		
	Horn River, Liard Basin		$ 396

Growth by acquisition created substantial shareholder value especially in the 2000s when oil prices were rising. In addition, Apache continued to find ways to add value to their purchased assets through organizational and technical innovation. However, the large acquisitions of 2011-12 appear to have caused some concern among investors and TSR has declined since 2011 (Figure 6a.1). Of particular fear were the company's substantial holdings in Egypt as that country experienced political turmoil.



Apache responded quickly to investors' concerns. In May 2013, Apache announced a portfolio rebalancing to focus on operations that generate production growth or provide cash for capital investments. The first major step in the rebalancing was the sale of Apache's Gulf of Mexico Shelf operations to Fieldwood Energy Company, a portfolio company of Riverstone Holdings, for $3.7 billion in cash and assumption of liabilities for future abandonment costs of the properties with a discounted value of $1.5 billion. This process continued in an agreement with Sinopec to sell 33% of its Egypt oil and gas business for $2.95 Bn in cash. In 2014 Apache continued to sell off assets. They sold their Argentina assets to YPF and sold their non-operated interests in Lucius and Heidelberg development projects and 11 primary term deep-water exploration blocks to a subsidiary of Freeport-McMoRan Copper & Gold Inc. Also, Apache sold off their natural gas assets in western Canada to concentrate on liquids-rich opportunities. During 2015, the Company completed the sale of all of its operations in Australia.

Table 6a.2: Apache Corp. Divestitures ($ Million)

Closing Date	Assets	Buyer	Consideration ($mm)	
Oct-28-2015	Australia Fertilizers	Yara	$	391
Jun-05-2015	Australia Upstream	Private Equity	$	5,025
Apr-10-2015	Canada Kitimat Interests	Woodside	$	2,750
Dec-31-2014	Non-Core US Assets	Unknown	$	1,400
Jun-30-2014	Deepwater GoM	Freeport McMoran	$	1,400
Apr-30-2014	Canada Deep Basin	CNRL	$	374
Mar-12-2014	Argentina	YPF S.A.	$	852
Nov-14-2013	Interests in Egypt	Sinopec	$	3,100
Sep-30-2013	W, Canada	Ember Resources Inc.	$	214
Mar-19-2013	GoM Shelf	Fieldwood Energy LLC	$	3,750
Feb-08-2013	Canada BC holdings	Chevron Canada Limited	$	550
	Total Sales		**$**	**19,806**

After more than 25 years at Apache, Chairman, CEO and President G. Steven Farris departed in January 2015. John Christmann, IV, an Apache veteran of 19 years and COO of North America, succeeded Farris as CEO and president. Apache now has exploration and production interests in four countries: the U.S., Canada, Egypt, and the North Sea.

North America Onshore

Apache's North American onshore and offshore assets are primarily located in the Permian Basin, the Anadarko basin in western Oklahoma and the Texas Panhandle, Gulf Coast areas of the United States and in Western Canada as well.

The company has access to significant liquid hydrocarbons across their 10.7 million gross acres onshore in the U.S. and Canada. About 55 percent of this acreage is undeveloped. Additionally, 58 percent of Apache's worldwide equivalent 2015 production and 72 percent of their estimated year-end proved reserves are in their U.S. and Canada onshore regions. Over the past several years, Apache's drilling activity has centered on their North American onshore assets. This contributed to a delivered liquids growth of 4 percent during 2015. This excludes the impacts of divestitures. To manage their development efforts across their acreage positions, their onshore assets are divided into three key regions.

Permian

Apache's Permian region controls over 3.3 million gross acres with exposure to numerous plays across the Permian Basin. Apache is one of the largest operators in the Permian Basin, with more than 14,300 producing wells in 163 fields. The Permian region's 2015 estimated proved reserves were 684 MMboe, representing 44 percent of the Company's worldwide reserves. Total region production for 2015 was up 6 percent, despite operating an average rig count of 12 compared to 40 rigs in 2014. The reduced rig count echoed the Company's decisive action to reduce capital spending in response to rapidly declining commodity prices. During the year, they drilled or participated in drilling 378 wells, 217 of which were horizontal, with a 97 percent success rate.

In recent years, the region has been testing numerous formations and building a large inventory of horizontal opportunities in several plays across Apache's acreage position. In 2015, they ran a capital program that focused on efficiency improvements, down spacing and other strategic tests to further explain several plays. Production growth was driven by Wolfcamp wells in the Barnhart, Wildfire and Azalea areas of the Southern Midland Basin, the Bone Spring development program in the Delaware basin, and Yeso drilling on the Northwest shelf. In addition, the region continued to manage its completion inventory as costs continued to fall throughout the year.

Given its acreage holdings and recent seismic data acquisitions, the region's deep portfolio of drilling inventory and opportunities allows them to focus efforts on the most economic wells and capital projects as the industry continues to adjust to current commodity price levels. Heading into 2016, they will continue to operate in a reduced capital spending program and will balance larger development programs with exploration activity in several new areas.

Midcontinent/ Gulf Coast

As part of Apache's 2015 strategic efforts to reduce their operating cost structure, they streamlined their organization by closing their regional office in Tulsa and combining their Midcontinent and Gulf Coast onshore regions. Apache's Midcontinent/Gulf Coast region holds 2.8 million gross acres and includes 3,402 producing wells mainly in western Oklahoma, the Texas Panhandle, and south Texas. Total region production in 2015 was 73 Mboe/d, encompassing 13 percent of Apache's worldwide production. The region's 2015 estimated proved reserves were 154 MMboe.

In 2015, Apache drilled or participated in drilling 127 wells with a 99 percent success rate. The region focused on drilling activities in the Canyon Lime, Eagle Ford, Marmaton, and Woodford formations with consistently strong results. Apache is active in the Woodford formation in central Oklahoma, where they drilled or participated in drilling 33 wells. The region continues to work on optimizing fracture geometry and well spacing to reduce costs in this play.

North America Offshore

Apache's offshore technical teams continue to focus on subsalt and other deeper exploration opportunities in water depths less than 1,000 feet, which have been relatively untested by the industry. In addition to the exploration and development of properties in shallower water, Apache continues to pursue joint venture and other monetization opportunities for its deep water prospects, which offer exposure to significant reserve and production potential in underexplored areas in water depths greater than 1,000 feet. During 2015, Apache's Gulf of Mexico region contributed 9.2 Mboe/d to the Company's total production.

Canada

Apache entered the Canadian market in 1995 and currently holds nearly 3.6 million gross acres across the provinces of British Columbia, Alberta, and Saskatchewan. The region's large acreage position presents significant drilling opportunities and portfolio diversification. Their Canadian region provided approximately 13 percent of Apache's 2015 worldwide production and held 280 MMboe of estimated proved reserves at year-end.

In 2015, Apache drilled or participated in drilling 38 wells in the region with a 100 percent success rate. Drilling operations continued in their established Swan Hills, Bluesky, and Glauconite plays, and they de-risked their Montney and Duvernay emerging growth plays.

International

Apache's international assets are located in Egypt and offshore U.K. in the North Sea. In 2015, international assets contributed 40 percent of their production and 51 percent of their oil and gas revenues. Approximately 28 percent of their estimated proved reserves at year-end were located outside North America.

Egypt

Apache began activity in Egypt in 1994 with their first Qarun discovery well, and today they are one of the largest acreage holders in Egypt's Western Desert. At the end of 2015, they held 6.7 million gross acres in 24 separate concessions. Approximately 73 percent of their acreage in Egypt is undeveloped, providing them with considerable exploration and development opportunities for the future. Their estimated proved reserves in Egypt are reported under the economic interest method and exclude the host country's share of reserves. Excluding the non-controlling interest, Egypt contributed 20 percent of their 2015 production and accounted for 14 percent of their year-end estimated proved reserves and 27 percent of their estimated discounted future net cash flows.

Apache has historically been one of the most active drillers in the Western Desert, however, 2015 activity was reduced in all regions in response to reduction in commodity prices. They drilled 97 development and 25 exploration wells in 2015. Approximately 60 percent of their exploration wells were successful. A key component of the region's success has been the ability to acquire and evaluate 3-D seismic surveys that enable their technical teams to consistently high-grade existing prospects and identify new targets.

North Sea

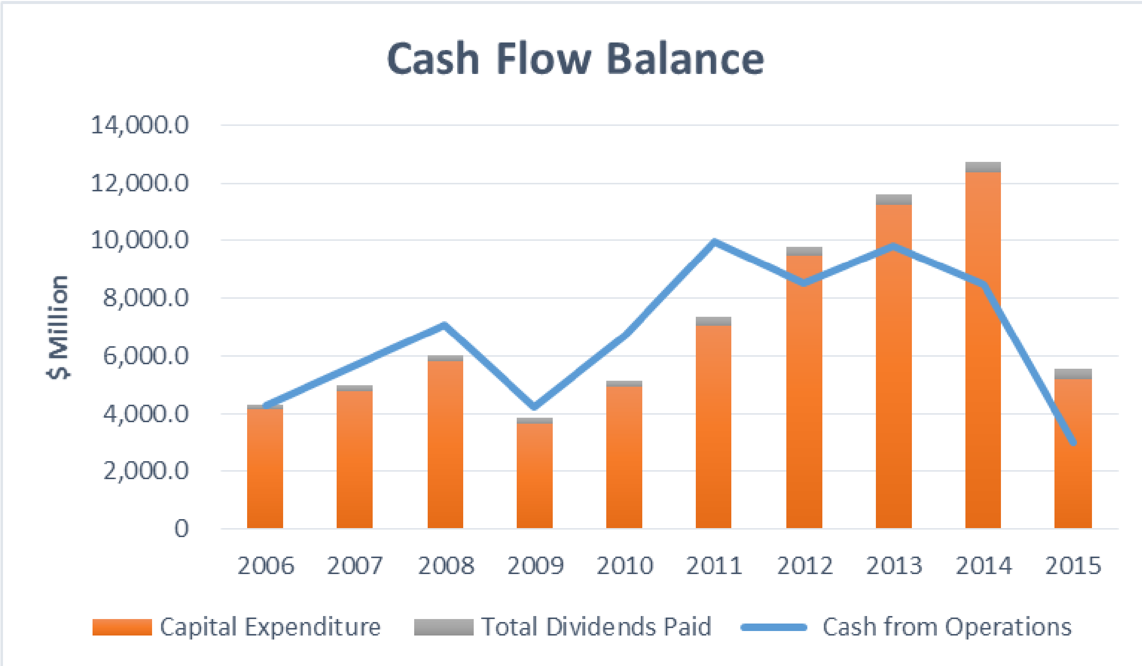
Apache entered the North Sea in 2003 after acquiring an approximate 97 percent working interest in the Forties field. Building on its success in Forties, in 2011 Apache acquired Mobil North Sea Limited, providing the region with additional exploration and development opportunities across numerous fields. In total, Apache has interests in approximately 1 million gross acres in the U.K. North Sea.

The North Sea region continues to play an important role in the overall Apache portfolio by providing competitive investment opportunities across multiple horizons and potential reserve upside with high-impact exploration potential. In 2015, the North Sea region contributed 13 percent of worldwide production and 9 percent of year-end estimated proved reserves. During the year, 23 development wells were drilled in the North Sea, of which 19 were productive. Apache has invested approximately $2.7 billion in infrastructure improvements across all of their fields over the past decade resulting in significantly improved production efficiency and lower unit operating costs. With leading production efficiency in the region, their infrastructure and offtake capabilities have positioned the area to be allocated a higher percentage of capital dollars for drilling and production.

Cash Flow

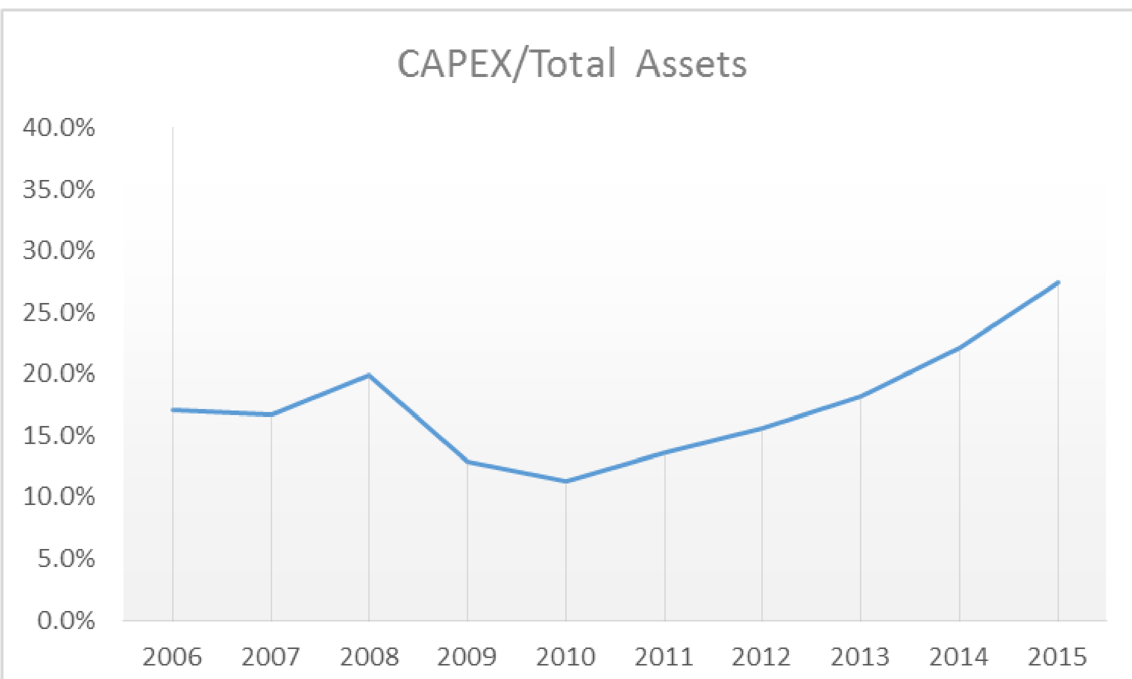
Apache traditionally kept capital expenditures well below its cash from operations, but since its major acquisitions has invested aggressively and since 2012 has exceeded its cash from operations.

Figure 6a.2: Cash Flows



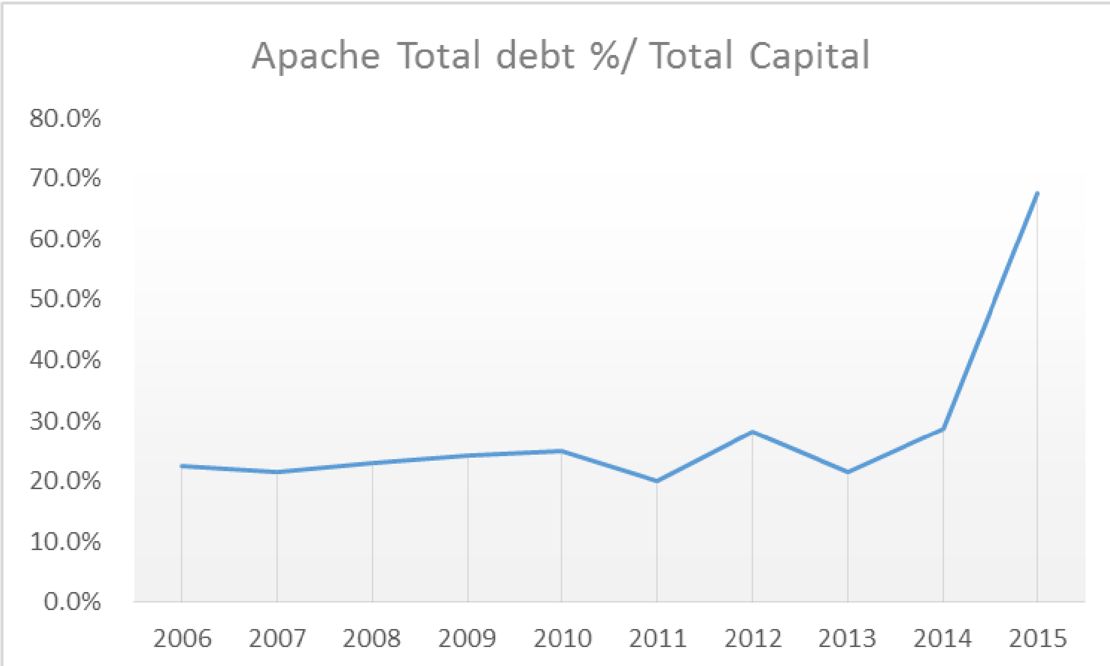
Divestitures and asset write-downs resulting from lower prices lowered Apache's book value of total assets, such that the metric of Capex/ Total Assets soared in 2015, even as capex was reduced (Figure 6a.3).

6a.3: Apache Capex/ Total Assets



With capital expenditures and dividends exceeding cash from operations, Apache's debt ratio increased to uncomfortable levels.

Figure 6a.4: Apache Debt Rato



<u>The Future of Apache</u>

Apache Corp set a 2016 capital budget more than 60 percent lower than its 2015 expenditure and reported a bigger quarterly loss due to $5.9 billion due to write downs and impairment charges. The net loss to Apache's common shareholders widened to $7.21 billion, or $19.07 per share, in the fourth quarter ended Dec. 31. They said they would adjust the budget more if prices change as they seek to maintain cash flow neutrality. Reduced spending on new wells will trim output by 7-11 percent from 2015 projected production. Apache now forecasts total projected production for this year of around 453,000 barrels of oil equivalent per day (boepd), excluding minority interest in Egypt and tax barrels.

"In 2016, we plan to be cash flow neutral after dividends and believe this can be achieved at $35 oil with minimal non-core, non-producing asset sales," Chief Executive John Christmann said in a statement. "Our target is for net debt at the end of 2016 to be unchanged or lower than it was at the end of 2015." Apache says it has no debt due this year or next year, and only $700 million maturing through 2020. The company's undrawn $3.5 billion revolving loan was extended to June 2020.

Over 2013-15, Apache delivered high EBITDA/ Total Assets returns and reinvested strongly in its core businesses. According to our analysis of value drivers (Table 3.2), this should have produced a relatively high TSR, but instead, TSR declined by 28%. It is likely that a combination of abrupt change in CEO, declining oil and gas production, appearance of strategic disarray and high debt levels have damaged investor confidence.

Our financial model indicates that investors are expecting an average 2.7% per year decline in production from 2015-21. The CEO has warned that 2016 production may decline faster. However, Apache's massive acreage position, particularly in the Permian, strong EBITDA/ Total Assets returns and rationalized portfolio provides a solid platform for future growth if it can reduce its debt.

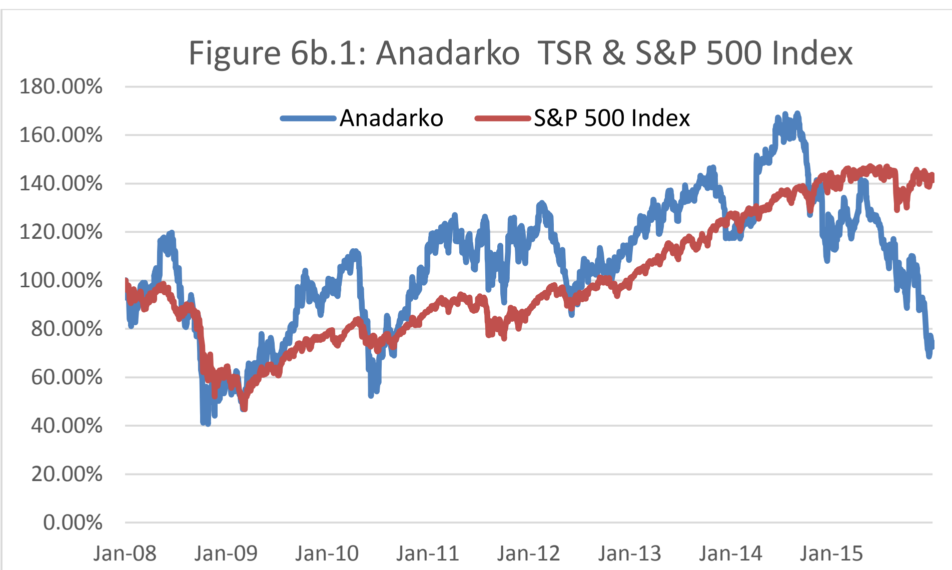
Sources: Capital IQ and Apache Dec. 31, 2015 10-K.

b. Anadarko Petroleum Corporation

Anadarko began life in 1959 as the exploration & production subsidiary of Panhandle Eastern Pipeline Company. Following the 1978 Natural Gas Policy Act (NGPA), Anadarko farmed in with Amoco to joint venture several Gulf of Mexico blocks. In 1979, Robert Allison became CEO of Anadarko and focused strongly on exploration in the Gulf of Mexico shelf. In 1993, Anadarko became the first foreign company since Algerian nationalization to discover a new oil field in Algeria.

In the early 2000s, Anadarko began to lose momentum as the Gulf of Mexico shelf matured, and in 2003 Jim Hackett was appointed CEO with Robert Allison remaining as Chairman. Production declined from 2002-05. In a series of bold moves in 2006, Anadarko purchased Kerr-McGee and Western Gas Resources, and acquired 2.6 million acres offshore Mozambique. The two major acquisitions stressed the Anadarko balance sheet, but the company was able to repair the damage quickly through disciplined portfolio rationalization, though the company’s debt ratio remains high relative to its rivals, especially for a company with a strong exploration emphasis. Kerr McGee helped rejuvenate Anadarko’s exploration capabilities (but also brought with it a $14 billion law suit filed by creditors when its former Titanium Dioxide subsidiary Tronox declared bankruptcy in 2009 citing environmental liabilities), while Western Gas gave the company a strong position in Rocky Mountain unconventional natural gas.

In 2009, Anadarko announced multiple major discoveries in the deep water Gulf of Mexico, Ghana and offshore Brazil, driving share prices up with every announcement. As of year-end 2009, the company had 2.3 billion barrels equivalent of proven reserve, making it one of the world’s largest Independent E&Ps.



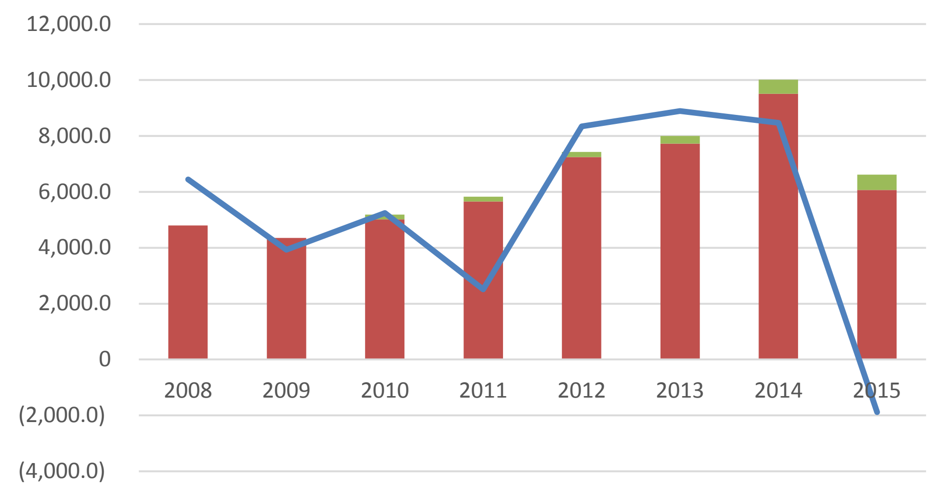
In addition to the shadow cast by the Tronox suit, Anadarko was also a non-operating partner in the Macondo Well in the Gulf of Mexico, and when tragedy struck in 2010, Anadarko settled its liabilities with BP for $4 billion. Company share value fell by over 40% in the months succeeding the incident. Soon after, Anadarko somewhat received consolation by resolving a dispute with Algeria on excess profit taxes levied by the government in its favor for $4.4 billion.

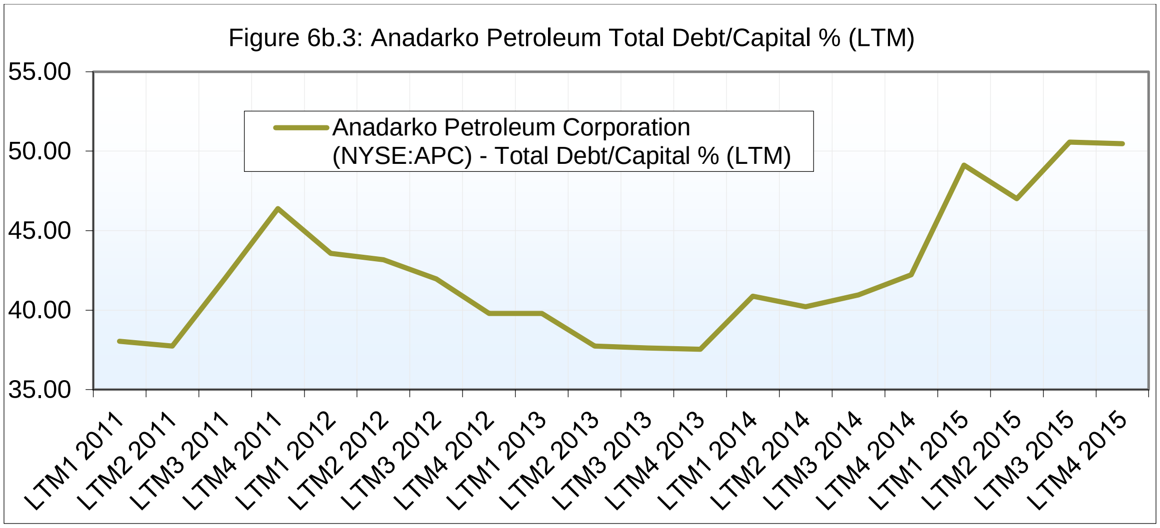
In May 2012, CEO Hackett, the man widely credited for Anadarko's comeback in the industry stepped down and R.A Walker, who served previously as Chief Financial Officer and Chief Operating Officer was promoted and appointed Chief Executive Officer. Also in 2012, Anadarko discovered three major Natural Gas fields off the shore of Mozambique. In 2014, Anadarko was able to monetize a part of its Mozambique reserves in advance of production by agreeing to sell a 10-percent interest in Mozambique's Offshore Area 1 to ONGC for $2.64 billion in cash. The company also sold the Kerr McGee China business for $1 Billion.

This followed a successful IPO in 2012 of the company's Rocky Mountain midstream assets in the shape of Western Gas Equity Partners for $6.8 billion. The boom was in full force and Anadarko's stock price hit an all-time high of $112.96 in August 2014 (See Figure 6b.1), propelling and encouraging the company to invest further.

In January 2015, Anadarko paid $5.2 Billion in settlement of the Tronox settlement negotiated with creditors and this sent cash from operations into negative territory (Figure 6b.2), exacerbating its cash balance and requiring increased debt (Figure 6b.3) to fund capital expenditures and dividend payments.

Figure 6b.2: Anadarko Cash Balance ($ Million)





In early 2015, Anadarko announced a severe reduction in drilling activities and plans to cut expenditure by 33%. Anadarko CEO R.A Walker went on to explain that they do not see any value in chasing growth in this environment, and they are prioritizing savings and spending cuts instead.

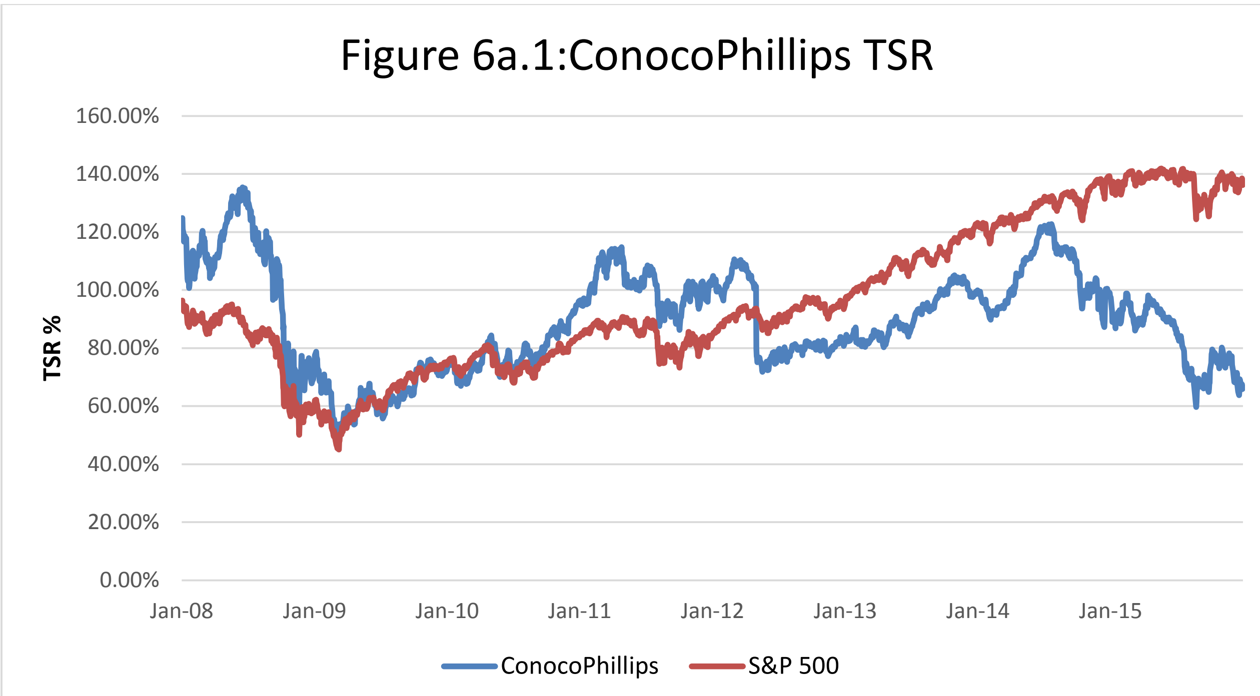
Anadarko's financial position in today's turbulent Oil & Gas climate remains a concern. On March 11th 2016, Anadarko unveiled a program designed to cut over 1,000 jobs to reinforce its cost-cutting agenda. The company also announced a reduction in its year-over-year capital investments by almost 50%, as a result reducing U.S onshore rig count by 80%. In addition, the company also cut quarterly dividends by $0.22/share, a move that it says is in line with its current disciplined financial approach and will generate an additional $450 million of additional cash for the company.

Anadarko reinvestment in its businesses (Capex/ Total Assets) has been below the average of its rivals, as has its EBITDA/ Total Assets returns (only Hess and Marathon were lower) from 2013-15. Consequently, it has delivered a below average TSR of -21.4% p.a. from 2013-15. However, the company enjoys a strong portfolio of future development opportunities as well as a strong exploration track record. It has strong oil shale positions in the DJ Basin of Colorado and the Delaware Basin in the Permian area of Texas, opportunities for relatively low cost tie-back investments in the Gulf of Mexico and is working on contractual frameworks and LNG sales agreements that will support project financing of its massive offshore Mozambique natural gas resource development and liquefaction project. In addition, the company has active exploration of targets offshore Colombia, in the deep water Gulf of Mexico and offshore Ivory Coast.

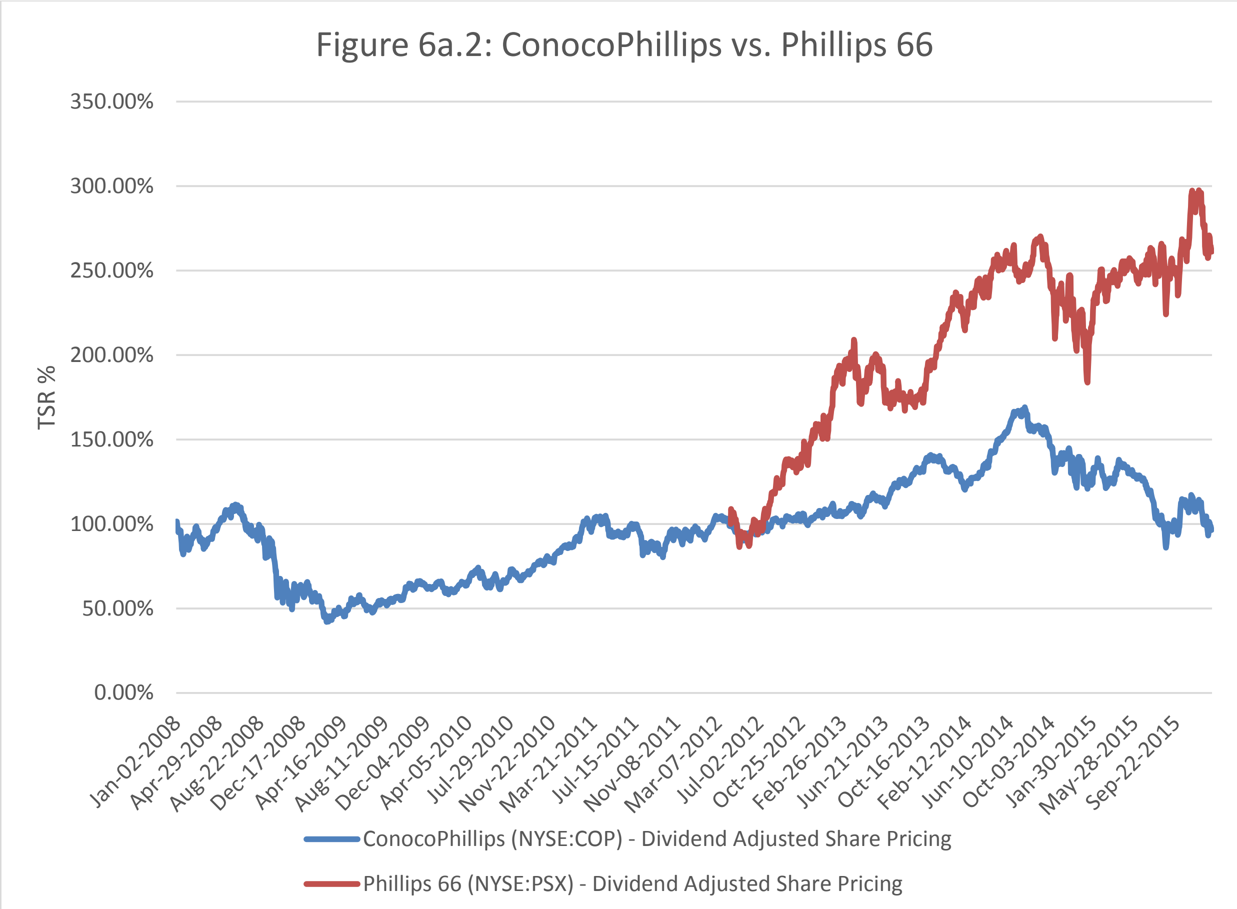
Nevertheless, our cash flow model suggests that investors are expecting 4.9% per year growth in oil and gas production from 2015-21, slightly higher than its growth of 3.9% p.a. from 2013-15. The optimism may be warranted: APC has confirmed they are on schedule to achieve first oil at the TEN complex in offshore Ghana, and are investing in three Gulf of Mexico projects that will increase production from Heidelberg, Lucius and Caesar/Tonga fields.

c. ConocoPhillips

In 2009, independent E&Ps started to pick up where they left off pre-2008 mortgage crisis in terms of creating value for their shareholders. ConocoPhillips (COP) between 2009 and 2011 was still a single company for its upstream and downstream operations, with the downstream really being the business that started to boom as a result of the North American shale development. After splitting upstream and downstream operations into two firms in July 2011 (ConocoPhillips and Phillips66 respectively), COP saw a TSR (total shareholder revenue) dip below the general market as measured by the S&P 500 index.



In the late spring of 2014, the drop in oil prices drastically affected ConocoPhillips's (and the other independent upstream firms') ability to deliver value for shareholders. Downstream operations are doing extremely well, and those shareholders who held on to their Phillips66 stock have benefitted. However, with the market oversupplied with oil, it is not hopeful that prices will rise again before 2017. Shareholders must decide for themselves if they can wait that long, though given COP's history for creating wealth it might be wise to do so.

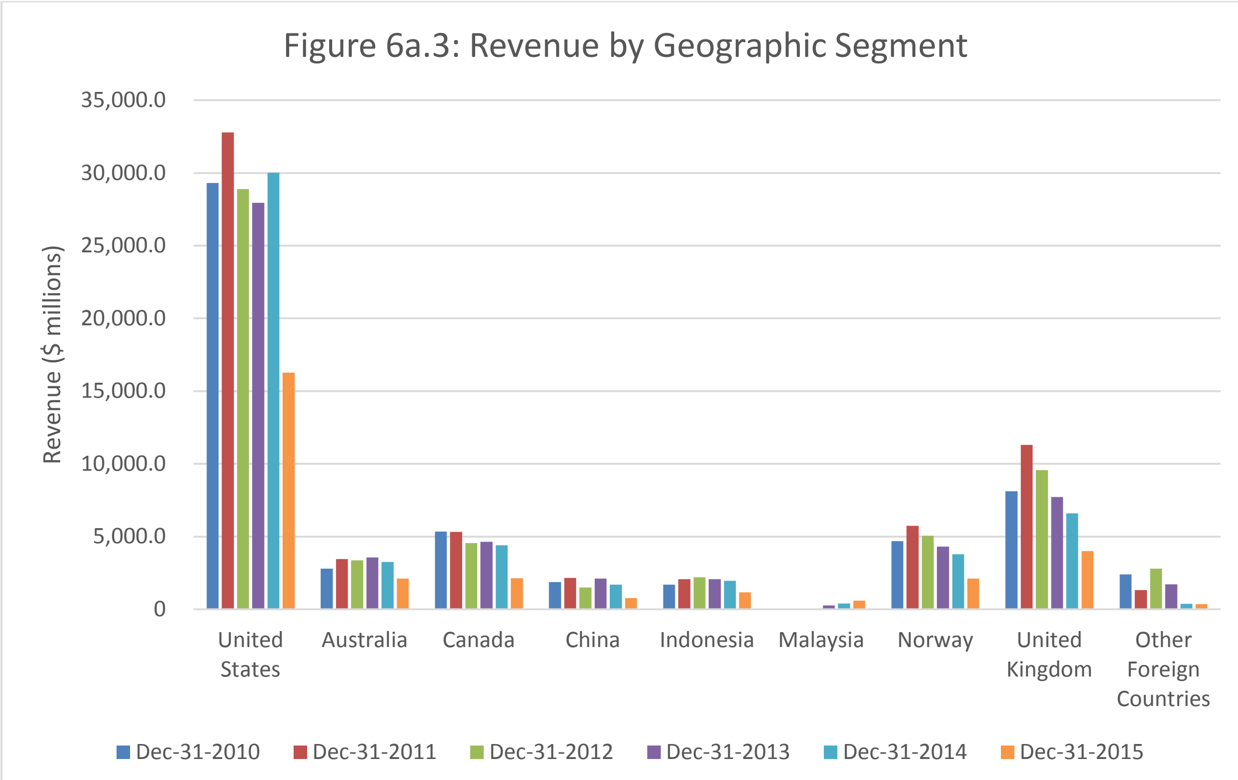


Since the spinoff, COP has completed 23 transactions in which they were the seller of whole subsidiaries or shares of the subsidiary. Notable sell-offs include two African businesses —the Nigerian Business of ConocoPhillips and ConocoPhillips Algeria—that sold for $1,660M and 1,750M respectively in late 2012 and the Kashagan Oil Field that sold for $5,000M in 2013 (Table 6c.1).

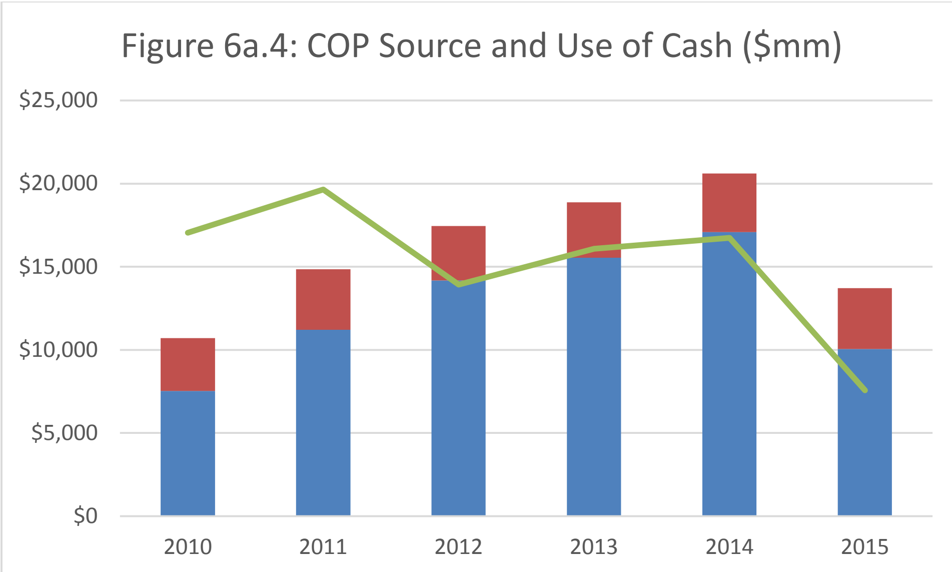
Table 6c.1: ConocoPhillips 2010-15 Transactions

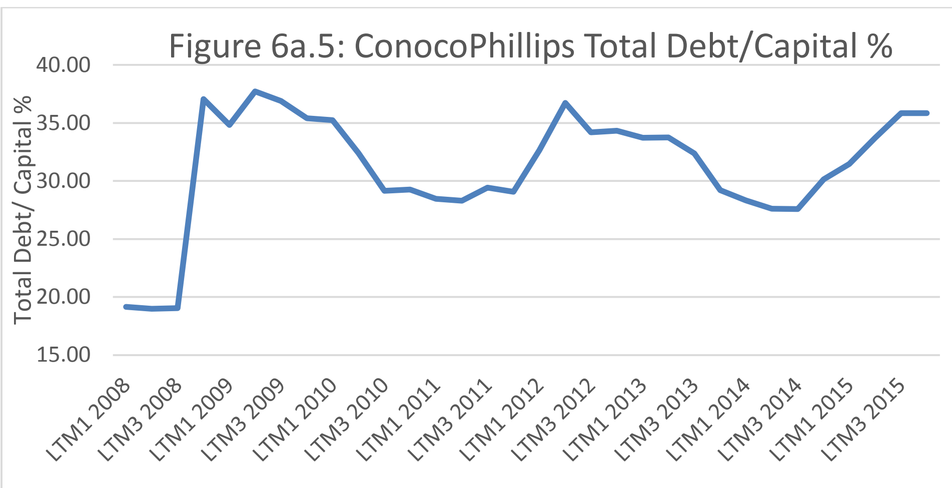
	ConocoPhillips Divestiture Transactions 2010-15		
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**
Jul-30-2014	Nigerian Businesses of ConocoPhillips	Oando Energy Resources Inc. (TSX:OER)	$ 1,660
Nov-27-2013	ConocoPhillips Algeria Ltd.	PT Pertamina (Persero)	$ 1,750
Oct-31-2013	Kashagan Oil Field	KazMunayGas	$ 5,000
Aug-16-2013	Phoenix Park Gas Processors Limited	The National Gas Company of Trinidad and Tobago	$ 593
Aug-16-2013	Alberta's Clyden Oil Sands	XOM	$ 725
Mar-27-2013	Bakken Assets	Denbury Onshore	$ 1,050
Aug-22-2012	NaryanMarNefteGaz	Lukoil	$ 529
May-31-2012	UK North Sea Interests	Endeavour Energy	$ 218
Apr-30-2012	Norwegian Interests	Centrica plc (LSE:CNA)	$ 223
Aug-16-2010	Lukoil Stock Holding	Lukoil	$ 3,442
Jun-25-2010	Syncrude Canada Ltd.	Sinopec	$ 4,650

A combination of falling oil prices and divestitures has reduced revenues in all regions (Figure 6a.3)



Lower revenues resulted in lower cash from operations, which fell below cash required for capital expenditures and dividend payments in 2012, and has stayed below since then (Figure 6a.4). The financial crisis in 2008 left ConocoPhillips with a high debt ratio that they have not been able to shake off. In 2010 they appeared to be reducing it only for it to go up after the split of upstream from downstream. The same happened in 2013—the debt ratio appeared to be dropping until the drastic fall in oil prices in 2014 (Figure 6a.5).





According to the June 2016 investor review, ConocoPhillips plans to maintain 2015 levels of production through 2016 with further asset sales to streamline its portfolio and cutting operating costs—a $3.7 billion and $1 billion reduction respectively. They plan to sell few if any of their producing properties to maintain the ability to expand production again upon the sign of a turnaround; their mindset being they rather have them and not use them than sell them and later need them. Additionally, COP decreased its dividend for 2016. This will drop the breakeven price down to $45 per bbl. COP has developed a plan to match the expected cyclical recovery: hunkering down in the short term; repairing the balance sheet and raising the dividend in the medium term; and disciplined investment in low cost of supply resources in the longer term. Its future opportunities for growth include strong positions in the Bakken and Eagle Ford shales, further development of its Surmont, Foster Creek and Christina Lake oil sands projects, development projects in Alaska and the North Sea, expansion of AP LNG and two development projects in Malaysia.

When looking at TSR from 2013 through 2015, ConocoPhillips is above the mean TSR of all players by about four percent (the mean is -22.3 percent while COP is at -18.2 percent). However, ConocoPhillips has reinvested lower than average Capex/Total Assets, realized lowest EBITDA/Total Assets returns of the studied companies, and has sharply increased debt as well decreasing dividends. These factors may explain why ConocoPhillips TSR declined 9.8% in 1Q16, as investors reappraised the company's true value.

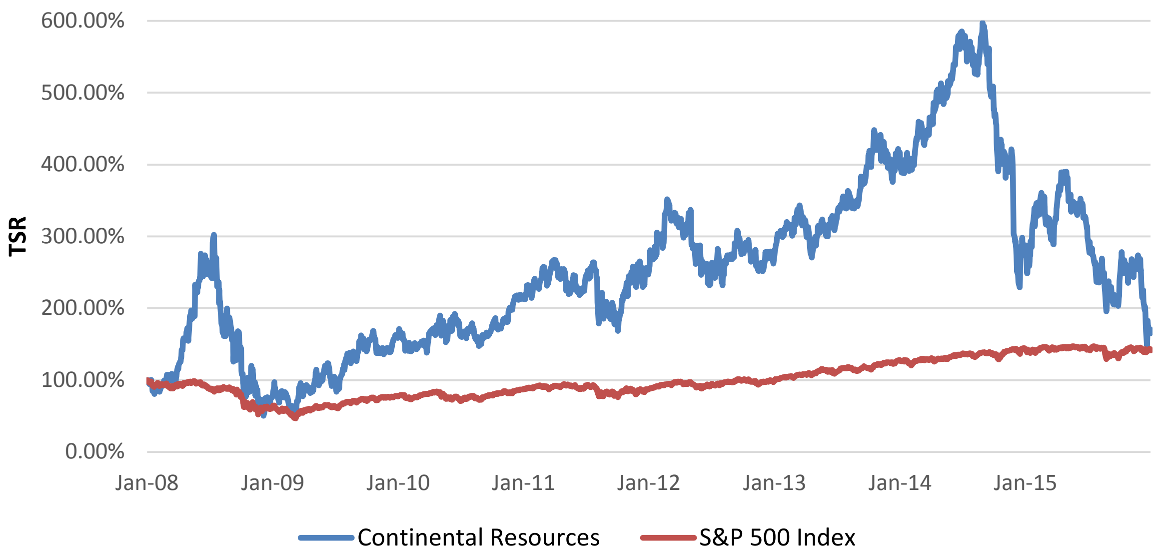
Our ConocoPhillips financial model suggests that the end 2015 valuation appears to anticipate a 2.8% average annual growth in oil and gas production through 2021, the same growth rate that was realized from 2013-15.

d. Continental Resources

Continental Resources (CLR) was founded as Shelly Dean Oil Co. by Harold Hamm in 1967. The company acquired Petro-Lewis in 1985 and changed its name to Continental Resources in 1990. The early focus was on Oklahoma and the Rocky Mountains; in 1995 CLR discovered the Cedar Hills field in North Dakota and in 2003 acquired 300,000 acres in the Bakken play and drilled the first Bakken horizontal well with hydraulic fracturing in 2005. The company went public on the NYSE in 2007.

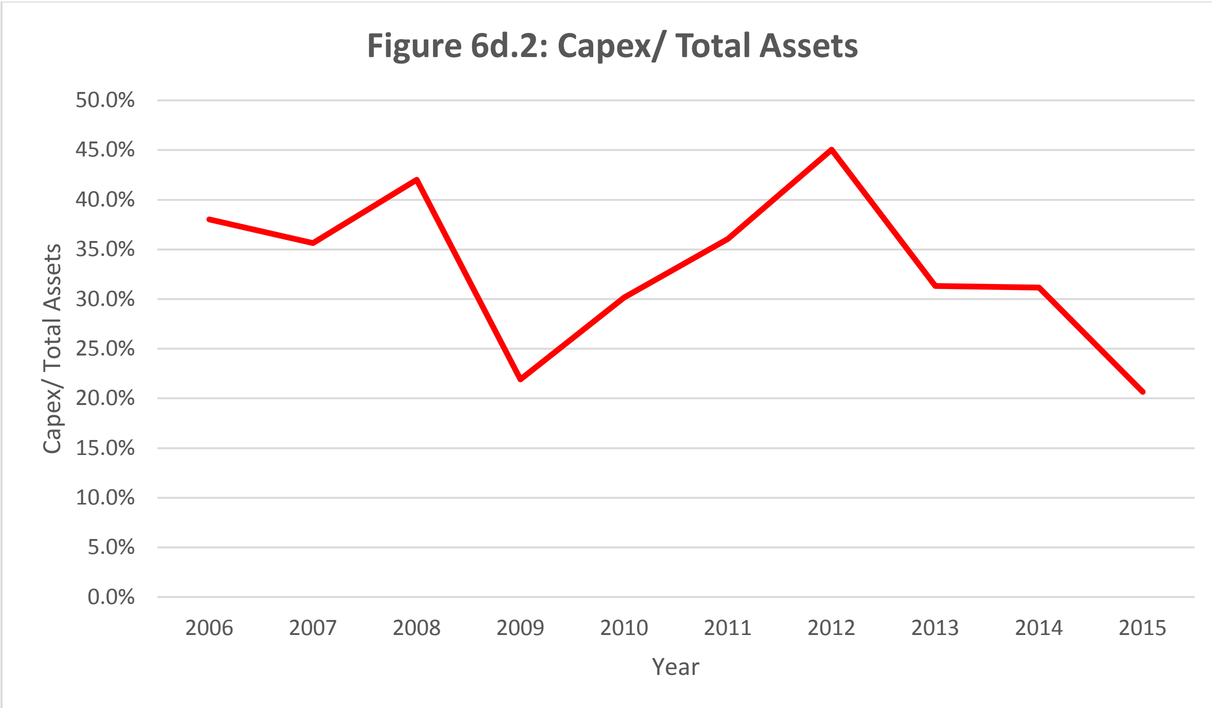
Since becoming a public company, CLR provided exceptional returns to shareholders through August 2014 (Figure 3.11), growing in TSR every year until the global oil price collapsed in September of 2014.

Continental Resources TSR & S&P 500 Index (Figure 6d.1)

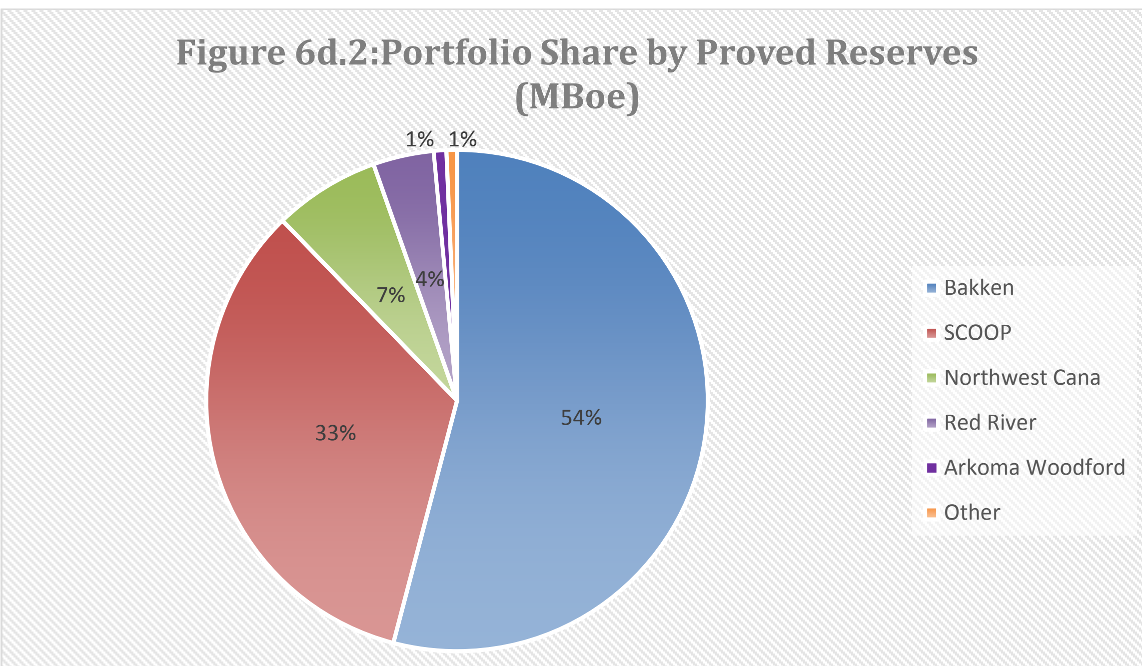


CLR was the most aggressive of the study group with average Capex/ Total Assets ratio of 34% from 2008 through 2013, compared to its nearest rival Anadarko with 26% reinvestment ratio and a mean for the group of 29%. During this period, CLR grew its oil and gas production at an average 27% per year, more than double the pace of its nearest rival, Pioneer Natural Resources. Proven reserves and production are both around 70% oil, higher than most of its rivals in this sector. Another reason for its strong TSR performance could be attributed to an undervaluation of the company at the time of its IPO, when the company was not well known.

This aggressive growth strategy was supported by a hedging program that locked in high prices. However, in November 2014, CEO Hamm lifted all the company's hedges and the company was fully exposed to collapsing oil prices. CLR until recently continued to reinvest at a torrid pace (Figure 6d.2) and its value fell precipitously.



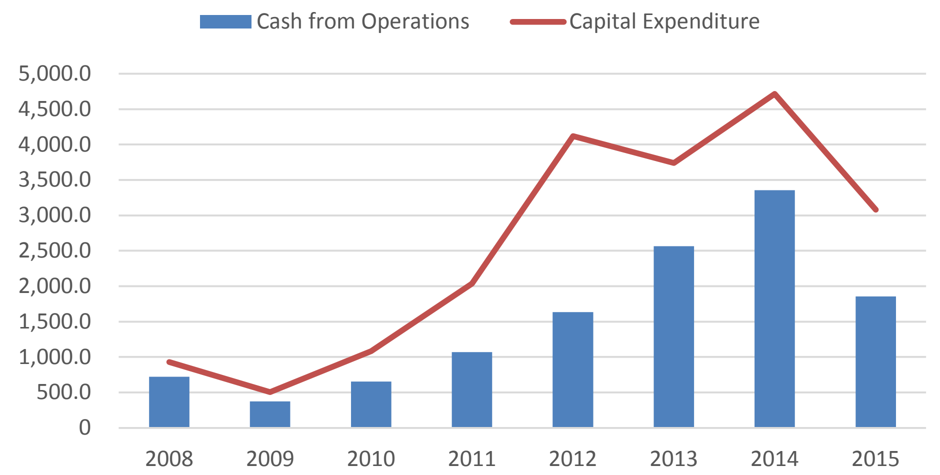
As of November 2012 CLR leases 1.1 million net acres, the largest holding, in the Bakken and Three Forks plays which continue to provide more than half CLR's Proven Reserves (Figure 6d.3).



Additionally, CLR holds substantial acreage in Oklahoma, the company's original producing state: the South Central Oklahoma Oil Province (SCOOP) play extends 120 miles across Garvin, Grady, Stephens, Carter, McClain and Love counties. As of December 31, 2014, the company controlled a leasehold position in SCOOP with approximately 806,800 gross (480,200 net) acres and owned 490 gross wells. The Red River units being developed along the Cedar Creek Anticline have also yielded strong returns. The newly developed Anadarko Woodford play of Oklahoma also provides a large source of production. CLR's diverse portfolio of oil opportunities creates a platform for continued crude oil production growth and concurrent growth in earnings per share.

Continental's aggressive capital program has far exceeded its cash from operations (Figure 6d.3). CLR's value proposition has always emphasized growth, and the company has not to date paid dividends.

Figure 6.d.3: Continental Cash Balance

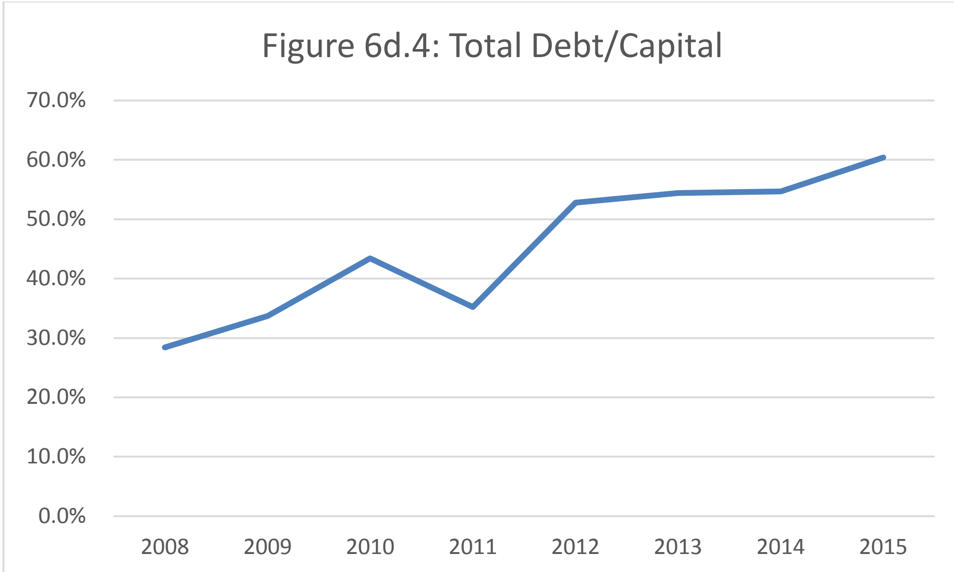


As a result, CLR has a high debt ratio (Figure 6d.4) in support of its aggressive capital program, but was upgraded by Standard and Poor's to investment grade BBB- in August 2013. CLR was later downgraded to BB+ as of February 2016, likely due to the mismatch between its aggressive strategy and the reality of low oil prices. The company has a higher beta than other high performing independents and a relatively high cost of capital but through 2013 produced correspondingly high returns for its shareholders.

CLR's debt to capital ratio has dramatically increased from 30% in 2008 to 60% in 2015. This rise in debt is not solely due to the oil price collapse as the debt first climbed in 2012 and continued to grow from there. The primary cause has been CLR's aggressive investment plans.

Continental Resources is taking measures to further improve its operations and reduce costs:

- CLR's strong acreage positions in the Bakken and in Oklahoma provide the company both a platform for future growth and the opportunity to capture economies of scale. CLR spearheaded the effort to transport Bakken oil to coastal refineries, utilizing a rail transport service.



- With the decline in oil prices, CLR has a focus on further reducing costs and improving drilling efficiencies and well productivity. CLR's capital budget was reduced by 35% to 3.0 billion and the company plans to reduce it 65% further to $0.9 Billion in 2016 to stay within cash flow from operations. The investments will be focused on the core areas of Bakken and SCOOP and will result in about a 10% production decline to 200 mboe per day. CLR also emphasizes a reduction in service costs, much of which has already been secured.
- For 2016, CLR plans to pursue a few key business strategies outlined in their 2015 annual report in order to offset industry challenges:
  - Optimizing cash flows through operating efficiencies and cost reductions.
  - High-grading investments based on rates of return and opportunities to convert undeveloped acreage to acreage held by production.
  - Working to balance capital spending with cash flows to minimize new borrowings and maintain ample liquidity.

Continental was slow to adapt its strategy to match the current low oil price environment and, like Apache, incurred an excessive debt burden which resulted in decay in shareholder value. However, the current austerity plan has been well received and TSR increased by 18% during the first quarter of 2016.

In our Continental Resources financial model, a production growth rate of 1.7% p.a. was required in order to match the Intrinsic Value to the end 2015 Enterprise Value of $15,605 million; 2.6% production growth supports the end 1Q16 EV of $18,331. Given CLR's strong land position and proven ability to grow rapidly, CLR appears to have considerable value upside if and when oil prices strengthen and it has reduced its debt burden.

e. Devon Energy

During the tight oil boom from 2008 to mid-2014, advances in technology followed price. Examples of the advances would be horizontal drilling and hydraulic fracturing, which led to the effect of extraordinarily high production and imbalances in supply and demand. The major events since 2013 led to an industry wide storm of lower prices affecting the independents each in a different manner.

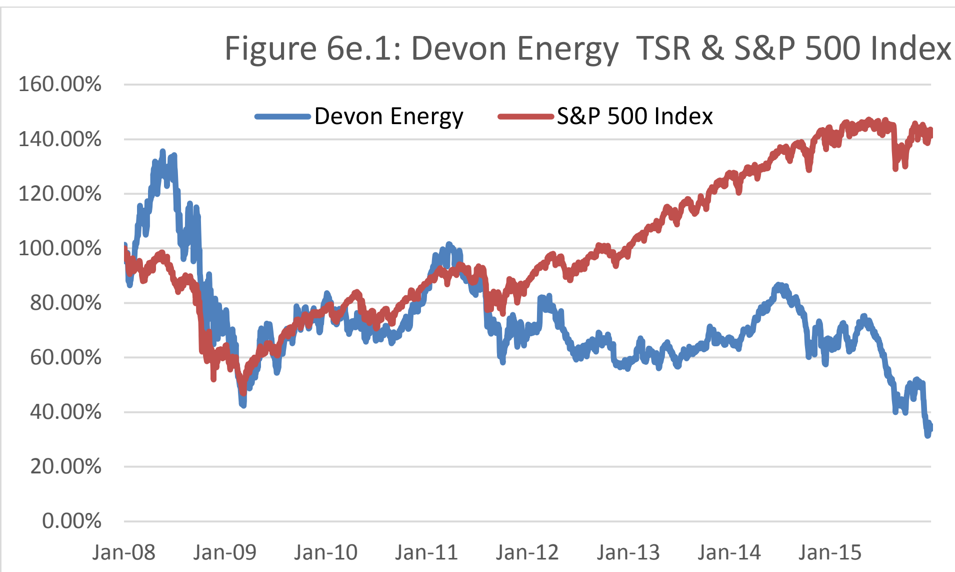
Devon Energy shares credit for the shale boom with Mitchell Energy, which it purchased in 2002 for $3.1 Billion, continuing a sequence of deals of an "acquire and exploit" strategy that started in 1992:

1971 Devon founded by John Nichols and his son, Larry.
1988 Devon becomes a public company, listing on the American Stock Exchange under the ticker symbol DVN.
1992 Acquisition of Hondo Oil and Gas for $122 million sets the stage for a series of major acquisitions in the years to come.
1996 Devon acquired Kerr-McGee's North American onshore oil and gas properties for $250 million, increasing the company's reserves by 46 percent.
1998 Devon acquired Northstar Energy for $750 million.
1999 the $2.6 billion acquisition of PennzEnergy establishes Devon as a significant offshore Gulf of Mexico operator. Employee count reaches 1,500 worldwide.
2000 Devon merges with Santa Fe Snyder in a $3.5 billion deal. Larry Nichols is named Chairman of the Board and Devon is added to S&P 500 Index.
2001 Acquisition of Anderson Exploration for $4.6 billion, positioning Devon as the third-largest independent gas producer in Canada.
2002 Devon acquires Mitchell Energy for $3.5 billion, adding the prolific Barnett Shale of North Texas to its portfolio. Devon is named to the Fortune 500.
2003 Devon's $5.3 billion merger with Ocean Energy creates the largest U.S.-based independent oil and gas producer.
2004 Devon transfers its common stock listing to the New York Stock Exchange (NYSE: DVN).
2006 Devon acquires Chief Oil and Gas Barnett Shale leasehold for $2.2 billion, expanding Devon's dominant position in North Texas.
2008 Devon announces plans to build a new 925-foot (282 m) tall, 1,900,000-square-foot (180,000 m^2) corporate tower in Downtown Oklahoma City.
2009 Devon executives announce plans to sell all of the company's international and Gulf of Mexico assets during 2010 to BP.

The 2009 transaction was the first of a series of divestitures as Devon sought to rationalize its portfolio and match it more closely to its capabilities. The resulting portfolio was reduced to North American natural gas and Canadian Oil Sands assets. As first natural gas prices then oil prices fell sharply, Devon found itself with a low value portfolio and in 2014 started a new series of acquisitions to increase its weighting to light crude oil produced from liquids rich shales (Table 6e.1), funded in part by divestment of non-core assets:

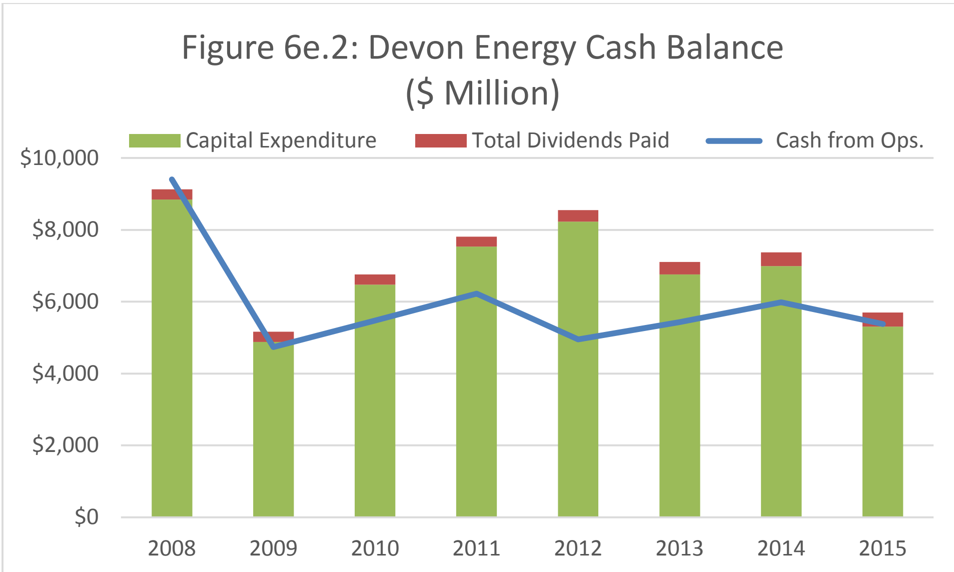
Table 6e.1: Devon Energy Transactions Since 2010

		Devon Energy Divestitures	
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**
Aug-29-2014	Non-Core US Properties	Linn Energy	$ 2,240
Apr-01-2014	Canadian Conventional Assets	CNRL	$ 2,832
Sep-27-2012	Interest in Permian Acreage	Sumitomo	$ 340
Apr-28-2012	Interest in 5 Shale Fields	Sinopec	$ 2,442
May-12-2011	Brazilian, Azeri and Gulf of Mexico Assets	BP	$ 6,500
Jun-30-2010	Kirby Oil Sands	BP	$ 500
Jun-18-2010	South China Sea Block	CNOOC	$ 515
Jun-09-2010	Gulf of Mexico Assets	Apache	$ 1,050
	Total Sales		**$ 16,419**
		Devon Energy Acquisitions after 2010	
Closing Date	**Assets**	**Seller**	**Consideration ($mm)**
Jan-07-2016	Anadarko Basin STACK 80,000 Net Acres	Felix Energy	$ 1,900
Dec-17-2015	253,000 Net Acres in Powder River Basin	Unknown	$ 1,339
Jun-30-2014	Cana-Woodford Shale Acreage	Cimarex Energy Co.	$ 249
Feb-28-2014	Eagle Ford Assets	GeoSouthern Energy Corporation	$ 6,000
	Total Purchases		**$ 9,487**

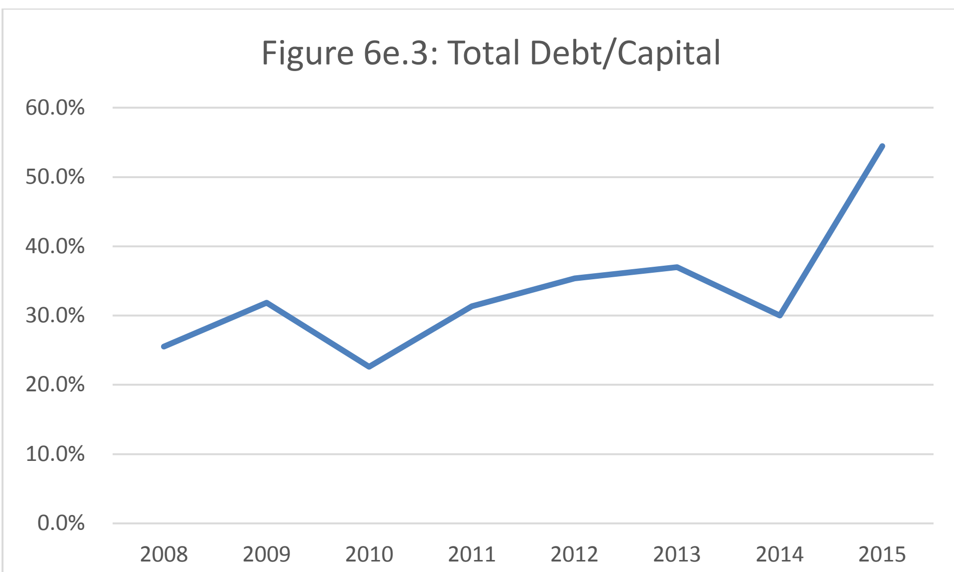


In 2014 Devon Energy underwent a transformation by repositioning the asset portfolio, which in turn delivered positive operational and financial results. The company divested its North American conventional oil and gas production, made a large Eagle Ford acquisition and later completed the anticipated IPO of its midstream assets as EnLink Midstream. During 2014, therefore, the resulting portfolio was focused on some of North America's top unconventional basins and provided an opportunity for the company deliver competitive, high-margin growth. Shareholder value improved, but then the collapse in oil prices undermined the turnaround (Figure 6e.1).

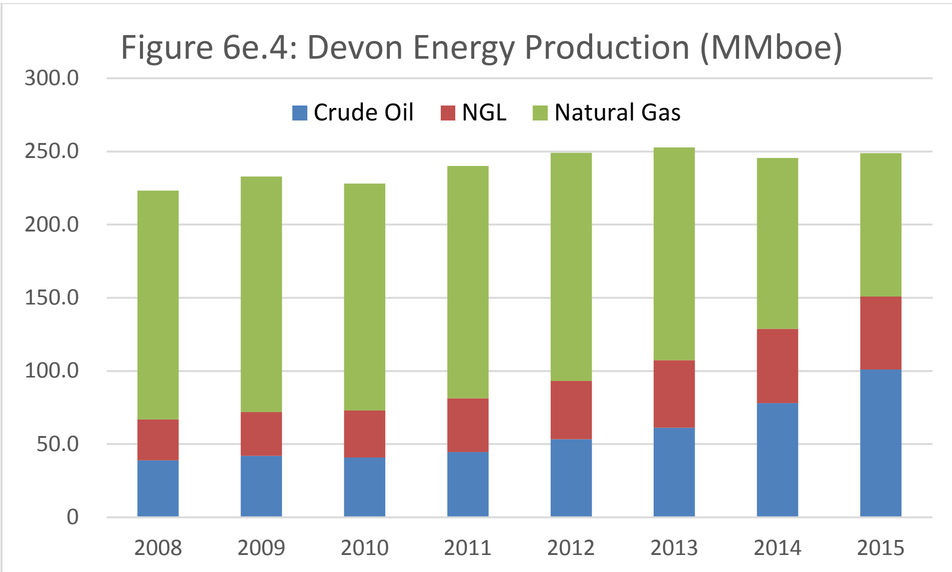
Like many of its rivals, Devon was unable to constrain its spending on capital investments and dividends within the available cash from operations through 2014. DVN came close to balance in 2015 (Figure 6e.2), but required more debt financing to fund its acquisitions.

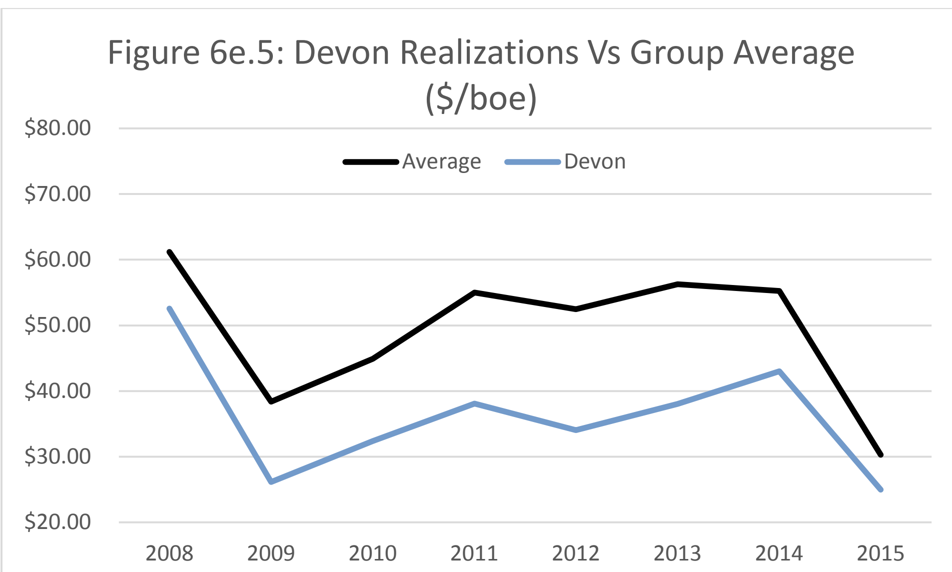


The resulting increased debt ratio (Figure 6e.3), is about average for the group studied and well below the levels reached by Apache and Continental.



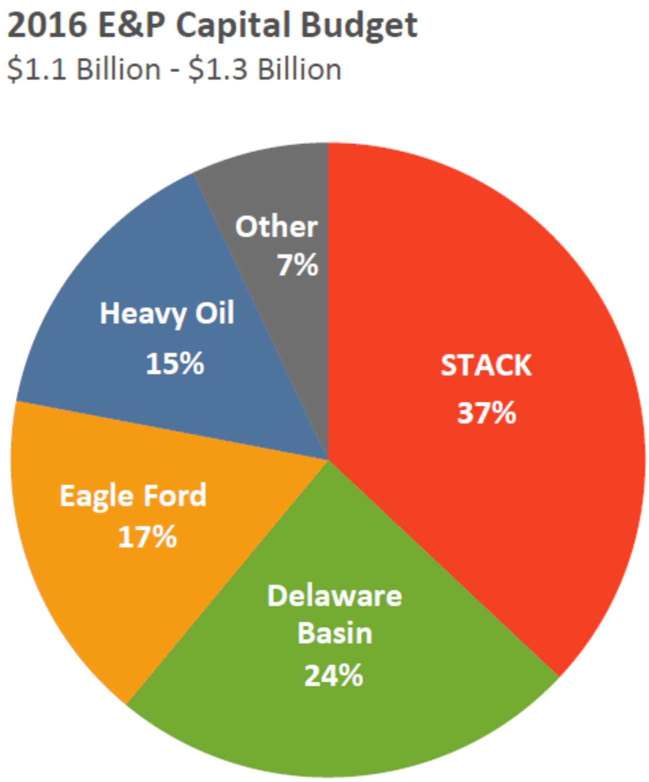
With the portfolio reshaping of 2014 and 2015, Devon divested its conventional assets and increased its holdings of tight oil and gas. Overall, however, its oil and gas production declined but its current portfolio is now less weighted to low value natural gas, and more to light crude oil, natural gas liquids and oil sands (Figure 6e.4), with average realizations moving from 65% of the group average in 2012 to 82% in 2015 (Figure 6e.5).





There remain structural disadvantages that leave Devon below average in EBITDA/ Total Assets and in Capex/ Total Assets. However, the company does have a solid platform for future growth, has reduced capex by 75%, reduced dividends and is working to improve operational performance. Its capital spending has been reduced from $5.3 Bn in 2015 to $1.1-1.3 Bn in 2016, focused on its top North American resource plays, The Delaware Basin in the Texas Permian, the Eagle Ford, the STACK play of the Oklahoma Woodford (Figure 6e.6) and Canadian oil sands.

Figure 6e.6: Devon Energy 2016 Capital Budget

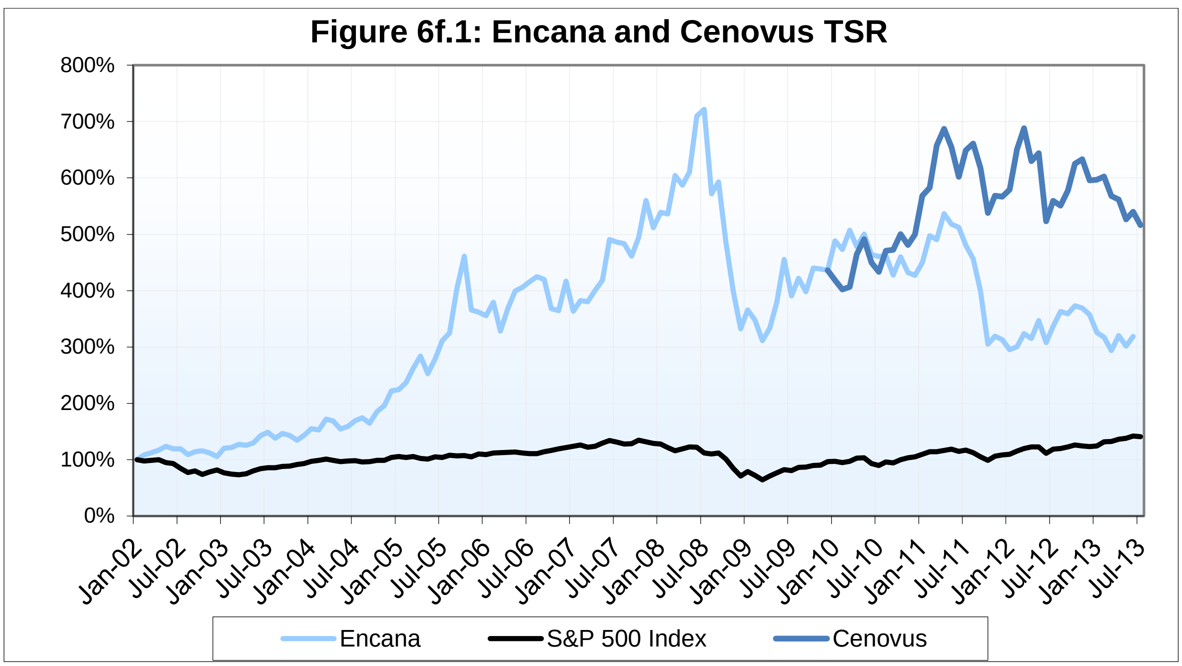


Our Devon financial model suggests that the end 2015 Enterprise Value was pricing in a continued decline in oil and gas production of 0.7% per year through 2020. This seems pessimistic and the value did appreciate by 5% during 1Q2015, suggesting a revised low expectation of 0.4% p.a. growth.

f. Encana

Encana was formed through the 2002 merger of PanCanadian Energy and Alberta Energy, both based in Calgary, Alberta. The combined company moved to further strengthen its North American natural gas position through acquisition of 500,000 acres in the Cutbank Ridge resource play in 2003 and its acquisition of Tom Brown, Inc. in 2004, extending its acreage in the Piceance Basin of Northwestern Colorado. Despite promising discoveries of oil in the North Sea, deep water Gulf of Mexico and offshore Brazil, the company decided to focus on development of North American unconventional oil and gas resources, based on its strong capabilities in unconventional natural gas resource development and the superior economic performance of its North American businesses. The company sold its North Sea assets to Nexen in 2004, its Gulf of Mexico deep water positions to Statoil in 2005 and South American assets to Andes Petroleum and Norsk Hydro in 2006 and then acquired a large position in the Haynesville natural gas shale play.

The refocused Encana emerged with a simplified portfolio of North American natural gas and Canadian Oil Sands. Then Encana formed a joint venture with ConocoPhillips to form an integrated oil sands value chain: Encana contributed and operate its Foster Creek and Christina Lake oil sands projects, while ConocoPhillips contributed, upgraded and operated its Wood River, IL and Borger, TX refineries. In November 2009, Encana may have taken a step too far and split its oil sands assets into a new company: Cenovus. From its inception through mid-2008, Encana provided superior returns to shareholders. After 2008, Encana underperformed its rivals, while Cenovus provided somewhat better returns to its shareholders (Figure 6f.1).



Perhaps distracted by the separation of Cenovus, Encana did not capitalize on the shale oil boom like other operators did; instead Encana focused heavily on gas production. As a result, Encana's shareholder value declined. There was a short-lived uptick in 2004, then value declined sharply in 2015 (Figure 6f.2). Encana belatedly started to increase its investments in oil rich shales and reduce spending on natural gas, but liquids production increased just as the oil price began to plummet (Figure 6f.3). In 2015, natural gas prices fell sharply, and Encana stopped drilling in the Haynesville play.

Figure 6f.2: Encana TSR & S&P 500 Index

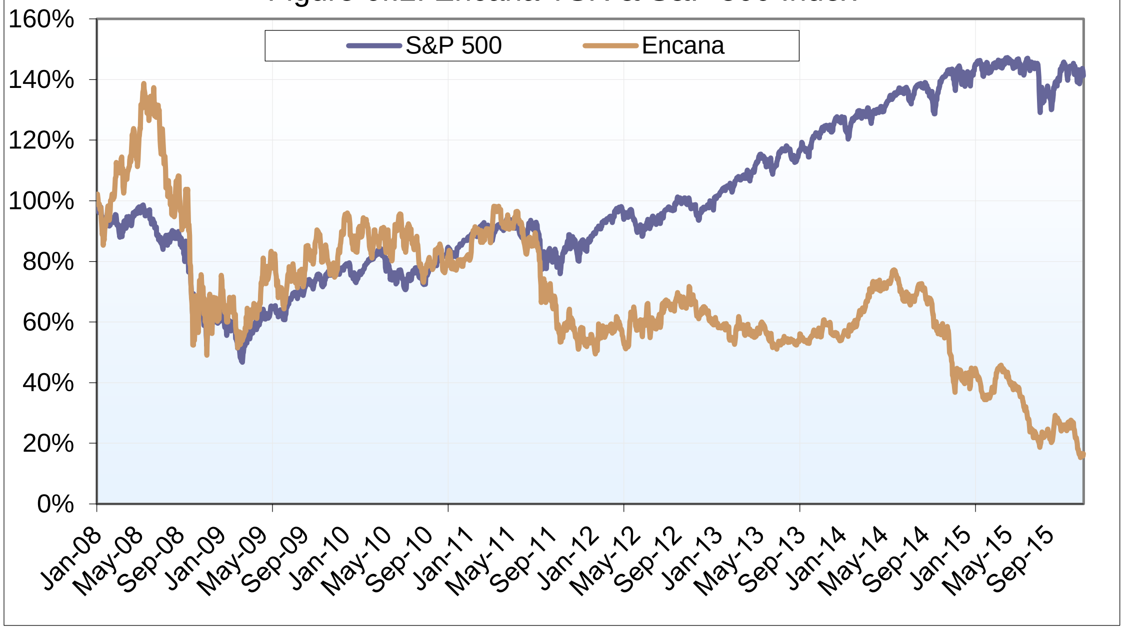
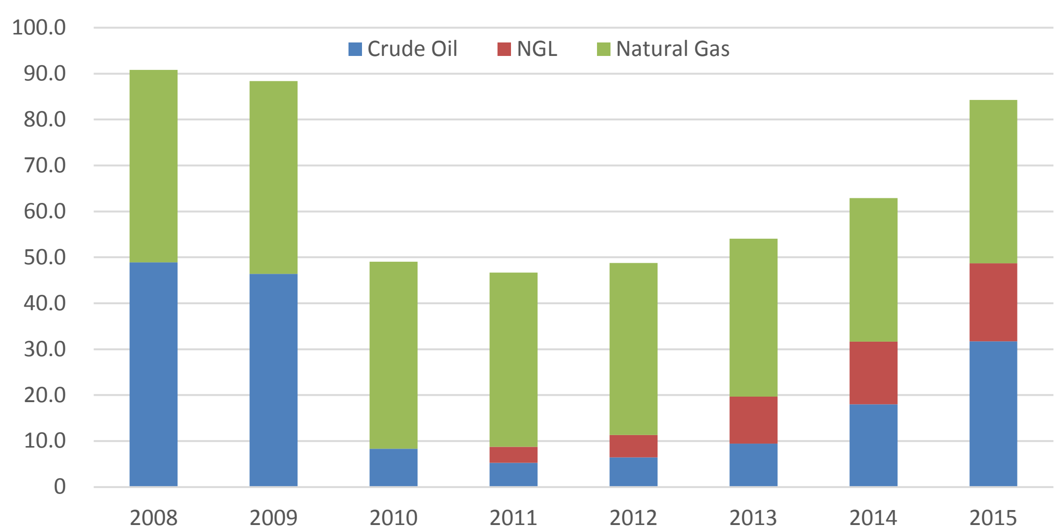


Figure 6f.3: Encana Oil & Gas Production (MMBoe)



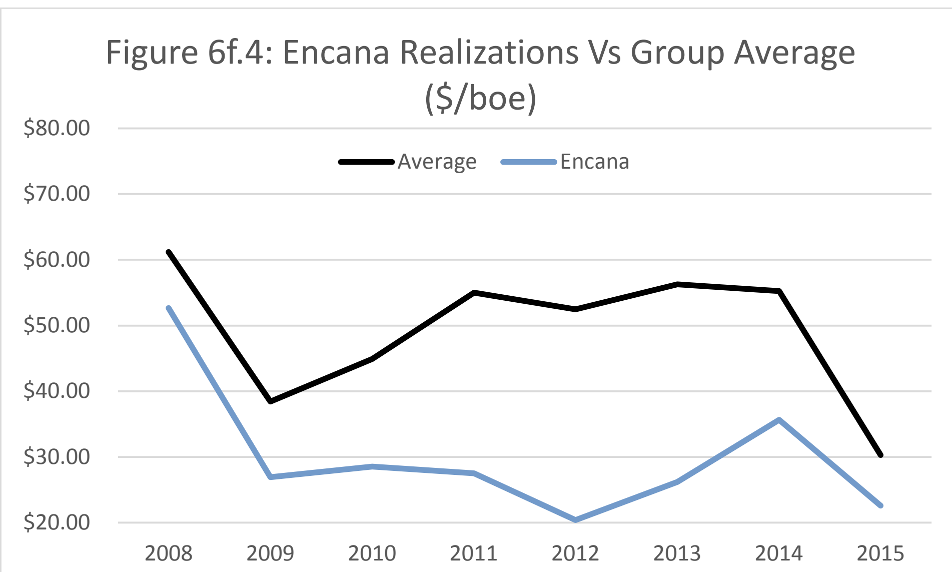
Since 2012, Encana has been attempting to rebalance its asset portfolio through transactions (Table 6f.1), selling natural gas assets in the U.S. and Canada and buying oil rich assets in the Permian and Eagle

Ford plays. This activity intensified following the appointment of former BP executive Doug Suttles as CEO in June 2013.

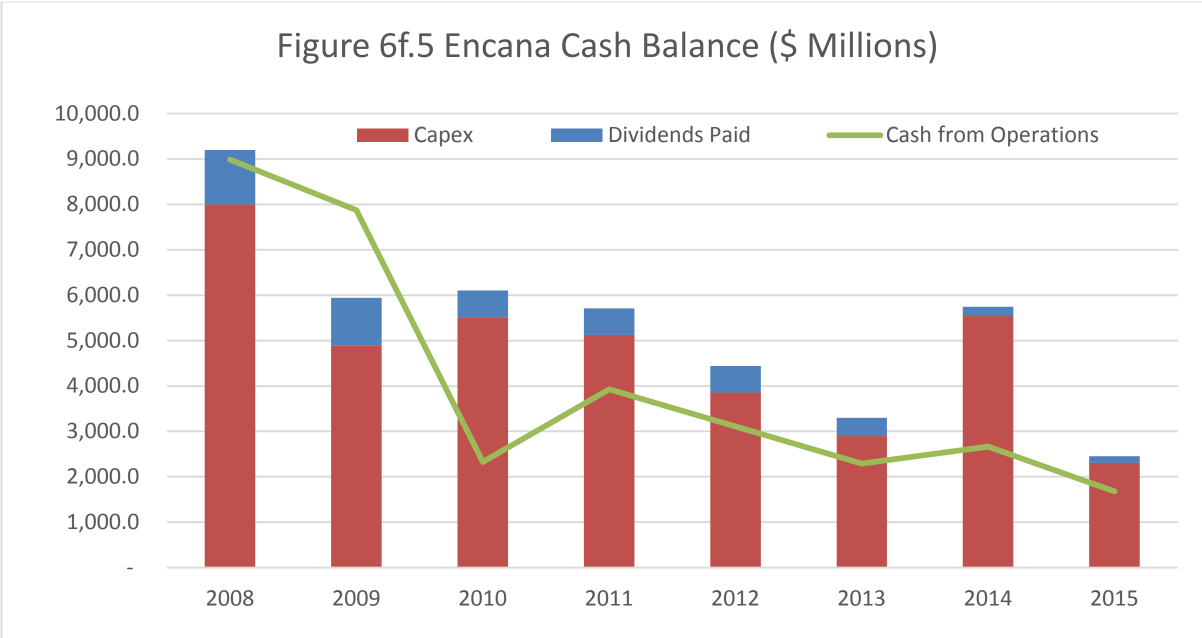
Table 6f.1: Encana transactions Since 2010

Closing Date	Assets	Buyer	Consideration ($mm)	
		Divestitures		
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**	
TBD	Denver Julesburg Basin Assets	Canada Pension Plan	$	900
Nov-12-2015	Haynesville Shale Assets	GeoSouthern	$	850
Jan-15-2015	Portion of Clearwater Business Unit Assets	Ember Resources	$	541
Sep-30-2014	Bighorn Assets In The Alberta Deep Basin	Jupiter Resources	$	1,866
Sep-30-2014	East Texas Properties	Hawkwood Energy	$	530
May-12-2014	Natural Gas Properties in Jonah Field	Private Equity	$	1,800
Feb-08-2013	Acreage in Horn River and Liard Basins	Chevron	$	550
Dec-31-2012	Undeveloped Duvernay Land Holdings	Petrochina	$	2,214
Feb-24-2012	Cutbank Ridge Partnership	Mitsubishi Corporation	$	1,453
	Total Sales		**$**	**10,704**
		Acquisitions		
Closing Date	**Assets**	**Seller**	**Consideration ($mm)**	
Dec-12-2014	Permian Assets	Athlon Holdings	$	1,277
Nov-12-2014	Permian Assets	Athlon Energy	$	6,980
Jun-20-2014	Eagle Ford Acreage	Freeport McMoRan	$	3,100
	Total Purchases		**$**	**11,357**

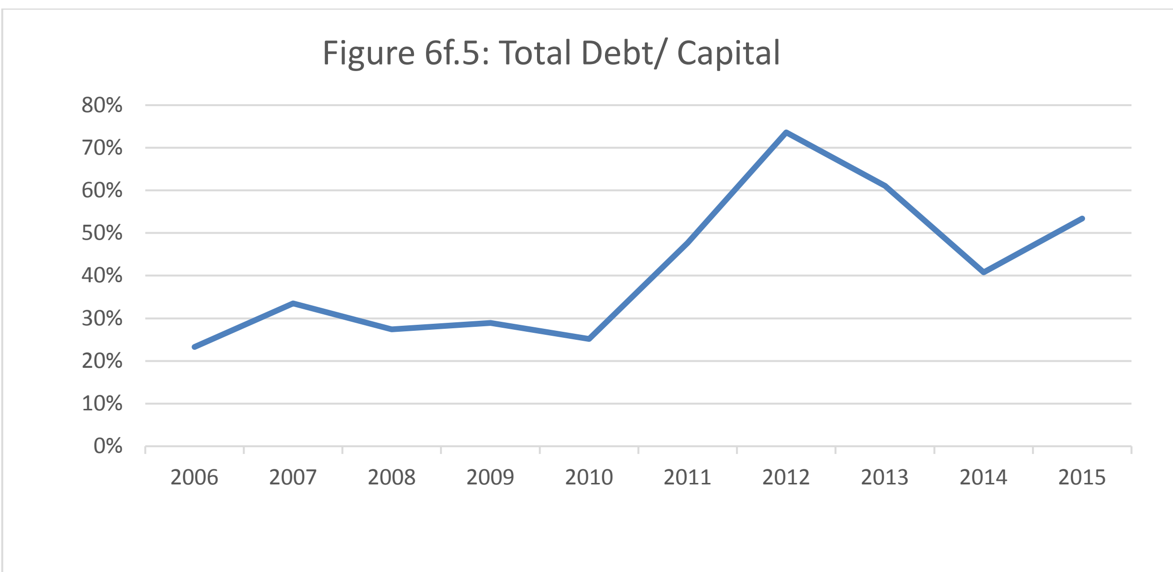
As a result of these transactions and resulting increase in proportion of liquids, Encana's realizations relative the group of companies studied have improved from 35% of the group average to 75% (Figure 6f.4).



Encana capital spending far exceeded its cash from operations in 2014 and the company was obliged to substantially curtail spending in 2015 (Figure 6f.5), with 2016 capital spending guidance at $900 million-$1.0 Billion concentrating on four core assets: the Montney and Duvernay plays in Canada, and the Permian and Eagle Ford in the USA.



Despite funding its acquisitions through divestitures, continuing erosion in its book value has resulted in a debt ratio above the group average (Figure 6f.6). The only good thing in regards to Encana's highly leveraged position is that none of their long term debt is due before 2019.



As a result of falling oil and gas prices, along with poor strategic management, Encana's share price today is a little over $3.00 per share; its share price was slightly over $18.00 per share on December 31st, 2013. With respect to the drivers of 2013-15 shareholder value, Encana performance is close to the group mean in organic reinvestment in the business measured as Capex/ Total Assets and slightly below the mean in EBITDA/ Total Assets. What makes Encana distinctive is its lowest in the group (22%)

proportion of oil in its production and consequently lowest realizations per boe, and its high debt ratio with Total Long Term liabilities / Total Assets above 50%.

Encana's immediate response to the fall of oil prices has been to cut its labor force, sell off assets, and to cut capital expenditures. Encana issued a statement in December of 2015 that elaborates on how they plan to modify their business strategies for the 2016 production year:

- cut capital expenditures by 25% and reduce drilling and completion costs by 10%-15%;
- focus on its four core plays: Permian Basin, Eagle Ford, Montney, and Duvernay. Encana believes that focusing on these specific plays will provide them with reliable and consistent returns, and will help them increase their operational efficiency due to their liquid richness, competitive supply costs, scale, and access to markets;
- utilize a more flexible capital program that will allow them to scale up or down quickly based on market conditions;
- increase operating margins by 10%. In a period of high prices, maximum efficiency can sometimes get lost as the total revenue generated is so high, but in periods of low prices it is necessary to focus more intensely on gross margin.

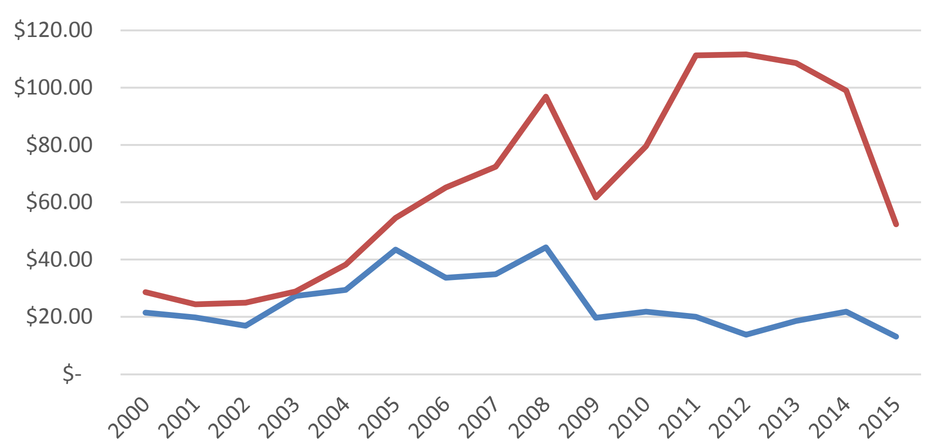
According to our Encana financial model, end 2015 Enterprise Value appeared to have priced in a continued **decline** in production of 4.5% per annum through 2021. If Encana can remain solvent long enough to show even flat production, our financial model shows a potential increase in Intrinsic Value of as much as 70%. However, a history of lamentable performance since the spin-off of Cenovus casts a deep shadow over CEO Suttles' sensible strategies.

g. EOG Resources

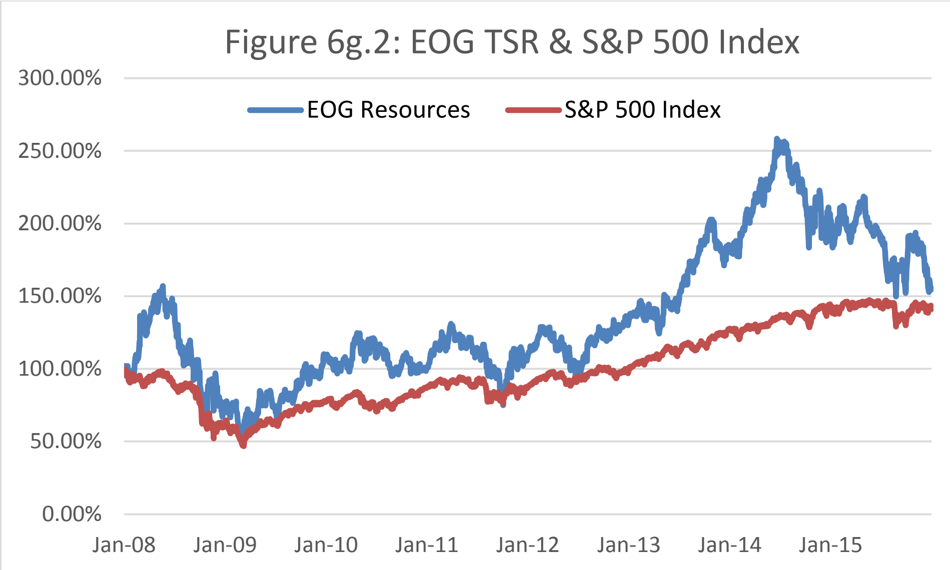
EOG Resources, Inc. is one of the largest independent, non-integrated, natural gas and crude oil companies in the United States. It has production in the United States, Southeast Alberta, Trinidad, the Southern Gas Basin of the United Kingdom and China. About 94 percent of the reserves are located in the United States.

Towards the end of the first decade of the new century, EOG CEO Mark Papa recognized that upstream independents, driven by investors and a desire to grow faster than rivals, were overinvesting in natural gas shales and this would inevitably lead to a sharp reduction in natural gas prices (Figure 6g.1). He initiated a pivot from natural gas shale development to oil shale development starting with a "stealth" acquisition of acreage thought to contain liquids rich hydrocarbons. Before most rivals had come to similar conclusions, EOG had amassed a large portfolio of prospective acreage in the three major oil shales basins: Permian, Bakken and Eagle Ford. The full strategy was revealed in the early 2010s and investors gradually came to understand the significance of the strategy.

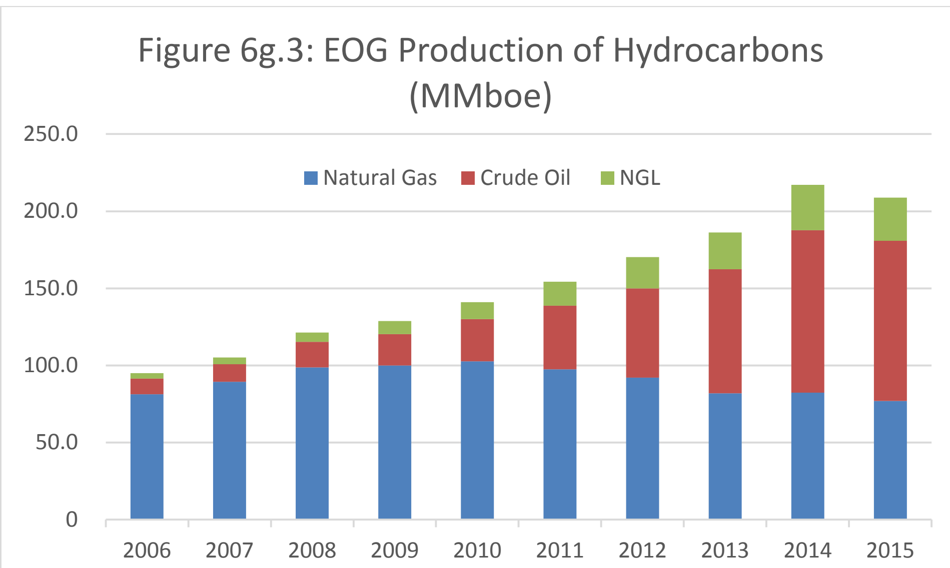
Figure 6.g.1:
Spot Crude Oil and Natural Gas Prices ($/Boe)



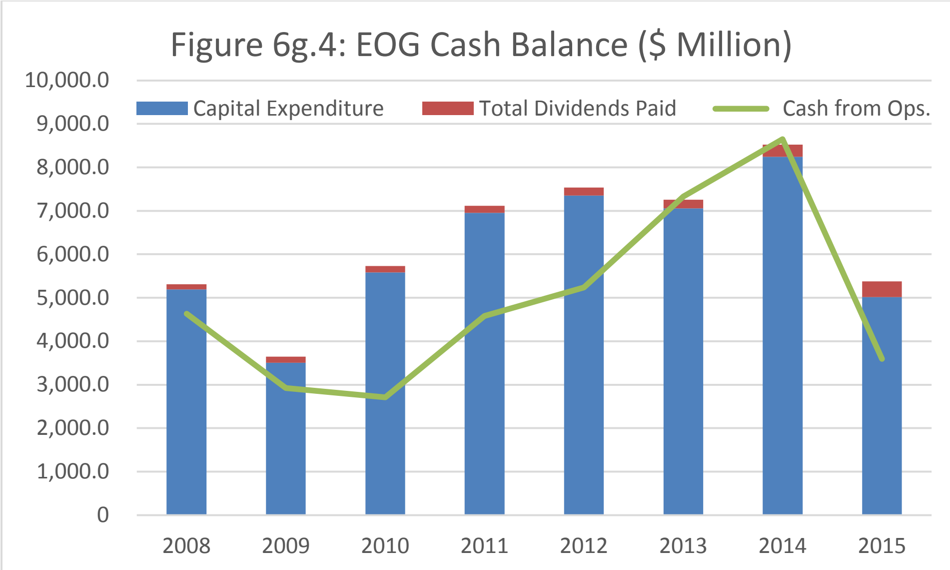
As a result of this strategic metamorphosis, EOG shareholder value soared through 2014 (Figure 6g.2). The risk of this move should not be underestimated. Though production of small methane molecules from shales had been de-risked following a decade of experimentation with horizontal drilling with ever longer laterals and multiple stages of hydraulic fracturing, it was not at the outset clear that large crude oil molecules could be made to flow through dense rock using these technologies. In the event, the technologies worked so well that the resulting production growth turned around decades of decline in U.S. oil production and went on to destabilize the global oil market. Moreover, EOG blazed the trail to refine the technologies and increase well productivity and lower the costs of drilling and fracturing to the extent that oil from shales became one of the lowest cost sources of incremental oil production.



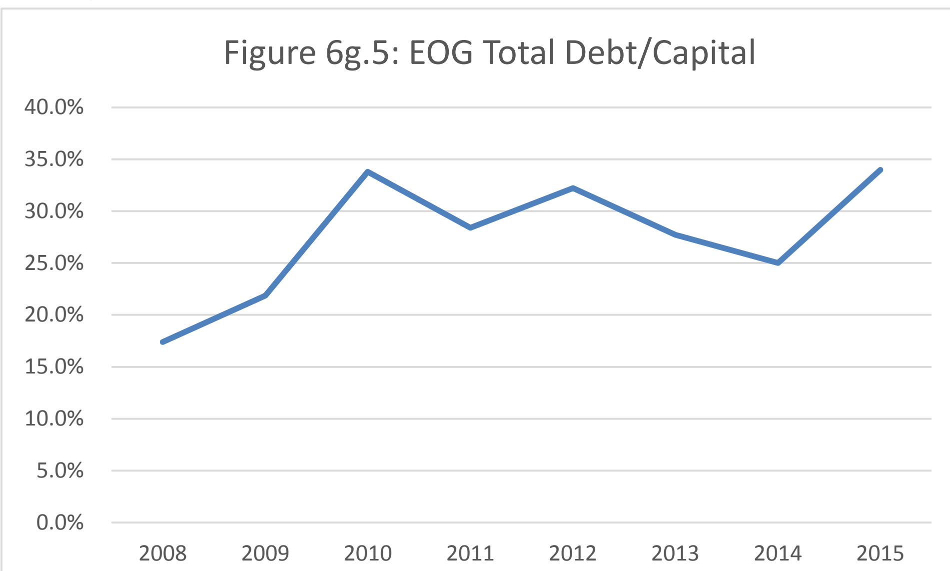
In 2006, 80% of EOG revenues came from production and sales of natural gas; by 2012, 60% of production and 90% of EOG revenues came from sales of crude oil and NGLs (Figure 6g.3).



As it was making the switch from natural gas to oil production from 2008-12, EOG was aggressive in its capital spending relative to its cash from operations (Figure 6g.4). The company was close to balanced between cash from operations and its deployment into capital spending and dividends paid. Then the oil price collapsed and capital spending was reduced, but not rapidly enough to avoid a shortfall relative to cash from operations.



EOG is all about profitable organic growth and rarely makes acquisitions or divestitures. Since 2010, EOG made one significant transaction in 2013, to sell properties in British Columbia to Chevron, which was at that time forming a joint venture with Apache to export Canadian gas through the Kitimat LNG project (Chevron has since bought Apache's interest). With strong capital discipline and few acquisitions, EOG maintains a conservative balance sheet with a low debt ratio (Figure 6g.5).



EOG has been innovative in lowering drilling and completion costs within its superior holdings of major oil resource plays: Permian, Eagle Ford, Bakken, DJ Basin and Powder River, where it has identified 3,000 premium locations that will deliver good returns on capital at a $50/B oil price. However, EOG has chosen to cut capex in half for 2016 while oil prices remain low, deferring investment into a hopefully more attractive price environment.

The strategic value creation lessons from EOG are:

- EOG operates under a stable business model acquiring prospective acreage, establishing its resource potential and efficiently drilling and fracturing wells to grow reserves and production.
- EOG has a widely admired engineering capability that has a deep understanding of the fields that are under development and prioritizes the prospective well sites to drill the best wells first and a performance management system that results in low cost development of their acreage.
- EOG maintains a conservative financial structure to maintain strategic flexibility through the price cycle.

Through this disciplined approach, EOG TSR showed the second best performance in the group in 2008-13 and in 2013-15 by delivering success on the primary drivers of TSR: high EBITDA/ Total Assets returns and high reinvestment in organic growth measured as Capex/ Total Assets.

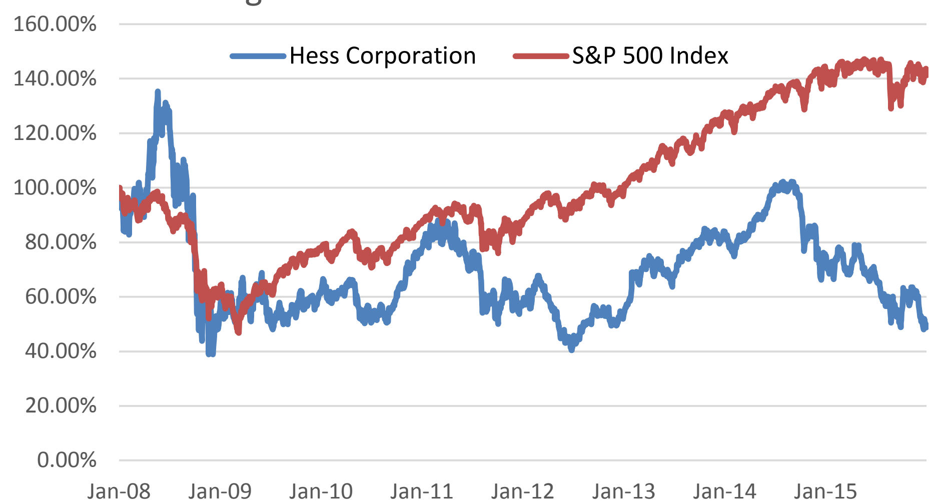
Our EOG financial model suggests that the end 2015 Enterprise Value is consistent with a 5.0% per year growth in oil and gas production from 2015-21, similar to the 5.9% p.a. delivered in 2013-15.

h. Hess Corporation

Hess Corporation was founded in 1933 by Leon Hess to deliver heating oil in Ashbury, NJ. Hess expanded the delivery business, purchased a terminal in in 1938, built a refinery in Port Reading, NJ in 1957 and built a large scale refinery in St. Croix, the U.S. Virgin Islands in 1967. He merged with an upstream company, Amerada in 1969 to become Amerada Hess. The company established significant positions in the Gulf of Mexico and the UK North Sea. Leon's son John Hess joined the company in 1977 and took over as CEO in 1995. He formed a joint venture with PDVSA, HOVENSA, to reduce Hess exposure to refining and acquired Triton to expand its upstream business into Equatorial Guinea and the Malaysia/Thailand Joint Development Area.

The company was renamed Hess Corporation in 2006 and further expanded its footprint with exploration ventures in Ghana, Egypt and Australia. In 2009, Greg Hill was appointed head of the Hess upstream business and shifted focus from exploration to exploitation of domestic shale plays.

Figure 6h.1: Hess TSR & S&P 500 Index



Shareholder value started to decline in 2011 as investors reacted negatively to the diffuse, unfocused Hess asset portfolio. Marathon and ConocoPhillips had both simplified their portfolios by spinning off their downstream businesses in July, 2011. In early 2012, Elliot Management announced that they had purchased shares in Hess and owned approximately 4% of the equity. They proposed a proxy effort to replace members of Hess' board of directors, exit downstream, and split the upstream into separate US and International companies. In January 2012, Hess announced the closure of St. Croix and in 2013 of the Port Reading refinery.

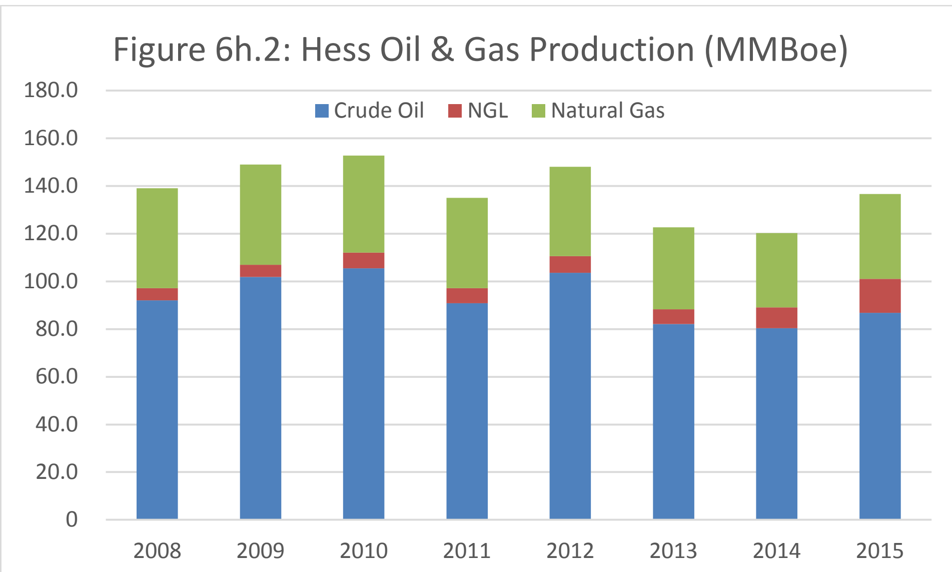
In May 2013, Hess and Elliott Management settled their dispute and Hess accelerated execution its plan to rationalize its portfolio (Table 6h.1).

Table 6h.1: Hess Portfolio Rationalization Transactions after 2010

	Divestitures		
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**
Apr-30-2014	Assets in Thailand	PTTEP	$ 805
May-28-2014	Assets in Thailand	PTTEP	$ 1,007
Jun-30-2014	Dry Utica Shale assets	American Energy	$ 1,075
Jan-10-2014	Hess (Indonesia-Pangkah) Limited	Saka Indonesia Pangkah B.V.	$ 565
Jan-10-2014	Pangkah Project & Natuna Sea A Project	Pertamina	$ 1,300
Apr-26-2013	ZAO Samara-Nafta	Lukoil	$ 2,050
May-31-2013	Assets In Eagle Ford	Sanchez Energy	$ 280
Jan-31-2013	12 N. Sea Fields	Shell	$ 525
Sep-28-2012	Schiehallion Field and Related Pipeline	Shell	$ 503
	Total Sales		**$ 8,111**
	Acquisitions		
Closing Date	**Assets**	**Seller**	**Consideration ($mm)**
Dec-29-2010	167,000 acres in Bakken	TRZ Energy	$ 1,075
Sep-30-2010	Valhall and Hod Fields	Total Norway	$ 507
	Total Purchases		**$ 1,582**

Hess also sold its Energy Trading business, its retail gasoline business and its midstream terminal assets to reposition itself as a pure play independent E&P company.

Hess divestitures resulted in lower oil production in 2013followed by stabilization in 2014 and growth in 2015 as organic growth compensated for sales of producing assets (Figure 6h2).



Hess still has a broad international portfolio of upstream assets, including unconventional production in the Bakken and Utica plays, a strong position in the deep water Gulf of Mexico, and cash generating production in Equatorial Guinea, the North Sea and in the Joint Development Area of Malaysia/ Thailand.

Buoyed by receipts from divestitures, Hess was able to maintain capital spending programs into 2015 (Figure 63.3) while maintaining a relatively healthy debt ratio (Figure 6h.4).

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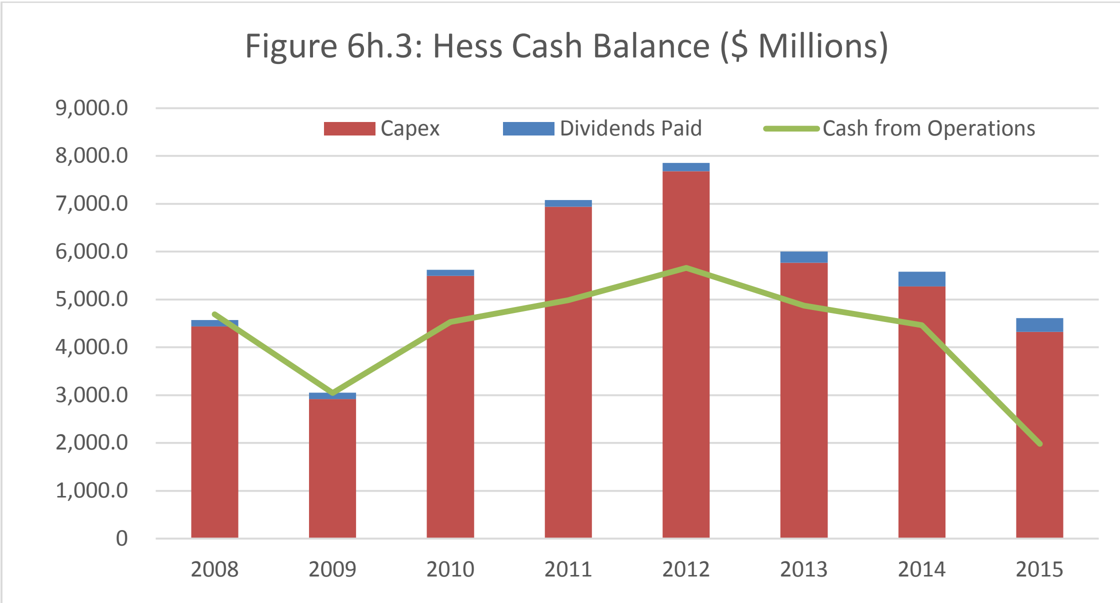
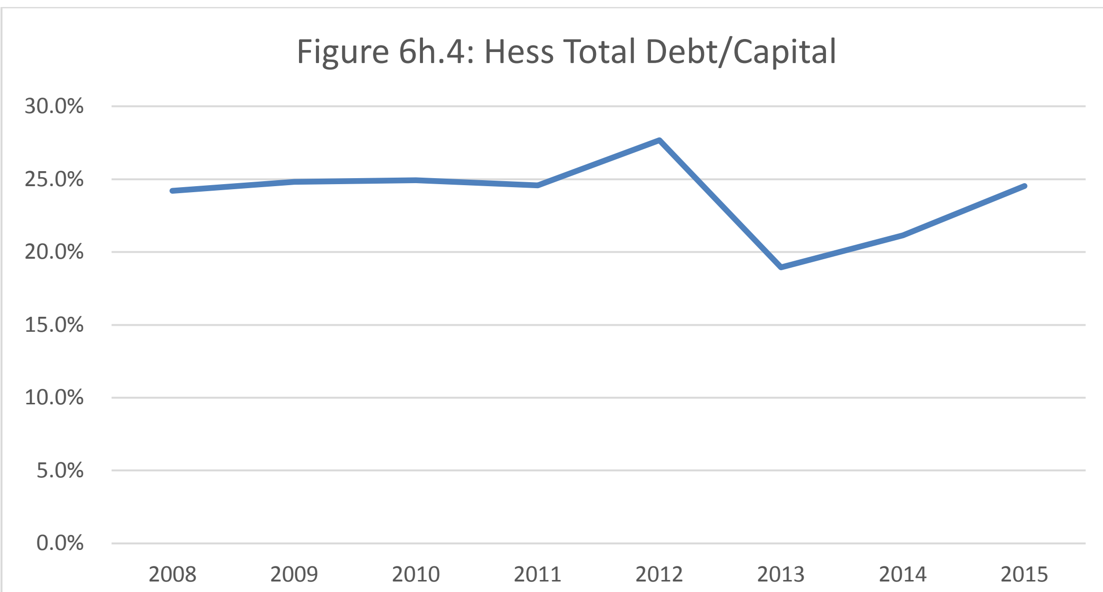


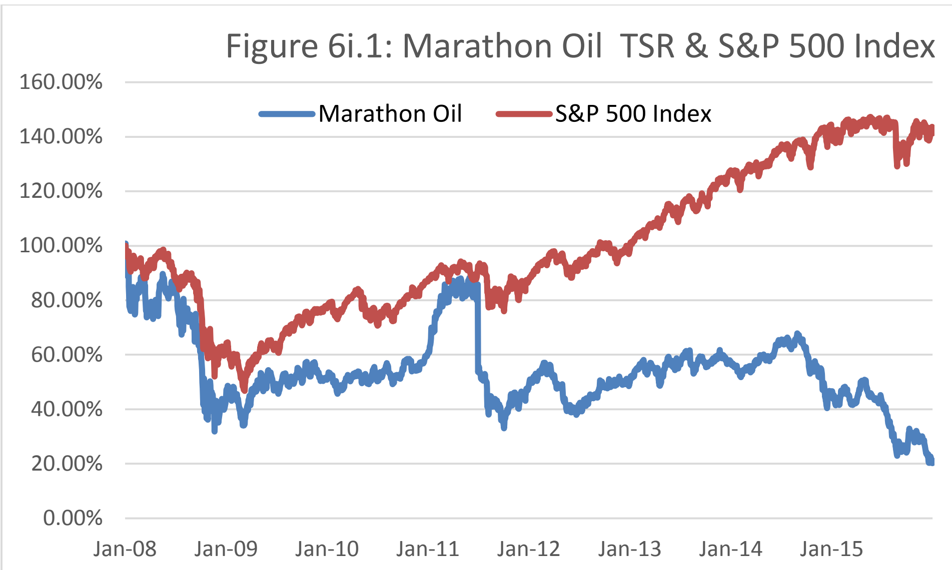


Hess has reduced its capital spending in 2016 by 40% to $2.4 Billion in response to very low oil prices in 1Q16 in order to preserve its strong balance sheet. The company has committed to preserve its core operating capabilities and long term growth options in its areas of competitive advantage and through focused deep water exploration around the Atlantic Margin, specifically in offshore Ghana, Guyana and Nova Scotia.

According to our Hess financial model, the market at the end of 2015 appeared to have priced in an ongoing production growth rate of 1.9% p.a. through 2011. Given the company's strong balance sheet, it seems well placed to provide positive surprises to deliver higher growth through organic investments and value creating acquisitions.

6i: Marathon Oil Company

Marathon was one of the first of the smaller integrated companies to spin-off their downstream business, with the split effective July 1, 2011. They then made a $3.5 billion investment in the Eagle Ford play in South Texas to add to their existing shale positions in Oklahoma and North Dakota. The next three years would see a narrowing of focus to primarily North American shale plays. Investors responded positively to the split of upstream from Downstream but not to the Eagle Ford acquisition ((Figure 6i.1). Shareholder returns have been among the weakest of the companies studied.



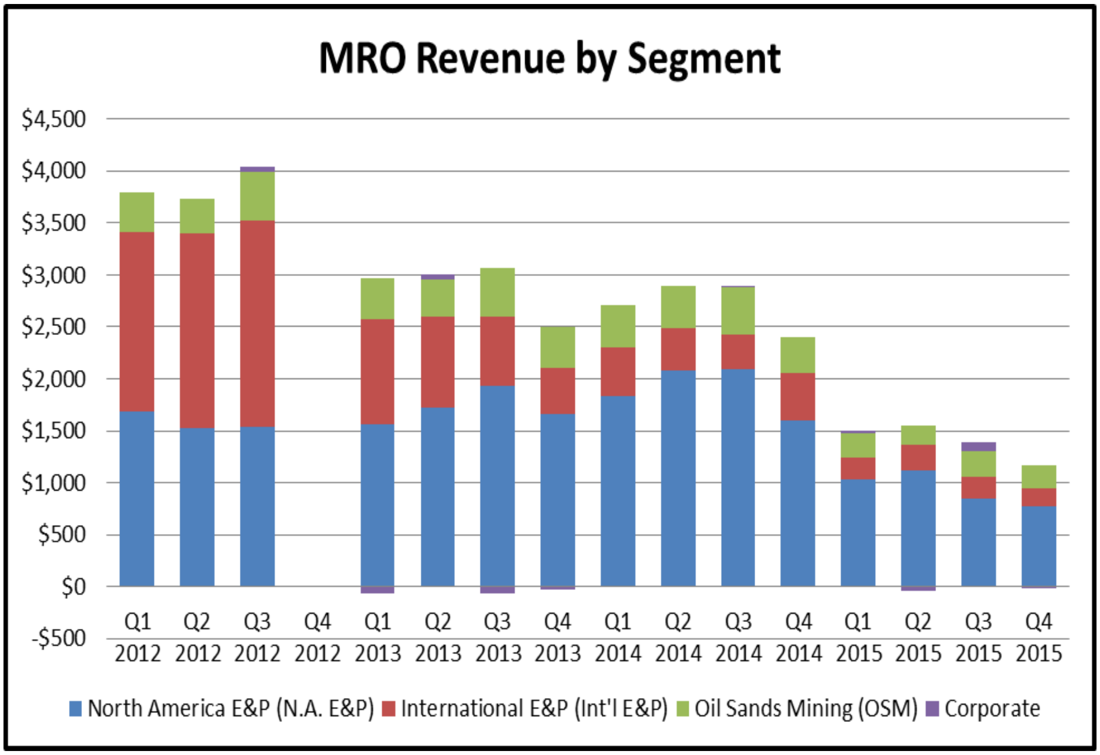
In 2013 Lee Tillman was elected as CEO to replace Clarence Cazalot, who had been leading the company for 14 years. There was a large turnover in both the executives and board members around this time period. The period since has been marked by many divestitures of legacy assets including positions in Norway, Angola, Gulf of Mexico, and East Texas (Table 6i.1). Figure 4 illustrates the shift in asset focus to mainly onshore U.S. shale plays. The proceeds would assist in further establishing shale positions and funding an ill-timed share buyback program near the peak of its value in 2013 and 2014.

Table 6i.1: Marathon Portfolio Rationalization Transactions after 2010

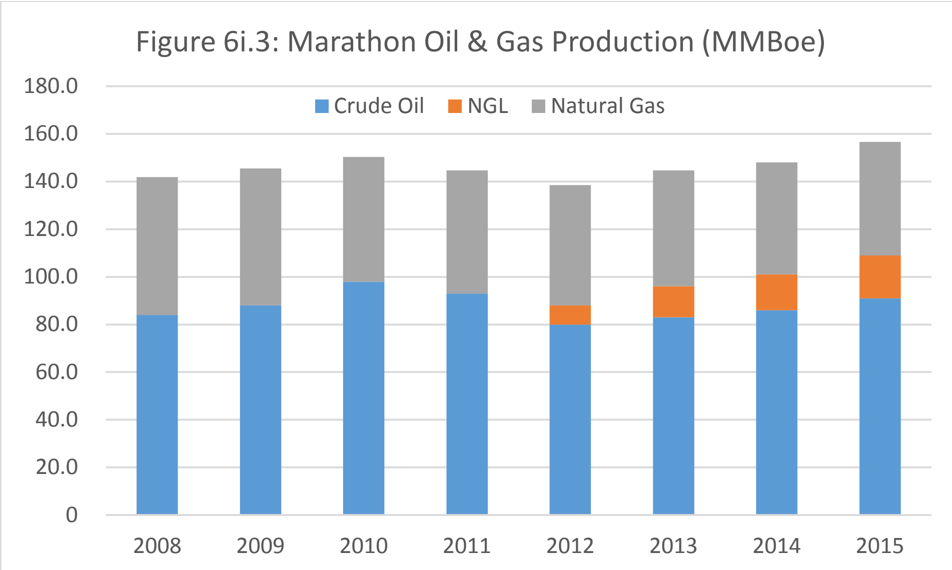
Divestitures				
Closing Date	**Assets**	**Buyer**		**Consideration ($mm)**
TBD	Wyoming Assets	Merit Energy Company		870.0
TBD	Deepwater GoM Assets	Unknown		205.0
Oct-15-2014	Marathon Norway	DETNOR		2,100.0
Mar-31-2014	Angola Block 32	Sonangol EP		590.0
Feb-28-2014	Angola Block 31	Sinopec		1,520.0
Apr-30-2011	Niobrara Acreage	Marubeni		270
	Total Sales		**$**	**5,555**
Acquisitions				
Closing Date	**Assets**	**Seller**		**Consideration ($mm)**
Nov-01-2012	Eagle Ford Acreage	Hilcorp	$	232
Nov-01-2011	Eagle Ford Acreage	Hilcorp Resources Holding		3,500.0
	Total Purchases		**$**	**3,732**

As a result of these transactions, Marathon has now focused mainly on its shale plays in the Bakken, Oklahoma and Eagle Ford, supported by cash generation from Equatorial Guinea.

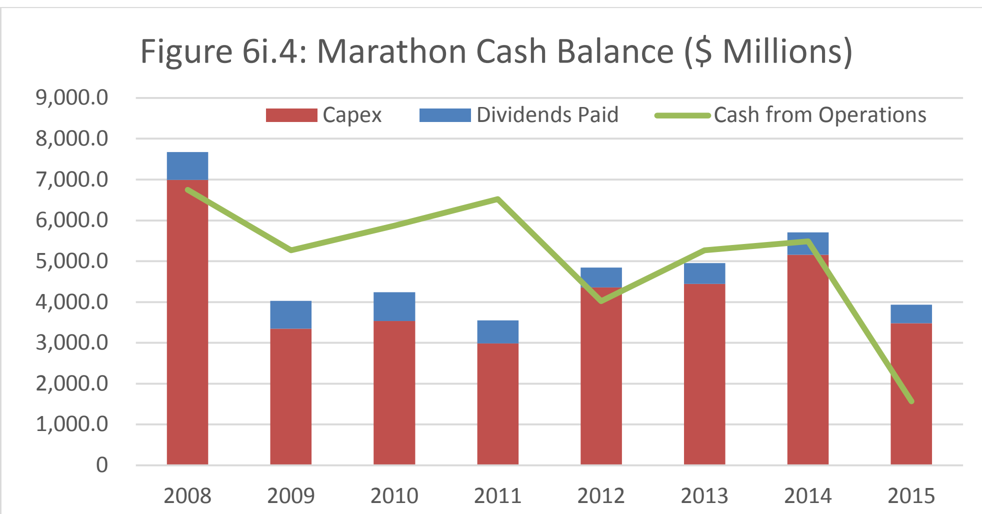
Figure 6i.2: Marathon Shrinking International Exposure



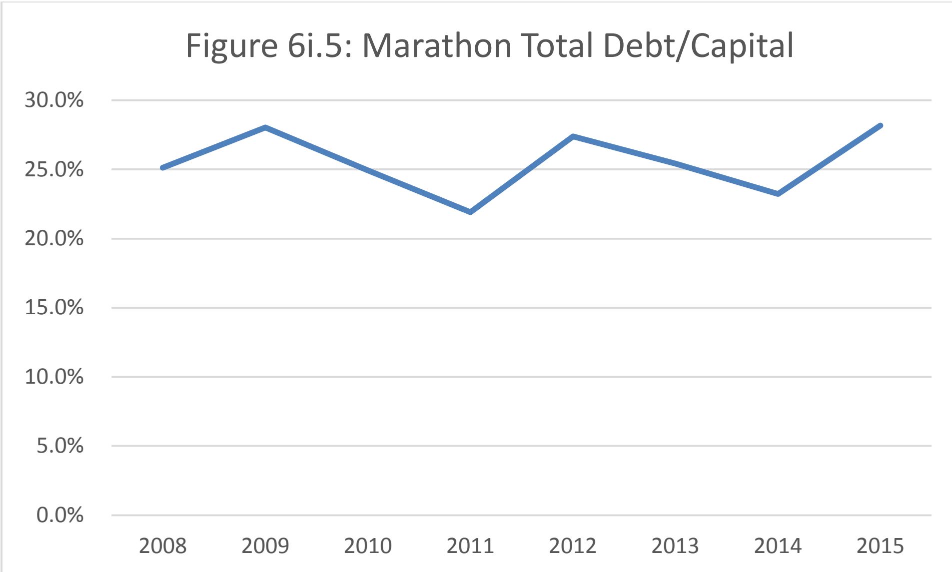
Marathon is weighted towards oil versus gas (Figure 6i.3), with oil revenue accounting for nearly 93% of O&G revenue in 2014. The price of oil has declined much further relative to gas and this factor is likely weighing heavily on Marathon's stock price. Marathon's decision to divest much of its legacy conventional production in favor of resource plays has resulted in the need to maintain a costly drilling program even during poor price conditions to maintain their production rates. (Marathon Oil, 2016)



Marathon spending on capital projects was broadly within its operating cash flow until 2015, when falling oil prices decimated cash flow



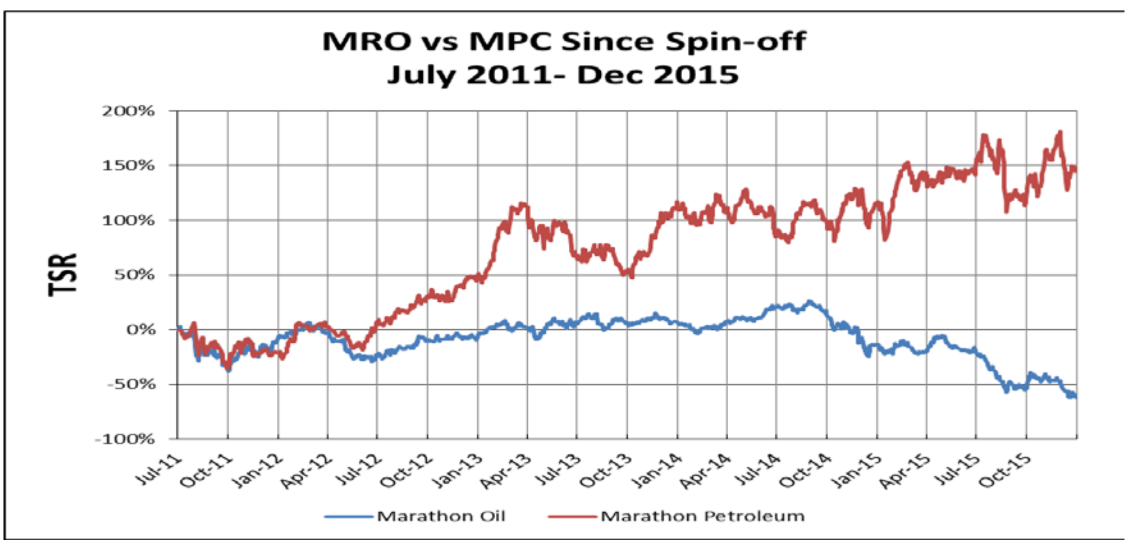
Marathon has a Debt/Capital ratio that has remained at approximately 25%, with substantial debt issues in 2012 to fund its Eagle Ford purchases and in 2015 to cover its cash flow deficit. The company's credit rating was recently decreased by Standard and Poor's to BBB-, which will increase their borrowing rate should they choose to increase debt in the near future. (USA Today, 2016)



Efforts have been made recently to reduce costs significantly. Staff was reduced by over 500 during 2015 and the dividend was cut 76% in Q4 2015. Operational cost savings have been largely successful with Q4 2015 production expenses down 30% year ago quarter, while growing production 6%. (Marathon Oil, 2016)

In recent presentations, Marathon has featured increasing productivity of wells drilled in its STACK and SCOOP plays in Oklahoma as well as continuing improvements in Bakken and Eagle Ford. Time will tell how the strategic changes at Marathon will turn out, but so far they are lagging the pack in their peer group and are being drastically outperformed by their former downstream counterpart (Figure 6i.6). Heavy weighting towards oil could position them for a significant recovery should oil prices experience a modest or greater strengthening.

Figure 6i.6: Marathon Oil Underperformance Vs. Marathon Petroleum



Insight from Financial Model and 2015 Annual Report

The drivers with the most explanatory power for the years 2014-2015 are quite different from those of the high oil price environment of the previous five years. Volatility is now inversely correlated with TSR, in contrast to the positive correlation seen in the segment pre 2014 Returns on assets, as opposed to growth, are now the key driver in the current oil price climate. Marathon has the second lowest EBITDA/Total Assets ratio during the last two years, which corresponds very well to their second to last TSR performance. Further, the company was reinvesting less (capex/ total assets) than its rivals, implying scarcity of profitable opportunities. Marathon Oil management has taken note, perhaps slower than their peers, of the importance of earnings and balance sheet protection over growth. They have greatly reduced the 2016 capital program to $1.4B, which is 75% lower than 2014. Asset sales up to $1B are targeted, with $300MM already achieved, to focus efforts on the core assets and ensure liquidity without increasing debt (Marathon Oil, 2016). Further efforts to increase liquidity include a public offering of common stock in February, 2016 which raised over $1B. With these significant changes firming up the financial foundation of the company, it seems Marathon Oil will have the opportunity to focus on their goal of becoming “the premier, independent exploration and production company” (Marathon Oil, 2016). Considering their performance since becoming an independent E&P in 2011, they have quite a task in front of them.

There are several challenges in modeling the intrinsic value of Marathon Oil. Financial data pre 2011 is associated with an integrated oil and gas company with many international assets. Since then there has been a significant strategy change including the spinoff of downstream, divestiture of several international assets, and acquisitions of large positions in U.S. onshore resource plays. The most difficult factors to model include future tax rate, due to a very high (over 70%) average tax rate in recent years associated with international assets that are quickly becoming a less significant portion of the portfolio. CAPEX will have a significant impact on future earnings, but will be in the immediate future be much lower than in previous years. There have been many large write-offs, acquisitions, and divestitures over the previous five years that are difficult to incorporate into a prediction of future financial performance. That being said using historical data and indications on future strategy and activity from Marathon Oil’s investor reports an intrinsic value near that of the current enterprise value can be achieved using reasonable inputs for production growth rate and free cash flow growth rate.

The end 2015 Enterprise Value of $14.6 Billion is consistent with a production growth rate of 0.8% p.a., which seems attainable from their core shale plays if oil prices stay above $40/B.

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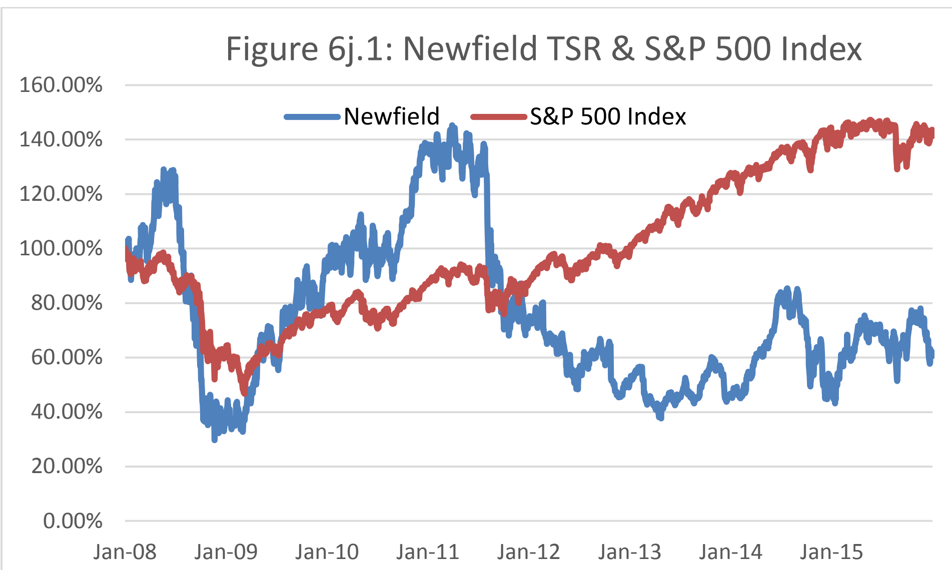
6j: Newfield Exploration Company

Newfield Exploration was founded by Joe Foster after the breakup of Tenneco Inc, where he had built Tennoco Oil into a strong independent oil and gas operator and had pioneered cross-functional teams to accelerate the cycle time from lease acquisition to first production in the Gulf of Mexico. He assembled a small team, mainly from Tenneco Oil and in 1989 started Newfield Exploration, funded mainly through private placements of equity. The company demonstrated success and completed an IPO in 1993. It continued to grow its Gulf Coast business and added a position in the mid-Continent and in Australia, Malaysia and China. Foster retired in 1990, succeeded by longtime colleague David Trice and then by Lee Boothby (also ex Tenneco Oil) in 2009.

In 2007, Newfield divested its Gulf of Mexico assets to McMoRan Exploration for $1.1 Billion and focused on shale plays, notably the Bakken and Oklahoma. Given its background as an offshore exploration company, investors were skeptical of the new direction: shareholder value declined with the overall market in 2008-09 (Figure 6j.1), then recovered on the back of growth in natural gas production. However, Newfield was unable to sustain its growth after 2010 and shareholder value declined through 2013.



Newfield responded through a set of focused transactions designed to simplify and rationalize its asset portfolio. Newfield its remaining Gulf of Mexico assets in 2012, had exited its international businesses by 2014 and divested certain Granite Wash assets in 2014. Over the same period, it strengthened its position in the Uinta Basin and in the Anadarko Basin (Table 6j.1).

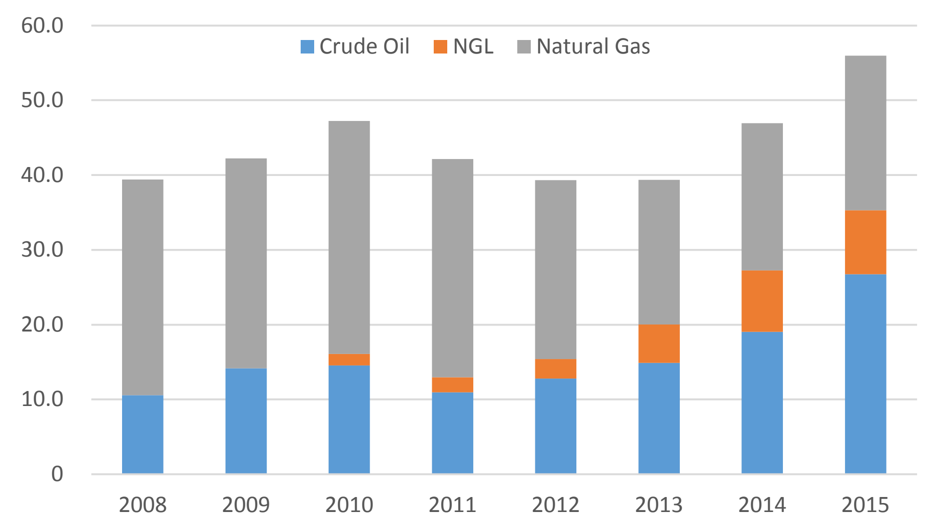
Table 6j.1: Newfield Portfolio Rationalization Transactions after 2010

Divestitures				
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**	
Sep-19-2014	Granite Wash Assets	Templar Energy	$	588
Feb-10-2014	Malaysia Assets	SapuraKencana Petroleum	$	896
Oct-05-2012	Remaing GoM Properties	W&T Offshore	$	228
	Total Sales		**$**	**1,712**
Acquisitions				
Closing Date	**Assets**	**Seller**	**Consideration ($mm)**	
May-17-2011	Uinta Basin Assets	Harvest Natural Resources	$	310
Aug-06-2013	146,000 acres in Anadarko Basin	Gastar Exploration	$	115
	Total Purchases		**$**	**425**

The company now has a focused portfolio in the Bakken, Anadarko Basin, Uinta Basin and Eagle Ford with considerable running room for growth. In 2014 and 2015, Newfield demonstrated the potential of its oil rich holdings in the STACK and SCOOP shale plays in the Anadarko Basin of Oklahoma and Newfield was the only company studied with positive growth in shareholder value over that period.

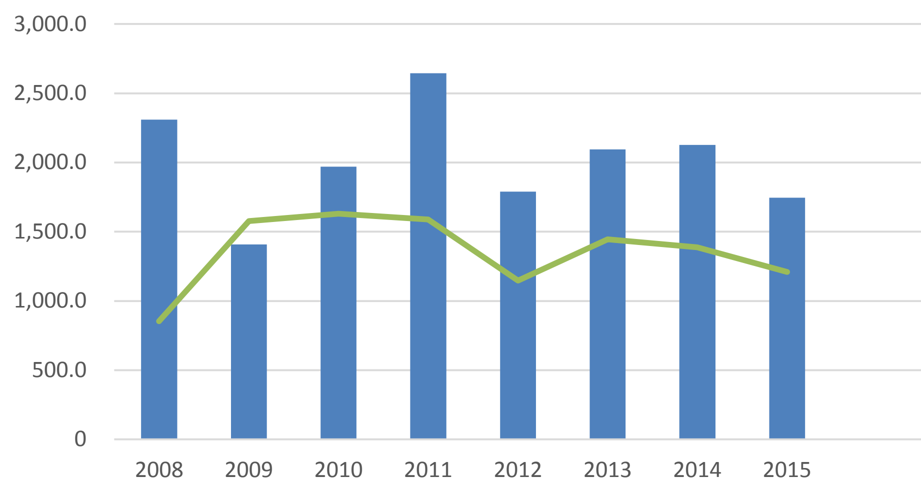
Contributing to investors' renewed interest has been a strong shift towards growth in production of liquids since 2011 due to the SCOOP and STACK development programs (Figure 6j.2).

Figure 6j.2: Newfield Oil & Gas Production (MMBoe)



This aggressive growth strategy has required capital expenditures considerably above cash from operations (Figure 6j.3). Newfield does not pay a dividend, as its shareholder value proposition has always favored growth.

Figure 6j.3: Newfield Cash Balance ($ Millions)



As a result, Newfield has been obliged to take on a high level of debt (Figure 6j.4), which is probably unsustainable.

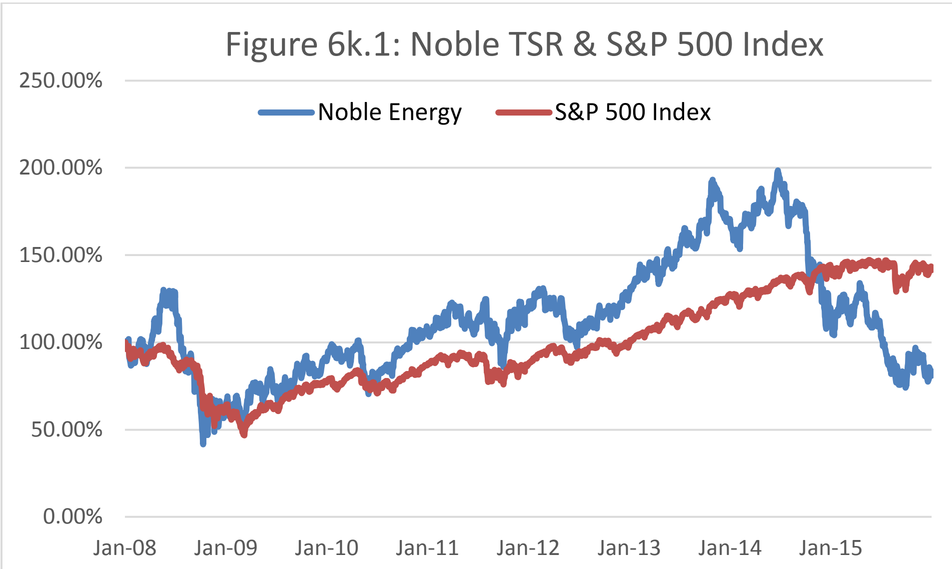
Newfield is an outlier in our analysis of shareholder value, declining from 2008-13 when most companies were growing shareholder value and being the only company studied to grow shareholder value over 2014-15. Undaunted by its high debt ratio, NFX has agreed to pay $0.5 Billion in May 2016 to further increase its holdings in the STACK play through an acquisition of 42,000 acres from Chesapeake, which overlaps Newfield's existing acreage. Newfield expects to fund the transaction with cash on hand after raising $800 Million in 2015 and in 2016 from equity offerings; closing is planned for the second quarter of 2016.

The end 2015 Enterprise Value of $7.8 Billion is consistent with a production growth rate of 1.9% p.a., which seems conservative in light of its recent growth rates of 19% in 2014 and 16% in 2015. The big question is whether Newfield's banks and bond holders will support Newfield's expansion ambitions in a low price environment.

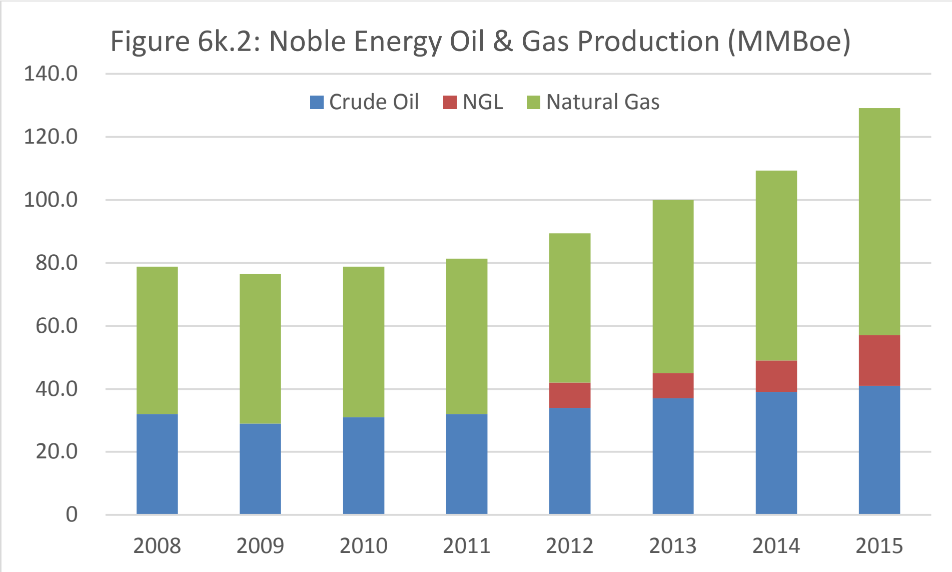
Noble Energy, Inc.

Introduction:

Lloyd Noble founded the Samedan Oil Corporation in 1932. In 1970 the company's name was changed to Noble Affiliates and began trading on the NYSE in 1980 after 8 years on the NASDAQ. In 1985, Noble spun of its drilling company to shareholders, leaving the parent company as a "pure play" independent oil and gas company. In 2000 Charles Davidson became CEO and in 2002 the company name was changed to Noble Energy. Noble first left the US in 1991 to explore Equatorial Guinea and since has developed operations in the North Sea, Bohai Bay of China, South America and the Eastern Mediterranean. Through 2013, Noble had an enviable record of growing shareholder value (Figure 6k.1)



Coming out of the economic downturn in 2009 Noble had success with their exploration programs in the Eastern Mediterranean, Gulf of Mexico and Equatorial Guinea. In 2013, multiple major projects were brought on stream: Tamar in Israel, Alen in Equatorial Guinea, and a new processing facility for its shale oil and gas production in the Colorado DJ Basin all commenced operation during the year. This bolstered the company's position globally bringing online considerable liquids and gas production (Figure 6k.2). In 2014, Noble announced two further successful discoveries. First, their Katmai discovery in the GOM and it is estimated to hold between 40 and 100 MMBoe. They also announced the Dantzler-2 well in the Mississippi Canyon hit crude oil and there is estimated to be between 65 to 100 MMBoe.

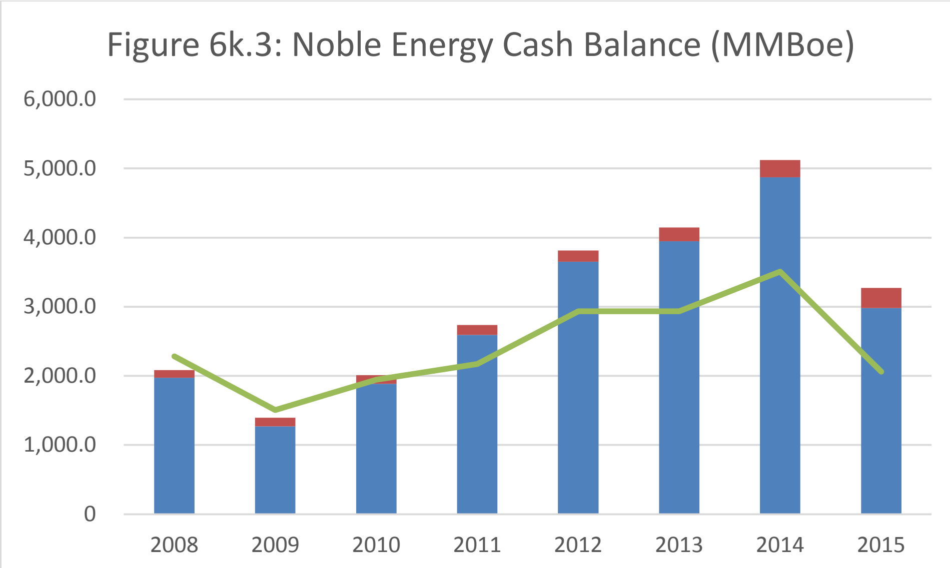


Noble entered the Marcellus play in 2011 and acquired Rosetta Resources, Inc. (ROSE) in 2015 for $1.6 billion in stock (Table 6k.1). This acquisition strengthened Noble's US onshore position with quality acreage in the Permian and Eagle Ford basins.

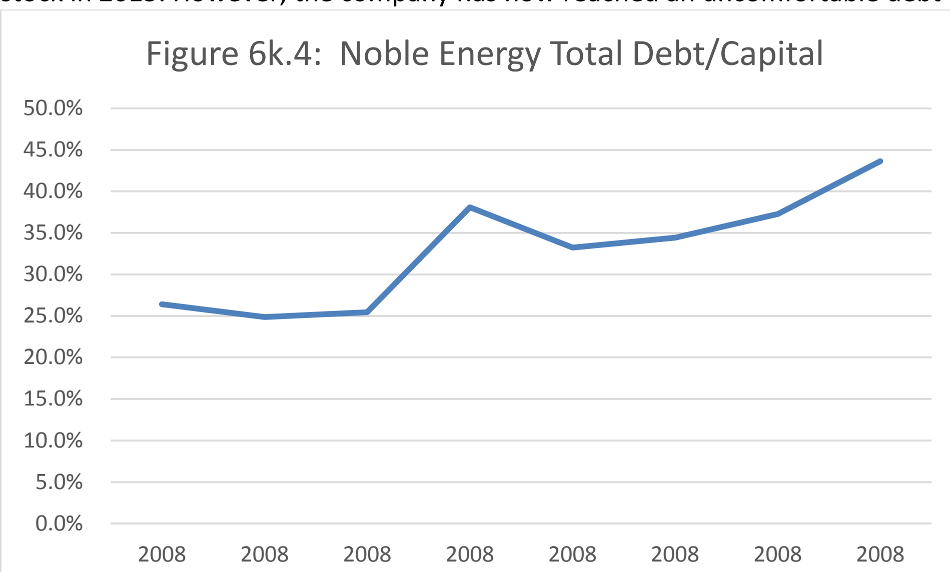
Table 6k.1: Noble Energy Transactions since 2010

		Divestitures		
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**	
Sep-04-2012	Permian Basin Properties	Sheridan Holding	$	320
Sep-17-2012	Anadarko Basin Assets	Unit Petroleum Company	$	593
Aug-12-2010	Mid-Continent and Illinois-Basin Properties	Citation 2004 Investment LP	$	552
	Total Sales		**$**	**1,465**
		Acquisitions		
Closing Date	**Assets**	**Seller**	Consideration ($mm)	
Jul-20-2015	Eagle Ford and Permian	Rosetta Resources	$	3,898
Sep-30-2011	Marcellus Shale Assets	CNX Gas Company	$	3,416
Mar-01-2010	Rockies Upstream Assets	Suncor	$	498
	Total Purchases		**$**	**7,812**

The successful quest for growth, which buoyed shareholder value through 2013, turned sour with the price collapse of 2014-15. The company's aggressive capital program exceeded its cash from operations from 2011 (Figure 6k.3) and the gap widened in the lower oil price environment of 2014-15.



The gap was closed by substantial debt offerings in 2013 and 2014, followed by issuance of common stock in 2015. However, the company has now reached an uncomfortable debt ratio (Figure 6k.4).



Compounding its problems and further depressing shareholder value, the Supreme Court of Israel recently decided that part of Noble's proposal for Leviathan and the Tamar expansion was not constitutional; the projects are on hold until they are able to finalize a new fiscal agreement.

The combination of the low price environment, the company's relatively low EBITDA return on total assets, and the unfortunate events in Israel have led to many analysts to downgrade the stock.

Noble is fully hedged through 2016 which has allowed them to make some defensive actions to protect the company. In 2015 Noble cut capex by 60% and plan to hold capex within its cash from operations for 2016. Noble has made progress in further reducing well costs and increasing well productivity in its U.S.

shale plays. The company is selling assets outside its core properties and have farmed in BG/Shell to its Cyprus discovery, with agreements totaling more than $800 million in 2016. While the acquisition of ROSE may not have been at the most opportune time, as a stock transaction the company did not increase its exposure to price risk, and the assets further strengthen the company's onshore position in two of the better basins (Permian and Eagle Ford) to go along with their Marcellus and Niobrara acreage. These shale plays are much easier to get up running on a short term basis and don't require the years of planning and massive investments like many of their offshore projects have. This will allow NBL to respond quickly in the event of a rebound in prices.

Noble's end 2015 enterprise value of $20 Billion suggests an expected oil and gas production growth rate of 3.6% p.a. which seems reasonable in light of its shale oil productivity gains. Its long track record of successful exploration adds an incremental option value to its known resources. If Noble is able to solve the issues in the Mediterranean and reach a final agreement acceptable to the Israeli Supreme Court, that will help, but low international natural gas and LNG prices have lowered the perceived value of Noble's massive discoveries in the Levant Basin.

6l: Occidental Petroleum

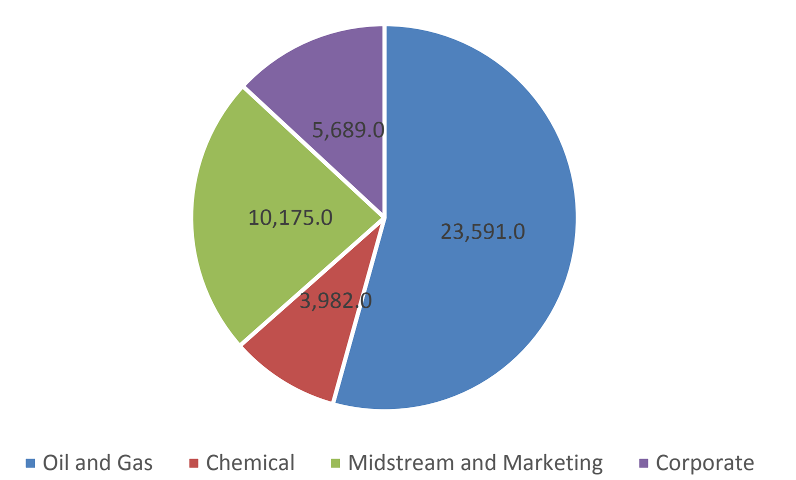
Occidental Petroleum Corporation (NYSE:OXY) is an independent oil company founded in California in 1920, has market capitalization of $71b, and employs 40,000 people. In 1957, Armand Hammer was appointed CEO and remained in that position until shortly before his death at age 92 in 1990. He appointed Ray Irani as his successor in 1990, who remained CEO until 2011 when he was replaced by Stephen Chazen.

Occidental Petroleum Corporation is vertically integrated company and operates its business through three segments: 'Oil and Gas Exploration and Production (E&P)', 'Midstream, Marketing and Other', and 'OxyChem'

- Under Oil and Gas E&P, it engages exploration and production of oil and condensate, NGLs, and natural gas in three core regions: United States, Middle East/North Africa and Latin America.
- Its 'Midstream, Marketing and Other segment' provide services to other segments and operates and invests in gas plants and oil, gas, NGLs and CO2 pipeline systems and storage facilities. It also provides similar services to third parties. In addition, the marketing and trading group markets OXY's and third-party oil and gas, trades around the midstream and marketing segment assets and engages in commodities trading.
- OxyChem manufacturers polyvinyl chloride (PVC) resins, chlorine and caustic soda and owns and operates manufacturing plants at 22 domestic sites in Alabama, Georgia, Illinois, Kansas, Louisiana, Michigan, New Jersey, New York, Ohio, Pennsylvania and Texas and at two international sites in Canada and Chile and has interests in a Brazilian joint venture.

Oil and gas is by far the largest segment (Figure 6.l.1), but midstream and chemicals provide more stable and to some extent counter-cyclical sources of revenue and cash flow.

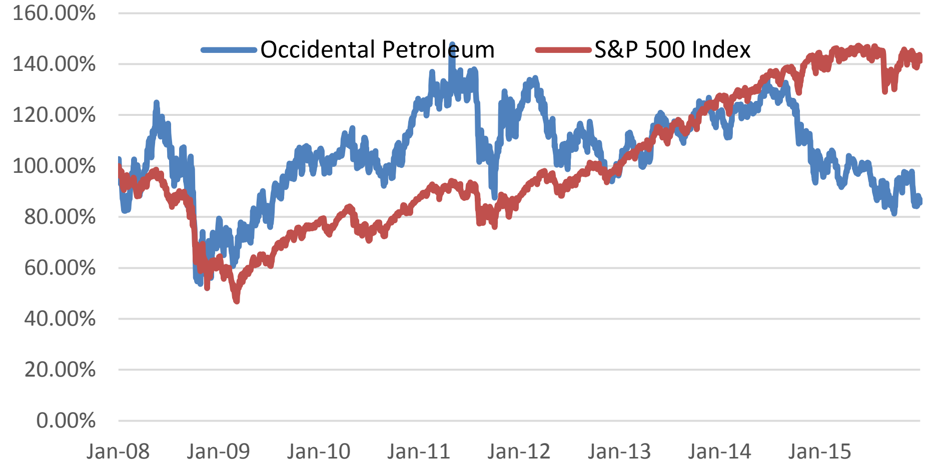
Figure 6l.1: OXY Assets ($ Million)



Following the appointment of Armand Hammer as CEO, OXY grew its business internationally, with major oil discoveries in Libya in the 1960s and Colombia in the 1980s. In 1997 the company purchased from the U.S. Government the historic Elk Hills Naval Petroleum Reserve for $3.7 Billion, the largest sale of U.S.

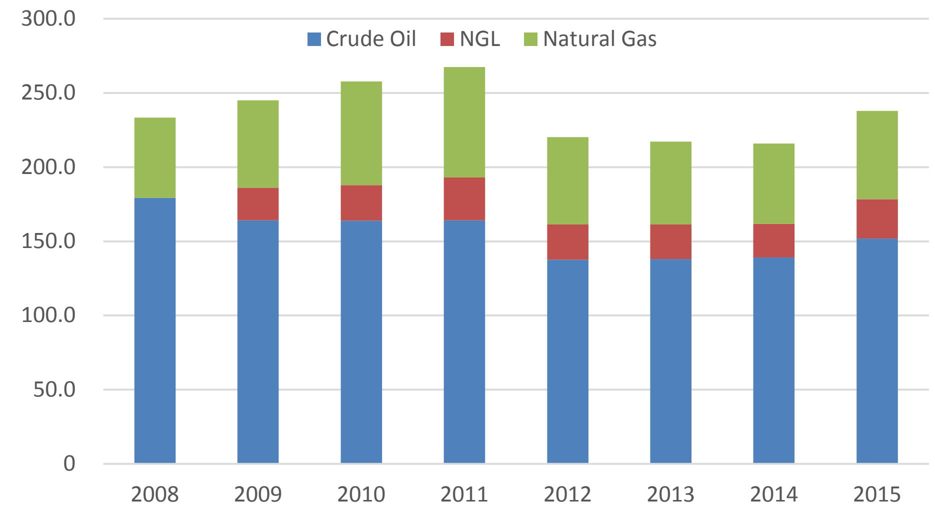
government property. In 2000, the purchase of Altura Energy, Ltd., in the Permian Basin of west Texas and southeast New Mexico made Occidental the largest oil producer in Texas. OXY continued to acquire additional Permian basin properties through the 2000s and established Middle Eastern operations in Qatar, Oman and The UAE. In 2014, OXY spun off its California operations as California Resources Corporation to its shareholders, and moved its headquarters to Houston, TX.

Figure 6l.2: Occidental TSR & S&P 500 Index



OXY delivered modest shareholder value from 2008-13 (Figure 6l.2), close to the average of the companies studied. Compared to its rivals, OXY provides a higher than average EBITDA/ Total Assets return and a lower than average reinvestment in growth measured as Capex/ Total Assets.

Figure 6l.3: OXY Oil & Gas Production (MMBoe)



OXY's production is 75% liquids, highest among the study group (Figure 6l.3). Production shows a decline in 2012 due to restatement of results back to 2012 to reflect the spin-off of California Resources. Production was also affected by disruption of Libyan operations.

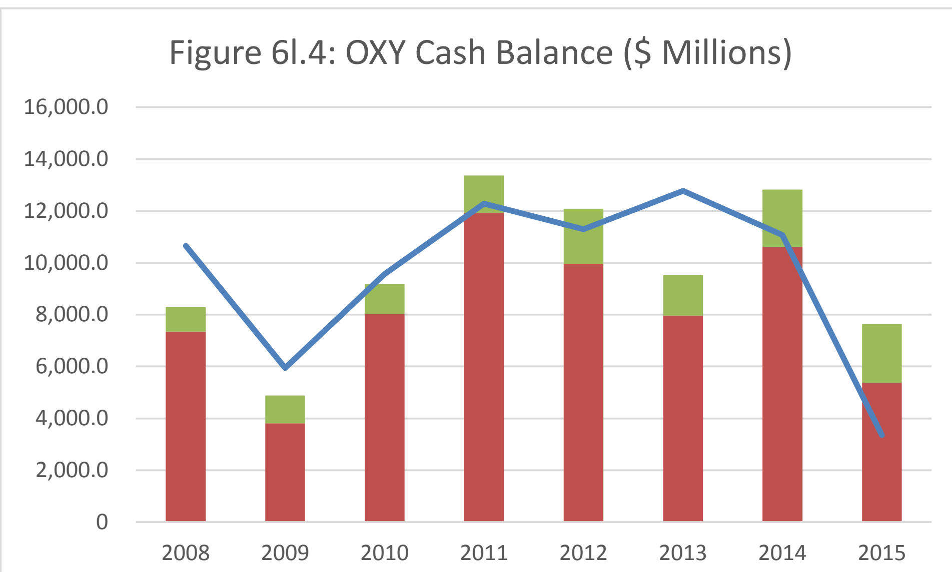
Since 2011, OXY has divested its assets in Argentina, the Hugoton and North Dakota (Table 6l.1).

Table 6l.1: OXY Transactions Since 2010

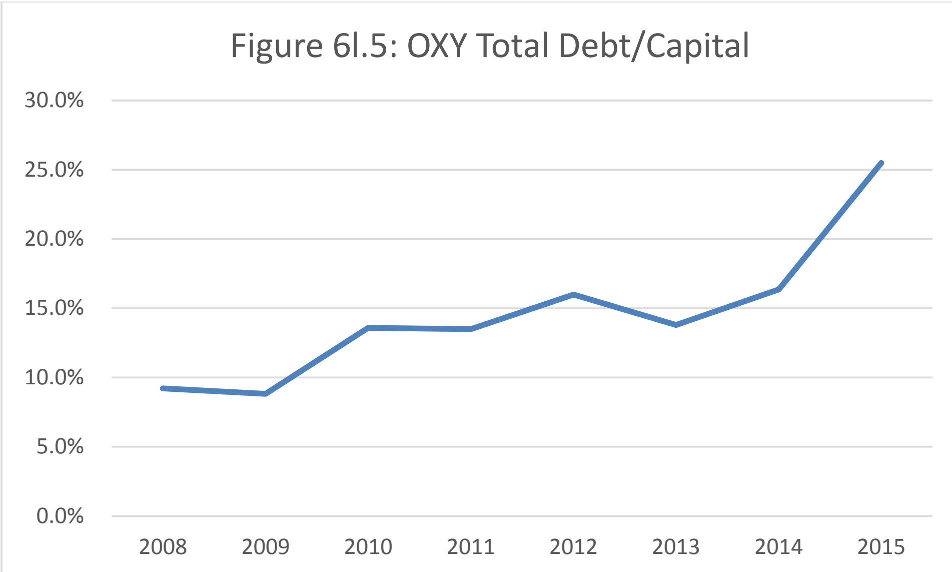
Sales	Divestitures		
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**
Oct-28-2015	North Dakota Assets	Lime Rock Resources	$ 600
Apr-30-2014	Hugoton Field Assets	Unknown	$ 1,400
Feb-23-2011	OXY Argentina	China Petrochemical Company	$ 2,450
	Total Sales		**$ 4,450**
	Acquisitions		
Closing Date	**Assets**	**Seller**	**Consideration ($mm)**
Apr-15-2011	Sacramento Basin Assets in California	Rosetta	$ 200
Jan-31-2011	South Texas Gas Fields	Shell	$ 1,800
Dec-13-2010	North Dakota Acreage		$ 1,400
	Total Purchases		**$ 3,400**

OXY now has a balanced portfolio with approximately half its production in the U.S. with a major position in the Permian Basin, where the company has for many years been a leader in Enhanced Oil Recovery and has sharply increased its production from the underlying shale formations. The other half comes from international assets in the Middle East, where Oxy as operator in partnership with ADNOC began production at the large Al Hosn natural gas field in 2015, and from Colombia.

OXY has generally managed its spending to be cash neutral (Figure 6l.4), but fell into deficit following the collapse of oil prices.



As a result, OXY's debt ratio increased in 2015 (Figure 6l.5) but remains the lowest among the companies studied.



OXY plans to reduce capex in 2016 by a half and according to a recent investor presentation at the 2016 UBS Global Oil and Gas Conference expects to return to cash neutrality:

- Carefully reduce activity levels without harming the strong progress on growth prospects
- Fund only those opportunities that exceed hurdle rates of return
- 2016 plan approximates expected cash from operations at around current prices

OXY's diversification has led to a lower beta than its rivals, lowering the discount rate used in our financial model, which suggests that the end 2015 enterprise value is consistent with a production growth rate of 3.4% p.a. In its investor presentation, OXY promised long term 5-8% growth from the Middle East and its extensive inventory of shale resources in the Permian Basin.

6.m Pioneer Natural Resources

Pioneer Natural Resources Company was formed through the 1997 merger of Parker & Parsley Petroleum Company and MESA Inc. Built on the strategy of acquiring and exploiting proved properties, these companies had established significant operated interests in quality long-lived fields.

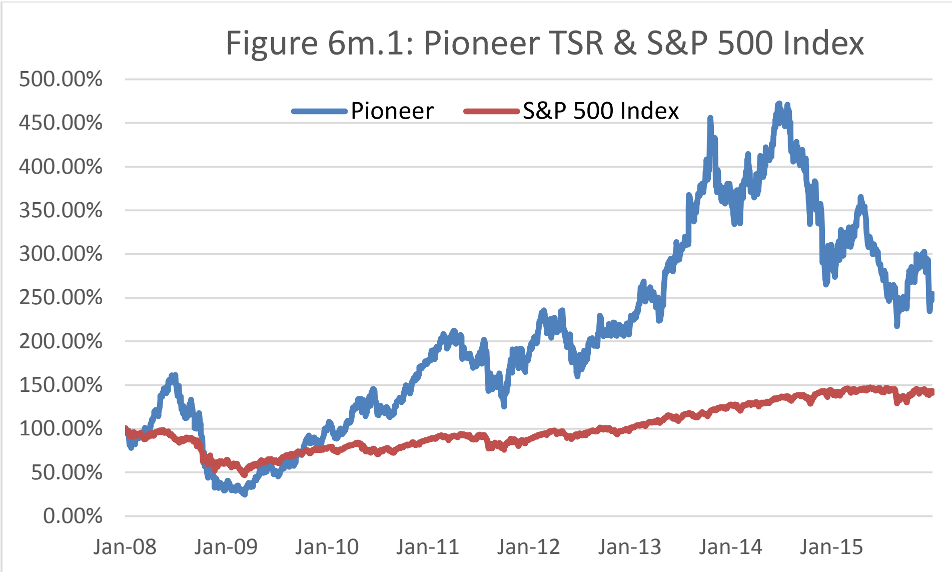
The company quickly moved to established interests in South Africa, Gabon, Canada and Argentina, then entered the deep water Gulf of Mexico in 1998. Over the next several years, it had success in offshore South Africa (Sable field) and the Gulf of Mexico (Aconcagua, Devil's Tower and Falcon discoveries). It continued to enjoy success in the Gulf of Mexico and entered Alaska and Tunisia. It also expanded its position in the Spraberry/ Wolfcamp formation in the Permian Basin

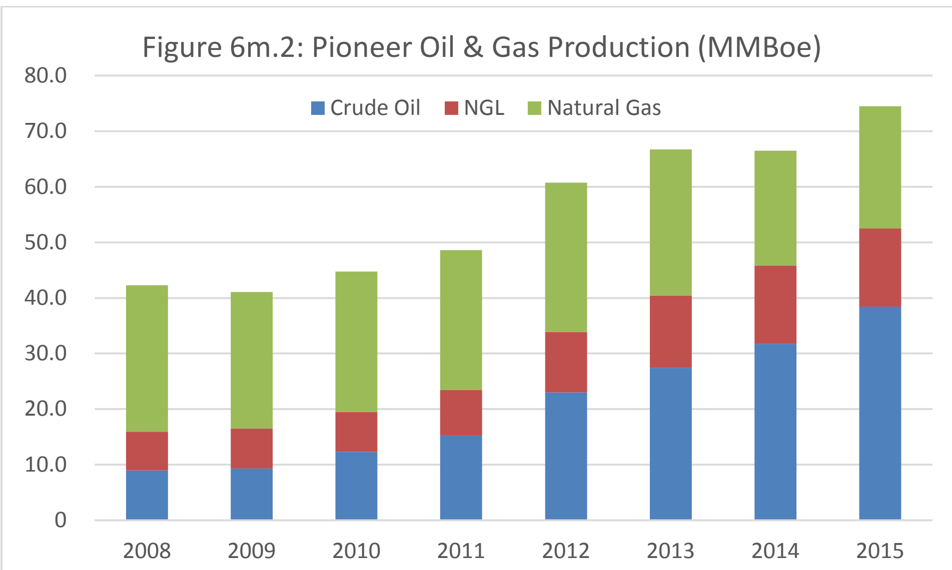
By 2008, the exploration led strategy had resulted in a Pioneer portfolio that was broad but thin with no break-out discoveries. Growth was modest, profitability was mediocre, the debt ratio was high and shareholder value stagnated. The company initially tried to sell its onshore U.S. assets to no avail, then took the opposite tack and moved to simplify its portfolio by divesting its deep water assets in 2006, divesting its international businesses by 2012 and concentrating on its U.S. assets. PXD became an early mover in deploying horizontal drilling and hydraulic fracturing in its legacy acreage in the Permian Basin. In 2010, PXD formed a joint venture with Reliance of India to develop its Eagle Ford assets and in 2013, sold a 40% interest to Sinochem in 82,000 acres of Spraberry/ Wolfcamp shales. PXD also sold a few non-core assets and its midstream assets (Table 6m.1).

Table 6m.1: Pioneer Natural Resources Transactions since 2010

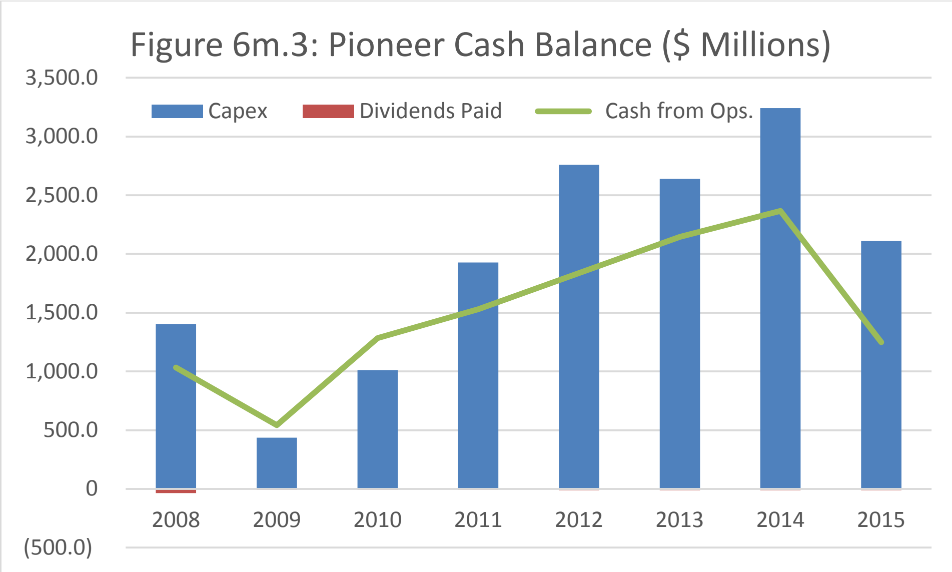
		Divestitures	
Closing Date	**Assets**	**Buyer**	**Consideration ($mm)**
Jul-08-2015	EFS Midstream LLC	Enterprise Products	$ 2,150
Sep-11-2014	Hugoton Field Assets	Linn Energy	$ 340
Apr-15-2014	Pioneer Alaska Assets	Caeles Energy	$ 300
May-31-2013	40% Wolfcamp Shale Interests	Sinochem	$ 1,740
Aug-01-2012	PXD South Africa	S. Africa Interests	$ 60
Feb-18-2011	TXD Tunisia	OMV	$ 800
Jun-29-2010	Eagle Ford JV	Reliance	$ 1,145
	Total Sales		**$ 4,385**

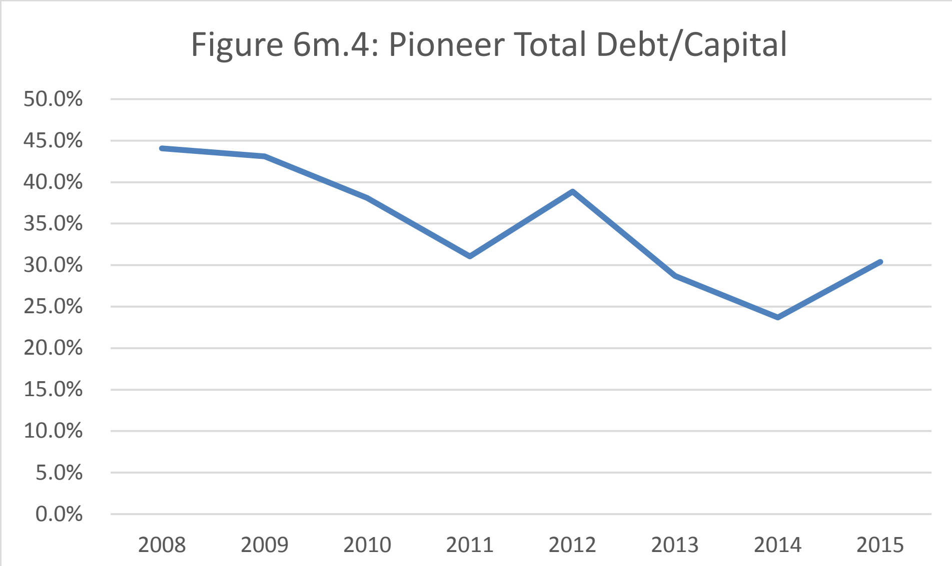
Shareholder value grew rapidly (Figure 6m.1) through 2013 as PXD delivered aggressive production growth (Figure 6m.2), primarily of liquids. PXD also built an integrated business model controlling drilling, fracturing, sand delivery and midstream activities.





Pioneer's capital expenditures exceeded cash from operations from 2011-2014 (Figure 6m.3). Pioneer pays only token dividends. However, well timed divestitures (Table 6m.1) and stock issuances in 2013 and 2014 enabled the company to lower its debt ratio over the same time frame (Figure 6m.3).





Pioneer was below average in capital spending/ Total Assets and in profitability, measured as EBITDA/ Total Assets and had a higher than average beta. However, Pioneer's strong production growth, second only to Continental Resources in our study group, together with a unique in the group reduction in debt between 2008 and 2013 drove superior shareholder value growth through 2013. For the period 2014-15, PXD shareholder value declined at the study group average rate as performance on the two main drivers, EBITDA/ Total Assets and Capex/ Total Assets were close to group average levels.

Our Pioneer financial model suggests that end 2015 enterprise value is consistent with an assumed 6.5% p.a. production growth rate. Pioneer investor presentation promises 15 % p.a. from its Permian acreage through 2017, so the assumption seems reasonable.

Appendix

Appendix 1: Drivers of TSR

	TSR Non-Core	TSR Core	Capex/ Total Assets	EBITDA/ Total Assets	Beta	Debt/ Total Assets	Change in Debt/ Total Assets	Change in LT Liabs. Total Assets	Prodn CAGR	Ave Prodn % Oil	Increase in % Prodn Oil	End Period % Prodn Oil	Ave F & D Costs ($/boe)
2008-13													
MRO		-9.0%	10.8%	15.8%	1.40	32.5%	1.8%	0.3%	0.4%	60.7%	-1.9%	58.1%	$ 12.98
COP		-3.8%	9.7%	18.2%	1.12	42.0%	-2.6%	8.5%	-7.6%	58.3%	-5.1%	56.3%	$ 16.13
HES		-3.2%	15.0%	17.7%	1.43	30.3%	-2.9%	-5.2%	-2.5%	72.3%	2.1%	72.0%	$ 30.60
OXY		3.1%	14.7%	21.7%	1.33	14.4%	0.9%	4.6%	-1.4%	74.2%	-2.5%	74.3%	$ 21.53
DVN		-6.5%	19.5%	15.6%	1.26	34.0%	0.0%	11.5%	2.5%	34.4%	12.4%	42.4%	$ 16.73
EOG		10.4%	25.9%	20.8%	1.31	38.7%	7.8%	10.3%	8.9%	34.4%	37.4%	56.0%	$ 16.42
CLR		25.9%	34.4%	22.1%	1.69	46.5%	15.6%	26.0%	27.4%	73.0%	-5.7%	70.5%	$ 9.94
PXD	23.7%		15.0%	11.7%	1.55	46.3%	-16.2%	-15.4%	9.6%	47.7%	22.9%	60.6%	$ 45.21
NFX	-12.0%		25.8%	17.6%	1.51	46.4%	13.9%	4.0%	0.0%	35.9%	24.0%	64.6%	$ 20.48
NBL		8.9%	16.3%	15.6%	1.40	38.4%	1.6%	30.4%	4.9%	38.7%	-3.6%	37.0%	$ 15.89
APC		2.8%	25.8%	17.6%	1.43	19.0%	13.9%	55.5%	0.0%	31.2%	16.3%	37.8%	$ 20.48
APA		-4.2%	15.3%	22.4%	1.29	35.8%	0.2%	22.3%	6.0%	51.6%	6.1%	55.7%	$ 30.83
ECA		-9.4%	17.8%	18.9%	1.04	47.2%	11.0%	31.9%	-7.8%	9.9%	-6.8%	10.4%	$ 22.53
Average	5.8%	1.4%	18.9%	18.1%	136.6%	36.3%	3.4%	14.2%	3.1%	47.9%	7.4%	53.5%	$ 21.52
Core RSQ			60.6%	18.7%	52.4%	2.4%	29.2%	6.5%	71.9%	8.5%	1.4%	13.0%	21.6%
Core SLOPE			1.11	1.74	0.44	0.16	0.86	0.15	0.92	0.15	0.09	0.20	(0.01)
2013-15													
MRO	-39.9%		12.5%	9.1%	1.45	33.3%	7.8%	4.9%	4.1%	58.1%	0.0%	60.7%	$ 21.38
COP		-18.2%	12.5%	12.2%	1.20	47.3%	6.7%	-9.0%	2.8%	57.4%	0.1%	57.4%	$ 40.07
HES		-22.7%	13.2%	10.4%	1.25	31.1%	6.0%	2.2%	5.5%	69.0%	-8.0%	64.0%	$(1,928.13)
OXY		-15.1%	15.6%	14.9%	1.07	11.7%	-3.1%	11.7%	4.7%	74.9%	0.7%	75.0%	$ 93.59
DVN		-27.7%	15.9%	14.6%	1.43	43.9%	15.0%	17.5%	-1.0%	56.7%	18.5%	60.9%	$ (58.56)
EOG		-7.4%	21.2%	19.7%	1.31	42.3%	5.1%	6.3%	5.9%	62.6%	7.2%	63.1%	$ 29.34
CLR	-34.7%		25.9%	19.1%	1.67	58.4%	8.0%	6.0%	27.7%	68.1%	-4.4%	66.1%	$ 20.82
PXD		-15.7%	17.8%	14.5%	1.36	33.5%	-0.9%	1.7%	5.3%	69.7%	10.4%	71.0%	$ 134.61
NFX		15.6%	29.4%	21.7%	1.63	52.7%	3.1%	12.9%	7.9%	48.9%	13.7%	64.6%	$ 65.23
NBL		-29.7%	17.0%	12.3%	1.44	45.4%	7.4%	40.5%	13.7%	33.7%	-5.3%	31.7%	$ 407.95
APC		-21.4%	14.3%	10.7%	1.33	52.1%	10.3%	15.3%	3.9%	51.3%	9.9%	53.2%	$ 48.46
APA	-27.9%		24.8%	24.4%	1.30	55.5%	32.8%	67.5%	-13.7%	62.3%	9.1%	64.8%	$ 9.47
ECA	-45.3%		17.9%	13.6%	1.09	51.4%	-2.2%	-11.7%	-11.4%	25.5%	22.4%	32.9%	$ 42.07
Average	-37.0%	-15.8%	18.3%	15.2%	134.8%	43.0%	7.4%	12.7%	4.3%	56.8%	5.7%	58.9%	$ (82.59)
Core RSQ			75.3%	71.1%	17.0%	3.3%	18.9%	6.5%	1.8%	0.4%	12.8%	18.3%	1.9%
Core SLOPE			2.27	2.97	0.35	0.19	(1.08)	(0.25)	0.46	0.06	0.55	0.47	0.00

Appendix 2

Transactions Reshaping Portfolios

	Divestitures ($mm)						
	2010	2011	2012	2013	2014	2015	Total
Continental	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EOG	$ -	$ -	$ -	$ 550	$ -	$ -	$ 550
Noble	$ 552	$ -	$ 913	$ -	$ -	$ -	$ 1,465
Newfield	$ -	$ -	$ 228	$ 1,484	$ -	$ -	$ 1,712
Pioneer	$ -	$ -	$ -	$ 1,740	$ -	$ 640	$ 2,380
Anadarko	$ -	$ -	$ -	$ -	$ 3,686	$ -	$ 3,686
OXY	$ -	$ 2,450	$ -	$ -	$ 1,400	$ 600	$ 4,450
Marathon	$ -	$ 270	$ -	$ -	$ 4,210	$ 1,075	$ 5,555
Hess	$ -	$ -	$ 503	$ 2,855	$ 4,752	$ -	$ 8,111
Encana	$ -	$ -	$ 3,667	$ 550	$ 4,196	$ 2,291	$ 10,704
Devon	$ 2,065	$ 6,500	$ 2,782		$ 5,072	$ -	$ 16,419
Apache	$ -	$ -	$ -	$ 7,614	$ 4,026	$ 8,166	$ 19,806
ConocoPhillips	$ 8,092	$ -	$ 970	$ 9,118	$ 1,660	$ -	$ 19,840
Total	$ 10,709	$ 9,220	$ 9,062	$ 23,911	$ 29,002	$ 12,772	$ 94,677
	Acquisitions ($mm)						
	2010	2011	2012	2013	2014	2015	Total
Anadarko	$ -	$ -	$ -	$ -	$ -	$ -	$ -
ConocoPhillips	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EOG	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pioneer	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Newfield	$ -	$ 310	$ -	$ 115	$ -	$ -	$ 425
Continental	$ -	$ 1,267	$ -	$ -	$ -	$ -	$ 1,267
Hess	$ 1,582	$ -	$ -	$ -	$ -	$ -	$ 1,582
OXY	$ 1,400	$ 2,000	$ -	$ -	$ -	$ -	$ 3,400
Marathon	$ -	$ 3,500	$ 232	$ -	$ -	$ -	$ 3,732
Noble	$ 498	$ 3,416	$ -	$ -	$ -	$ 3,898	$ 7,812
Devon	$ -	$ -	$ -	$ -	$ 6,249	$ 3,239	$ 9,487
Encana	$ -	$ -	$ -	$ -	$ 11,357	$ -	$ 11,357
Apache	$ 11,987	$ 1,750	$ 3,107	$ -	$ -	$ -	$ 16,844
Total	$ 15,467	$ 12,243	$ 3,339	$ 115	$ 17,606	$ 7,137	$ 55,907