# UBS Investment Research

# Q-Series®: Energy Sector M&A

## Ripe Conditions for Increased E&P M&A?

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- **Are conditions ripe for accelerating M&A activity in the US E&P sector?**

Majors have been net sellers of US properties for most of the last several decades. However, the emergence of enormous resource potential from the unlocking of shale gas and oil development coincides with a time when the Majors rising cash flows from higher oil prices are finding limited re-investment opportunities given declining access to resources abroad. With the E&Ps having won the great shale land grab over the last 7 years, Majors have shown an increasingly acquisitive appetite over the last two years and we expect consolidation to accelerate in 2012.

- **The purpose of this report was twofold:**

1) outline the shift in behavior of Majors from net sellers of US properties to net buyers over the last 2 years, & show their increasing desire to operate US assets; & 2) provide a framework to see which of the 41 E&P companies analyzed make the most attractive targets and which E&Ps may be most willing sellers.

- **How to identify potential E&P takeout targets?**

Our scorecard takes into account: 1) a higher ratio of unbooked resource-to-proved reserves provides greater re-investment opportunity for cash-rich Majors; 2) which CEOs would benefit the most in compensation on an absolute & relative basis from a change in control; & 3) which E&P balance sheets are most financially stretched. Notably, we found no meaningful evidence that older CEOs are more likely sellers.

- **UBS's list for most likely E&P M&A takeout targets include:**

APC, COG, CLR, EOG, OAS, PXP, RRC, SM, SWN. The list has been integrated into a basket (Bloomberg: UBSMEPUS) for investors to track performance.

### Exhibit 1: Most Likely E&P M&A Takeout Targets

| Most Likely Takeout Candidates | Ticker | Rating | Resource Potential to Proved Reserve Ratio | | Payout Package Relative to Current Holding | | Negative Free Cash Flow Yield in 2012 | | Debt to Cap Ratio | | CEO Age | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Median = 4.2x | | Median = 0.59x | | Median = -4.1% | | Average = 35.0% | | Median = 57 | |
| Anadarko Petroleum | APC | Buy | 4.6x | Neutral | 4.06x | Top 10 | 1.1% | Less Likely | 41% | Neutral | 57 | Neutral |
| Cabot Oil and Gas | COG | Not Rated | 8.4x | Top 10 | 0.81x | Neutral | 1.7% | Less Likely | 37% | Neutral | 57 | Neutral |
| Continental Resources | CLR | Not Rated | 6.3x | Top 10 | 0.00x | Less Likely | -2.9% | Less Likely | 27% | Less Likely | 65 | Neutral |
| EOG Resources | EOG | Neutral | 3.3x | Less Likely | 0.57x | Neutral | -6.9% | Top 10 | 28% | Less Likely | 64 | Neutral |
| Oasis Petroleum | OAS | Buy | 7.2x | Top 10 | 0.02x | Less Likely | -11.8% | Top 10 | 38% | Neutral | 51 | Less Likely |
| Plains Exploration | PXP | Not Rated | 5.8x | Top 10 | 1.86x | Top 10 | -4.1% | Neutral | 52% | Top 10 | 51 | Less Likely |
| Range Resources | RRC | Buy | 10.8x | Top 10 | 0.25x | Less Likely | -5.5% | Neutral | 43% | Top 10 | 57 | Neutral |
| SM Energy | SM | Not Rated | 4.8x | Neutral | 1.39x | Neutral | -6.2% | Neutral | 28% | Less Likely | 61 | Neutral |
| Southwestern Energy | SWN | Buy | 5.3x | Neutral | 4.32x | Top 10 | -1.7% | Less Likely | 26% | Less Likely | 66 | Neutral |

Color Coding = Top Ranked Takeout Based on Metric; Neutral Based on Metric; Less Likely Takeout Based on Metric

Source: Company Proxy Statements, FactSet, UBS estimates, Herolds, Wood Mackenzie, and company documents

# Introduction

The unconventional oil and gas resource boom in the U.S. ignited by the *E&P sector* coupled with the *Majors'* increasingly limited access to international resource has, in our view, created an environment ripe for consolidation, with early evidence of this trend apparent over the last two years. Having been net sellers of U.S. assets for decades, the Majors have been aggressively acquiring U.S. assets in recent years as unconventional oil and gas resources offer attractive economics, significant oil and natural gas reserve potential, and low development risks….at a time when access to international resources is shrinking and Majors' cash inflows are ballooning with higher oil prices creating re-investment pressure. While often initially taking the path of non-operated joint venture partnerships, the Majors now seem more interested in outright corporate acquisitions to gain operatorship of assets, increasing exposure to material resource potential, and expanding their footprints in major unconventional resource plays. This trend was clearly signalled by ExxonMobil's acquisition of XTO Energy in 2009, Chevron's purchase of Atlas Energy and Chief Oil & Gas in the Marcellus in 2010 . . . and more recently, Statoil's takeover of Brigham Exploration in the Bakken and BHP's purchase of Petrohawk Energy in 2011. Given the current fragmented state of the corporate/asset landscape in most major resource plays, in particular the Marcellus, Eagle Ford and Permian Basin, we believe industry consolidation will accelerate in the next several years led by cash-flush Majors and NOCs. **The purpose of this report is to examine historical trends in M&A activity in the U.S. and identify the most likely M&A takeout candidates.**

## What's Covered in This Report?

**From a historical perspective, we studied the M&A activity of the Majors in the US since the mid-1990s:**

- **The Majors largely neglected their US asset base in the 1990s and the first half of last decade, but slowly increased their acquisition appetite in 2007 and have been demonstrably more acquisitive the last two years.** The Majors and NOCs have picked up the pace of U.S. acquisitions over the past 2 years, with the number of acquisitions nearly double the levels seen in prior years.

- **We believe there are four reasons behind Majors' return to the U.S.**: 1) emerging availability of massive resources unlocked by the shale boom; 2) the need to re-invest vast cash flows from higher oil prices; 3) transfer of domestic shale (or unconventional development) knowledge to their respective overseas asset bases; and 4) the Majors' ability to more efficiently allocate capital.

**To identify which E&Ps are the most likely takeout candidates, we investigated 40 publicly traded U.S. E&Ps from four perspectives:**

- **We measured which companies might be most attractive to resource-seeking Majors by measuring the ratio of estimated unbooked resource potential to proved reserve ratios**. Within the E&P companies surveyed in this report, the median ratio of unbooked resources relative to proved reserves was 4.2x, with the sector leaders on this metric being

**Range Resources, Swift Energy, Cabot Oil & Gas, EXCO Resources, and Oasis Petroleum**. As resource short Majors seek re-investment opportunity, we believe their preference in M&A targets are assets or companies with large unbooked development opportunities for their vast cash flows. This report also provides acreage and resource exposure for companies in the most fragmented resource plays: the Marcellus Shale, the Eagle Ford Shale, and the Permian Basin of west Texas.

— **We analyzed E&P companies' financial capacity to fund future capex budgets.** We believe companies in a weak liquidity position are more likely to divest assets to fund their capital program or opt for an outright sale if an outsized resource base cannot be developed internally due to financial constraints. However, we do not weigh this metric nearly as heavily when evaluating likely M&A takeout targets, as the financing window for E&Ps continues to be wide open for equity, debt, JV carry transactions, MLPs, and asset sales. Should deteriorating macro or market conditions close the financing window, poorly capitalized companies may be more willing sellers to financially stronger and larger companies.

— **We detailed each CEO's financial incentive to sell the company measured by the CEO's total payout package with a change of control relative to current holding value**. While it is obvious that much more than management compensation is factored when boards of directors decide to sell a company, we believe it is worth highlighting nonetheless to see which top managers would be most incentivized to sell . . . . and also note if any of these companies have an outsized unbooked resource base that would prove attractive to a Major.

— **We disclose the age of CEOs under the theory that those approaching retirement age may be more willing sellers of the company**. Unfortunately, this assumption proved to be more myth than reality as on average there was little difference in age between the CEOs of sellers and buyers from the largest E&P corporate transactions over the last 12 years.

## Conclusion of Findings

- **We believe companies with *both* outsized unbooked resource base (indicate attractiveness to acquirers) *and* above average CEO payout packages at change of control (indicate willingness to sell) are the most likely M&A candidates.** CEOs with the highest potential compensation package triggered by a change in control payouts relative to the value of their current holdings should potentially be more willing sellers than those with lower ratios. And E&Ps with higher unbooked resource potential relative to proved reserves should be viewed as more attractive acquisition candidates to resource-short Majors. In addition to these two key metrics, we added negative free cash flow yield, current financial leverage ratio and CEO age to present a more comprehensive picture of a company's financial situation and management's desire to sell . . . although we put much lower weightings on these three metrics when analyzing the most likely takeout targets. Combining these metrics, we are able to gauge which companies fit the profile best for likely take-out candidates.

- **In Exhibit 2, we have ranked companies based on resource potential to proved reserve ratio, payout package relative to current holding 2012 free cash flow yield and debt to capitalization ratio.** We compared individual company results to the universe average/median for each category to determine rankings for each metric analyzed. ***For reference, the median unbooked resource potential-to-proved reserve ratio for the E&Ps we analyzed was 4.2x and the median ratio of payout package to current holding value is 0.6x.*** Given most of the companies studied in this analysis are not under UBS coverage, **our impartial screen yielded the most likely takeout candidates to be Anadarko Petroleum, Cabot Oil & Gas, Chesapeake Energy, Comstock Resources, Continental Resources, EXCO Resources, Forest Oil, Oasis Petroleum, Plains Exploration & Production, Range Resources, SM Energy, Southwestern Energy, and Swift Energy**.

## Exhibit 2: E&P M&A Prospectivity Scorecard

| | Resource Potential to Proved Reserve Ratio | | Payout Package Relative to Current Holding | | Negative Free Cash Flow Yield in 2012 | | Debt to Cap Ratio | | CEO Age | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Median = 4.2x | | Median = 0.59x | | Median = -4.1% | | Average = 35.0% | | Median = 57 | |
| **Most Likely Takeout** | | | | | | | | | | |
| Range Resources | 10.8x | Top 10 | 0.25x | Less Likely | -5.5% | Neutral | 43% | Top 10 | 57 | Neutral |
| Swift Energy | 9.9x | Top 10 | 0.71x | Neutral | -12.5% | Top 10 | 33% | Neutral | 55 | Less Likely |
| Cabot Oil and Gas | 8.4x | Top 10 | 0.81x | Neutral | 1.7% | Less Likely | 37% | Neutral | 57 | Neutral |
| EXCO Resources | 7.7x | Top 10 | 0.20x | Less Likely | -4.8% | Neutral | 50% | Top 10 | 63 | Neutral |
| Oasis Petroleum | 7.2x | Top 10 | 0.02x | Less Likely | -11.8% | Top 10 | 38% | Neutral | 51 | Less Likely |
| Comstock | 6.6x | Top 10 | 0.95x | Neutral | -11.4% | Top 10 | 41% | Neutral | 55 | Less Likely |
| Chesapeake Energy | 6.5x | Top 10 | 0.60x | Neutral | -13.2% | Top 10 | 42% | Top 10 | 51 | Less Likely |
| Continental Resources | 6.3x | Top 10 | 0.00x | Less Likely | -2.9% | Less Likely | 27% | Less Likely | 65 | Neutral |
| Plains Exploration | 5.8x | Top 10 | 1.86x | Top 10 | -4.1% | Neutral | 52% | Top 10 | 51 | Less Likely |
| Forest Oil | 5.6x | Top 10 | 2.41x | Top 10 | -8.4% | Top 10 | 52% | Top 10 | 54 | Less Likely |
| Southwestern Energy | 5.3x | Neutral | 4.32x | Top 10 | -1.7% | Less Likely | 26% | Less Likely | 66 | Neutral |
| SM Energy | 4.8x | Neutral | 1.39x | Neutral | -6.2% | Neutral | 28% | Less Likely | 61 | Neutral |
| Anadarko Petroleum | 4.6x | Neutral | 4.06x | Top 10 | 1.1% | Less Likely | 41% | Neutral | 57 | Neutral |
| **Studied** | | | | | | | | | | |
| Bill Barrett | 5.5x | Neutral | 0.82x | Neutral | -13.3% | Top 10 | 39% | Neutral | 50 | Less Likely |
| Noble Energy | 5.4x | Neutral | 1.09x | Neutral | -2.5% | Less Likely | 31% | Less Likely | 61 | Neutral |
| Marathon Oil | 5.0x | Neutral | 1.35x | Neutral | 1.4% | Less Likely | 22% | Less Likely | 60 | Neutral |
| Ultra Petroleum | 4.6x | Neutral | 0.15x | Less Likely | -3.5% | Less Likely | 47% | Top 10 | 57 | Neutral |
| QuickSilver | 4.2x | Neutral | 0.31x | Less Likely | -18.0% | Top 10 | 60% | Top 10 | 55 | Less Likely |
| Murphy Oil | 4.2x | Less Likely | 5.75x | Top 10 | -6.0% | Neutral | 10% | Less Likely | 54 | Less Likely |
| EQT Corp. | 3.1x | Less Likely | 0.59x | Less Likely | -4.1% | Less Likely | 36% | Neutral | 53 | Less Likely |
| Cimarex Energy | 3.7x | Less Likely | 0.43x | Less Likely | -2.6% | Less Likely | 10% | Less Likely | 75 | Neutral |
| Rosetta Resources | 3.6x | Less Likely | 1.94x | Top 10 | -3.9% | Less Likely | 29% | Less Likely | 53 | Less Likely |
| Devon Energy | 3.4x | Less Likely | 2.32x | Top 10 | -0.6% | Less Likely | 20% | Less Likely | 60 | Neutral |
| Carrizon Oil and Gas | 3.4x | Less Likely | 0.35x | Less Likely | -11.9% | Top 10 | 56% | Top 10 | 55 | Less Likely |
| EOG Resources | 3.3x | Less Likely | 0.57x | Neutral | -6.9% | Top 10 | 28% | Less Likely | 64 | Neutral |
| SandRidge | 3.2x | Less Likely | 0.19x | Less Likely | -31.9% | Top 10 | 58% | Top 10 | 51 | Less Likely |
| Newfield Exploration | 2.8x | Less Likely | 6.17x | Top 10 | -3.2% | Less Likely | 44% | Top 10 | 49 | Less Likely |
| Denbury Resources | 2.7x | Less Likely | 0.55x | Less Likely | -2.1% | Less Likely | 33% | Less Likely | 54 | Less Likely |
| QEP | 2.1x | Less Likely | 3.16x | Top 10 | 0.6% | Less Likely | 32% | Less Likely | 52 | Less Likely |
| Pioneer Resources | 2.0x | Less Likely | 0.61x | Neutral | -2.1% | Less Likely | 34% | Less Likely | 58 | Neutral |
| Whiting Petroleum | 1.3x | Less Likely | 5.35x | Top 10 | -4.6% | Neutral | 29% | Less Likely | 64 | Neutral |
| Occidental Petroleum | 1.2x | Less Likely | 0.36x | Less Likely | 5.6% | Less Likely | 14% | Less Likely | 76 | Neutral |
| Concho Resources | 0.9x | Less Likely | 0.29x | Less Likely | 1.0% | Less Likely | 36% | Neutral | 51 | Less Likely |
| Apache Corp. | NA | | 1.15x | Neutral | 6.0% | Less Likely | 19% | Less Likely | 62 | Neutral |
| Energy Partners | NA | | 1.44x | Neutral | 15.3% | Less Likely | 29% | Less Likely | 53 | Less Likely |
| Energy XXI | NA | | 0.60x | Neutral | 17.4% | Less Likely | 47% | Neutral | 52 | Less Likely |
| Stone Energy | NA | | 0.43x | Less Likely | 2.0% | Less Likely | 46% | Neutral | 62 | Neutral |
| Kodiak Oil & Gas | NA | | 0.17x | Less Likely | -6.5% | Neutral | 10% | Less Likely | 57 | Less Likely |
| McMoRan Exploration | NA | | 0.15x | Less Likely | -17.9% | Neutral | 25% | Less Likely | 72 | Neutral |
| ATP Oil & Gas | NA | | 0.07x | Less Likely | -4.1% | Less Likely | 90% | Neutral | 67 | Neutral |
| W&T Offshore | NA | | 0.01x | Less Likely | 8.7% | Less Likely | 56% | Neutral | 56 | Less Likely |

Source: Company Proxy Statements, FactSet, UBS estimates, Herolds, Wood Mackenzie, and company documents

- **Adding some further refinement to the list of potential takeout candidates generated from our analysis, we outline below the companies we believe to be the more likely takeout candidates**.

### Most Likely Takeout Targets

- **Anadarko Petroleum (Buy).** Following the recent Macondo settlement which removed a large financial uncertainty, we believe Anadarko is a willing seller and note CEO Jim Hackett has been a seller in the past (Seagull Energy, Ocean Energy) and would be one of the biggest compensation beneficiaries amongst E&P CEOs from a change in control. We believe Anadarko would be attractive to a Super-Major or NOC as it offers both attractive North American unconventional resource potential in the Eagle Ford, Marcellus, and Niobrara as well as a large queue of discoveries to develop in the leading deepwater exploration plays in the Gulf of Mexico, west Africa Cretaceous Fan Play, pre salt Brazil and offshore east Africa in Mozambique. Based on current NYMEX futures strip prices, we believe Anadarko would seek a takeout price in the $120-125/share range, but note there is a relatively short list of potential buyers given the potential size of a deal.

- **Cabot Oil & Gas (Not Rated).** Cabot's operations are primarily focused in one of the most prolific areas of the Marcellus Shale play, Susquehanna County where Cabot offers attractive, visible natural gas weighted production growth in the basin with the most favorable natural gas economics. Cabot holds an estimated ~21 Tcf of unbooked resource potential in the Marcellus with a companywide unbooked resource potential-to-proved reserve ratio of 8.4x, the third highest of the companies we surveyed. This large resource inventory would provide an ample platform for a resource-starved Major with a constructive long-term view on natural gas price fundamentals to enter the trend and develop the resource base. Notably, the Marcellus has witnessed some of the largest deals involving US Majors over the past 2 years with the entry of XOM through its acquisition of privately-held Phillips and CVX through its purchases of Atlas and Chief Oil and Gas. Cabot could prove an attractive takeout candidate with a concentrated resource base in the core of the Northeast Marcellus…and notably at a more reasonable EBITDX multiple than its closest comparison in the trend, Range Resources.

- **Continental Resources (Not Rated).** Continental appears to provide an excellent entry point into the Bakken with nearly 540 MMBoe of unbooked resource potential in the trend (including the Montana Bakken) according to John S. Herold (which is well below its internal Bakken resource estimate of >1 BBoe) and a well above average 6.3x unbooked resource potential-to-proved reserve ratio. A first-mover in the trend with a substantial core acreage position of over 900,000 net acres, CLR could be an attractive bolt-on driver of meaningful production growth for a late-entrant Major to the Bakken. Furthermore, founder and CEO Harold Hamm, owns an ~$8.2 billion equity stake in the company at current prices, or ~68% of shares outstanding which is the largest insider stake holding among the E&Ps we analyzed. Such a highly concentrating holding could present liquidity issues and it is likely that it could be effectively monetized only in an outright sale of the company. We would note that Mr. Hamm is 65 years of age and that 5 of the past 7 domestic public corporate M&A sellers above $1 billion were sold by their respective founders.

— **Oasis Petroleum (Buy).** OAS is one of a handful of publicly traded small-cap E&Ps with pure play exposure in the Bakken Shale. With ~303,000 net acres in the play, we estimate it holds ~288 MMBoe of unbooked Bakken resource potential, placing its unbooked resource potential-to-proved reserve ratio of 7.2x near the top of the E&P group surveyed. Notably, OAS holds an estimated incremental ~196 MMBoe of resources in the Three Forks Sanish formation where the company's drilling activities have been limited to date. We believe Oasis could be an attractive bolt-on acquisition target for companies looking to expand their existing footprint in the Williston Basin. However, we see Oasis as a more likely seller post 2012 upon further de-risking of their Montana Bakken acreage and Three Forks Sanish resource potential, enabling a better gauge of the companywide resource potential. In addition, we note that CEO Thomas Nusz is only 51 years old and his payout package in the event of a takeout is worth only a small fraction of his current holding, implying little incentive to sell in the near term.

— **Plains Exploration & Production (Not Rated).** With a 5.8x resource potential to proved reserve ratio and strong management incentives as CEO James Flores holds the largest dollar amount of unvested stock of the CEOs we surveyed, Plains Exploration screens well as a potential takeout candidate. Although PXP lacks material exposure to many of the emerging liquids rich resource plays, we believe it offers a unique combination of Eagle Ford exposure and deepwater GoM exploration upside which may well suit a Major or NOC, as well as Haynesville exposure providing tail gas upside longer term. An acquirer could see value in PXP’s 58,700 net Eagle Ford acres located between the oil and gas condensate windows, where management expects production of over 20 MBoed net in 2012. Additionally, we believe a Major or NOC would be attracted to the quality of PXP’s deepwater GOM assets which includes a 23% working interest in Lucius with ~106 MMBoe of net resource potential as well as a deep calendar of exploration prospects over the next 3 years.

— **Range Resources (Neutral).** We believe it is a matter of when not if Range Resources is acquired. It has the third largest acreage position in the Marcellus Shale, behind only Chesapeake Energy and Chevron, making it the biggest pure play target for a Major interested in building a position in the largest and lowest cost gas shale play in the US. While Range boasts the largest unbooked resource potential-to-proved reserve ratio in the companies surveyed in this report, we believe management will wait to put the company up for sale until after it has further appraised the resource size in the northeast portion of the Marcellus and its Upper Devonian and Utica shale acreage. We believe Range would be a more likely seller in 2013 than 2012, as the company is not financially stretched and should have capex nearly matching cash flow by 2014 enabling it to await an improvement in gas prices.

- **SM Energy (Not Rated).** With nearly 200,000 net acres in the Eagle Ford Shale, SM Energy could prove an appealing small-cap bolt-on acquisition target for a Major. Of its Eagle Ford acreage, approximately 150,000 net acres are in the condensate window (100% working interest) which offers some of the most attractive economics in the play. SM is testing downspacing pilots on its operated acreage, down to 625 foot spacing, which could further boost its resource potential if successful. SM is carried by JV partner Mitsui on its remaining ~46,000 net acres in the Eagle Ford oil window for the next several years. SM offers an above average unbooked resource potential-to-proved reserve ratio of 4.8x. SM also offers unconventional upside in the Bakken/Three Forks where it holds 205,500 net acres. Companywide, SM expects ~35-40% production growth in 2012.

- **Southwestern Energy (Buy).** Southwestern boasts an above average unbooked resource potential-to-proved reserve ratio, and could attract a Major bullish on longer term natural gas given its sector leading position in the Fayetteville Shale. We believe the Fayetteville is the second lowest cost gas shale play in the US, and SWN is still in the early stages of developing it. With acreage largely held by production and the midstream infrastructure built out, Southwestern's Fayetteville play offers a less complicated development opportunity to other shale plays making it an attractive target to a large foreign operator with less experience in the US.

### Less Likely Takeout Targets

- **Chesapeake Energy (Neutral).** Chesapeake has one of the highest resource potential-to-proved reserve ratios among the E&Ps and arguably one of the best onshore unconventional resource asset bases with exposure in both gas and liquids rich resource plays. While CHK significantly outspends organic cash flow, the company is able to meet its cash flow shortfall with proceeds from sale of non-E&P assets, joint ventures, VPP and royalty trusts. Also, it is one of the most expensive stocks in our universe on cash flow multiples, and would require very large capex commitment even for a major. In addition, we believe CEO Aubrey McClendon is not a willing seller and is also not incentivized to sell considering his relatively small payout package at change of control relative to the value of his current stake in the company, which is much lower post the 2008 margin call. Moreover, we believe the numerous JVs with Majors would potentially sour any potential buyers.

- **Comstock Resources (Not Rated).** Comstock offers an above average unbooked resource potential-to-proved reserve ratio. However, the vast majority of it is in the Haynesville Shale. We view the Haynesville as less attractive to potential suitors interested in natural gas, as it is a higher cost basin than the Marcellus which offers several takeout candidates.

- **Forest Oil (Not Rated).** While management may be a willing seller and its unbooked resource potential-to-proved reserve ratio is an above average 5.6x, we do not believe Forest's assets would attract the Majors.

Its Eagle Ford results have been below the industry average, operations have been challenged in the Granite Wash, and we believe the Haynesville Shale is more challenged than other gas shale plays in the current environment.

- **Swift Energy (Not Rated).** Swift's large unbooked resource potential-to-proved reserve ratio of 9.9x would appear to make it an attractive takeout candidate; however, we view it as unlikely for several reasons. First the majority of its unbooked resource is in the gas-prone portion of the Eagle Ford shale which is not nearly as attractive as the liquids rich window. Secondly, the CEO is only 55 years old and does not receive a particularly large payout package in the event of a takeout.

### Our Wildcard Takeout Pick

- **EOG Resources (Neutral).** While EOG does not screen in our analysis as a top takeout target, we believe it could be acquired within the next 18 months for several reasons. EOG's unbooked resource potential-to-proved reserve ratio of 3.3x is below the median of 4.2x but we believe its Eagle Ford shale resource potential may be under-stated. And if its Wolfcamp Shale position proves commercial, we think EOG would have sufficient resources to attract a Major. Moreover, it offers one of the best technical teams in the industry . . . a team that can be credited with "cracking the code" on horizontal drilling development of gas shales in the Barnett in 2004 and then cracking the code on oil shales in the Bakken a few years later. With CEO Mark Papa retiring in May 2013 and the presumed successor (Loren Leiker) unexpectedly resigning last summer, we believe the odds of EOG being a more willing seller have increased.

## M&A Activity Fairly Steady from 2001-2008 . . . But Majors' Acquisition Appetite is Growing

M&A activity by Major Oil companies has been increasing in the U.S. since 2009

- **Over the past decade, domestic upstream M&A activity has been fairly steady with proved reserve acquisitions ranging between 2-3 BBoe per year, enabling an average of just over 2.5 BBoe.** Measuring M&A activity by total transaction dollar value, the deal pace has averaged roughly $35 billion per annum since 2001. However, a notable increase in transaction value has occurred since 2006 as the increase in the price of oil boosted the average price paid per Boe. *Given the trend of rising acquisition costs per Boe is correlated to higher oil prices, we believe measuring M&A activity levels by proved reserves transacted rather than dollar value is more instructive of trends.*

- **We estimate M&A activity in 2011 reached the second highest level in terms of proved reserves acquired and dollars spent, behind only 2009 which was boosted by ExxonMobil's $40.5 billion acquisition of XTO Energy.** 2011 activity has been headlined by BHP's acquisitions of both Petrohawk Energy and CHK's Fayetteville Shale assets, Statoil's recently announced acquisition of Brigham Exploration, KKR's planned acquisition of Samson Resources, and Chesapeake's recent Utica Shale joint ventures. It is worth noting that four of the five largest transactions in 2011 involved Integrateds buying independent E&P companies, highlighting the newly emerging trend of Major Oil companies returning to the US via M&A. This emerging trend has enabled 2011 total transaction volume, both on dollar volume and on a proved reserve basis, to end the year at the second highest level in the last decade (behind only 2009 when XOM announced its acquisition of XTO Energy). Exhibits 3 and 4 below highlight the aggregate proved barrels of oil equivalent and dollar level of E&P M&A activity by year since 2001.

Exhibit 3: E&P M&A Transactions 2001 to 3Q11 – Annual Reserves Acquired

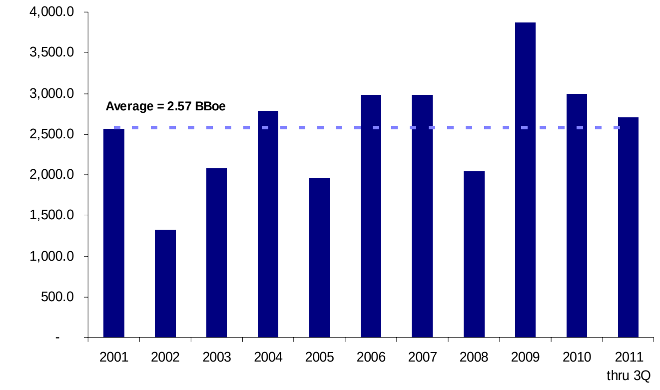
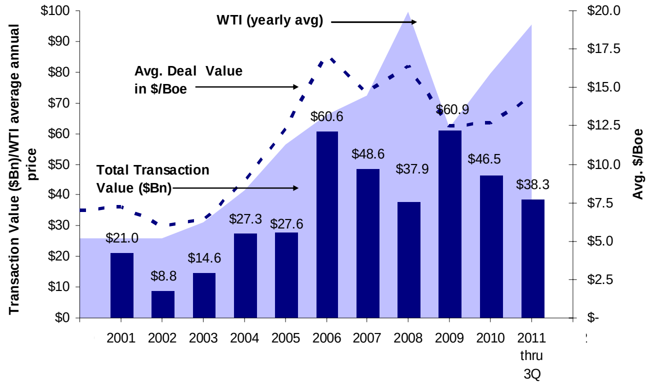



Exhibit 4: E&P M&A Transactions 2001 to 3Q11 – Total Transaction Value and $/Boe




Source: Company documents, IHS Herold Quarterly Upstream Transaction Review.
Note: Transactions in Exhibit 3-4 are through 3Q11 only and do not include acreage deals

Majors and NOCs have become aggressive acquirers of North American oil and gas assets…

- **The most important domestic E&P M&A trend over the past several years has been the emergence of Majors and National Oil Companies as active, aggressive acquirers of North American oil and gas resources…at both the corporate and asset levels.** After decades of being net sellers of US properties as they sought larger resources and higher returns abroad, the Majors along with rising, cash-flush NOCs have returned to North America with a vengeance as net buyers of E&P assets. See Exhibits 5 and 6.

…with the number of acquisitions seen in the past 2 years nearly double the level seen previously

- **The Majors and NOCs have picked up the pace of U.S. acquisitions over the past 2 years, with the number of acquisitions nearly double the levels seen in prior years.** Other than ConocoPhillips' rather ill-timed, pricey $36.5 billion acquisition of Burlington Resources in 2005, the turning point marking the beginning of the return of the Majors to the US really began with ExxonMobil's December 2009 acquisition of XTO Energy. Since then, the shear number of acquisitions by the Majors and NOCs in the US has jumped markedly, with 24 transactions in 2010 (8 transactions greater than $1 billion) and 23 in 2011 (8 greater than $1 billion). See Exhibit 7.

Exhibit 5: Net U.S. M&A (acreage and reserves) by Majors and NOCs ($MM) – 1995 to 2011

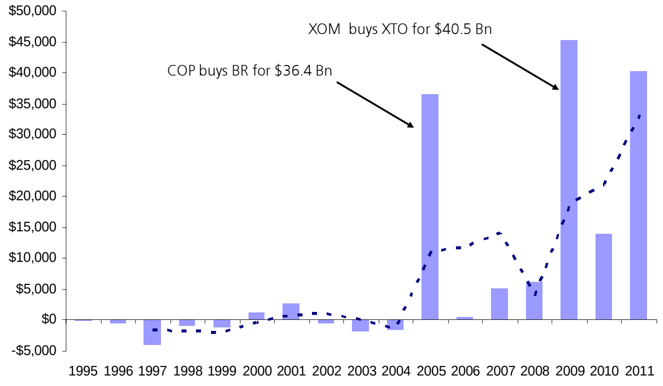
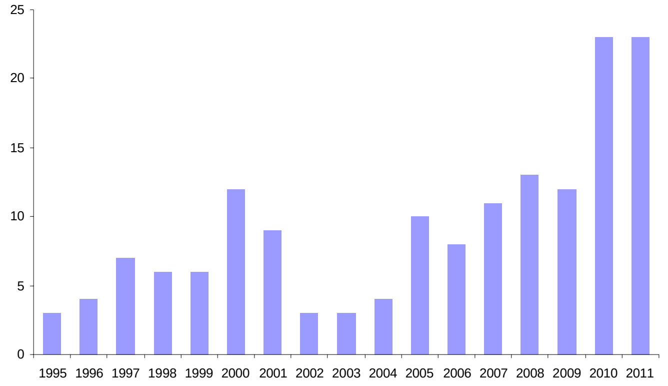



Exhibit 6: Number of Publicly Announced U.S. Acquisitions by Majors and NOCs – 1995 to 2011




Source: Company documents, IHS Herold M&A Database

Majors' deal appetite for domestic shale plays is evolving from joint ventures to operatorship

- **The Majors' initial foray into domestic shale plays were often structured as joint ventures, where international players such as Statoil and BP invested as passive partners with E&P companies such as CHK in the Marcellus and Fayetteville, respectively, with the goal of climbing the shale gas learning curve.** Fast forward to the current environment and the Majors are increasingly interested in the outright acquisition and operation of assets, particularly punctuated by ExxonMobil's acquisition of XTO Energy in 2009, Chevron's purchase of Atlas Energy in the Marcellus in 2010, Statoil's takeover of Brigham Exploration in the Bakken this fall, and BHP's purchase of Petrohawk Energy this summer to gain entry to the Haynesville and Eagle Ford Shales. Even recently active JV signatories such as Total and Reliance have built out or are in the process of building out dedicated US-based management teams….clearly implying a growing acquisition appetite and desire to ultimately operate and control a larger suite of assets in the US. Exhibit 7 below shows major domestic transactions since 2009.

### Exhibit 7: Notable US M&A Transactions 2008-present

| Date | Buyer | Seller | Purchase Price (bn) | Location | JV/Acquisition |
|---|---|---|---|---|---|
| | | | **2012** | | |
| 1/3/2012 | Sinopec | Devon Energy | $2.5 | 5 New Venture Plays | Joint Venture |
| | | | **2011** | | |
| 12/22/2011 | Repsol | SandRidge Energy | $1.0 | Horizontal Miss | Joint Venture |
| 11/30/2011 | KNOC | Apollo, Parallel Petroleum | $0.8 | Permian, E. Tx | Corporate |
| 11/22/2011 | KKR | Samson | $7.2 | Permian, MidCon, Bakken | Corporate |
| 11/3/2011 | Total | CHK, Enervest | $2.4 | Utica | Joint Venture |
| 10/17/2011 | Statoil | BEXP | $4.8 | Bakken | Corporate |
| 9/8/2011 | HESS | Marquette Exploration | $0.8 | Utica | Corporate/Asset |
| 9/7/2011 | HESS | CONSOL | $0.6 | Utica | Joint Venture |
| 8/18/2011 | NBL | CONSOL | $3.4 | Marcellus | Joint Venture |
| 7/15/2011 | BHP | Petrohawk | $15.2 | Eagle Ford/Haynesville | Corporate |
| 6/29/2011 | Mitsui | SM Energy | $0.7 | Eagle Ford | Joint Venture |
| 6/16/2011 | Laredo Petroleum | Broad Oak Energy | $1.0 | Permian/MidCon | Corporate |
| 6/8/2011 | XOM | Phillips Resources | $1.7 | Marcellus | Corporate |
| 6/1/2011 | MRO | Hilcorp/KKR | $3.5 | Eagle Ford | Asset |
| 5/4/2011 | CVX | Chief Oil & Gas | NA | Marcellus | Asset |
| 3/21/2011 | KNOC | APC | $1.6 | Eagle Ford/Pearsall | Joint Venture |
| 2/21/2011 | BHP | CHK | $4.8 | Fayetteville | Asset |
| 1/31/2011 | CNOOC | CHK | $1.3 | Niobrara | Joint Venture |
| | | | **2010** | | |
| 11/22/2010 | HESS | TRZ Energy | $1.1 | Bakken | Asset |
| 11/9/2010 | CVX | ATLS | $4.3 | Marcellus | Corporate |
| 10/10/2010 | CNOOC | CHK | $2.2 | Eagle Ford | Joint Venture |
| 10/10/2010 | Statoil/Talisman | Enduring Resources | $1.3 | Eagle Ford | Joint Venture |
| 7/20/2010 | CXO | Marbob Energy | $1.3 | Permian | Corporate |
| 6/2/2010 | SD | Arena Resources | $1.3 | Permian/MidCon | Corporate |
| 6/24/2010 | Reliance | PXD | $1.3 | Eagle Ford | Joint Venture |
| 5/28/2010 | RDS | East Resources | $4.7 | Marcellus | Corporate |
| 5/10/2010 | BG | EXCO | $1.0 | Marcellus | Joint Venture |
| 4/15/2010 | APA | Mariner | $4.7 | GoM/Permian | Corporate |
| 4/9/2010 | Reliance | ATLS | $1.7 | Haynesville/Bossier | Joint Venture |
| 2/16/2010 | Mitsui | APC | $1.4 | Marcellus | Joint Venture |
| | | | **2009** | | |
| 12/30/2009 | Total | CHK | $2.3 | Barnett | Joint Venture |
| 12/14/2009 | XOM | XTO | $40.5 | Multiple Trends | Corporate |
| 6/30/2009 | BG | EXCO | $1.1 | Haynesville | Joint Venture |
| 5/18/2009 | ENI | KWK | $0.3 | Barnett | Joint Venture |
| | | | **2008** | | |
| 11/11/2008 | Statoil | CHK | $3.0 | Marcellus | Joint Venture |
| 9/2/2008 | BP | CHK | $1.9 | Fayetteville Shale | Joint Venture |
| 7/17/2008 | BP | CHK | $1.8 | Woodford | Asset |
| 6/10/2008 | XTO | Hunt Petroleum | $4.2 | Onshore Gulf/Bakken | Corporate |

Source: IHS Herold M&A Database, Company documents

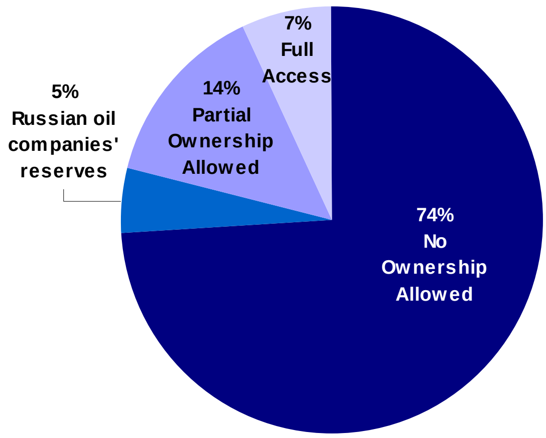
## Why are the Majors Returning Their Focus to North America?

- **We believe the emergence of the Majors as active acquirers of North American assets comes down to four reasons: 1) availability of massive resources; 2) the need to re-deploy vast cash flows; 3) transfer of domestic shale knowledge to overseas asset base; and 4) more efficient capital allocation**.

  — **Advances in unconventional oil and gas development have unlocked massive resource potential in North America**. According to the Energy Information Administration, the US has discovered ~750 Tcf of natural gas shale and 23 BBoe of liquids in a handful of oil shales, and we believe both of these estimates are low, particularly the oil estimate as numerous breakthroughs have occurred since the report was researched. If one were to include the oil sands and shale resource in Canada, the unconventional resource opportunity set in North America is far too large

After decades of declining oil production and peaking conventional production, technological advances have unlocked massive shale resource potential to ignore, even for elephant-hunting Majors. And it is particularly important for the Majors who have been slowly crowded out of access to resources internationally. According to PFC Energy, the Majors had full access to 75% of the world's oil reserves in 1970, but that access has shrunk to just 7% today or 21% if partial ownership of proved reserves is included. US oil production had been on a steady decline since 1970, and natural gas appeared to be destined for a similar fate until the shale gas revolution began in the middle of last decade. ***Against this backdrop, after having been net sellers of US assets for decades, the Majors have expanded their US holdings dramatically over the past 3 years as it became increasingly apparent that shale gas and unconventional oil presented a massive resource development opportunity.*** Majors have been gobbling up domestic acreage as they seek to match the scale achieved by the independents in the extraction of shale resources, while NOCs have partnered with E&Ps in order to move up the shale oil and gas learning curve.

Exhibit 8: 2010 global oil reserves, split by non-state oil companies' level of access

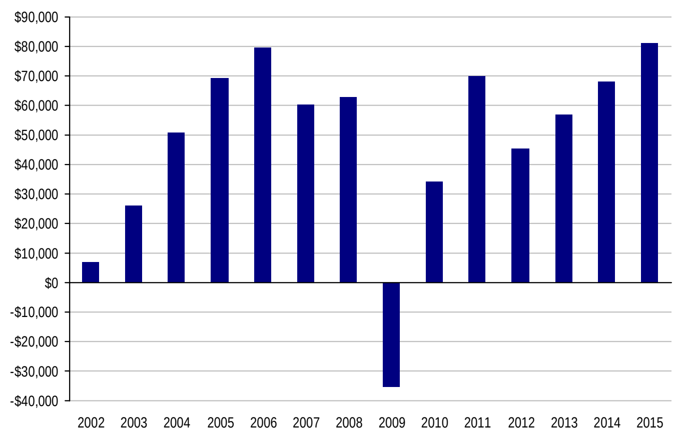



Source: Wall Street Journal and PFC Energy

Majors need to reinvest the massive waves of free cash flow enabled by $100/Bbl oil at a time access to resources has been reduced aboard

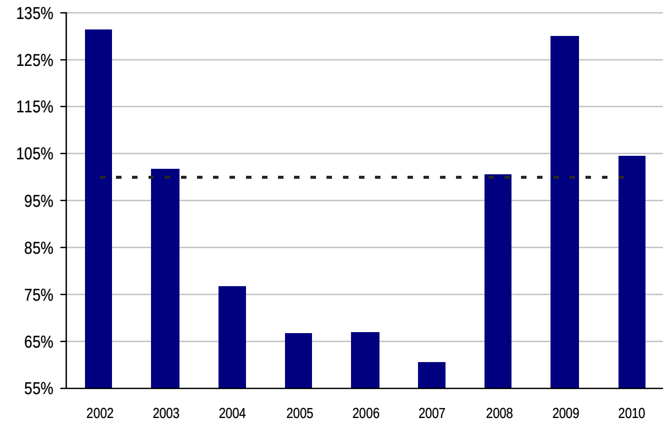
– **The Majors need to re-deploy their vast free cash flows.** From 2011-15, we assume the Majors will generate aggregate free cash flow in the range of $50-80 billion per annum after funding capex and dividends. While this is in the range of the per annum free cash flow generated from 2004-08, we believe managements now have the conviction that higher oil prices are likely more sustainable, unlike the disbelief many managements (e.g., ExxonMobil, TOTAL) had in rising crude prices from 2004-08. Additionally, exploration programs have been disappointing with the vast majority of Majors missing out on the largest exploration finds of the last 3+ years in Brazil's pre-salt, the West Africa Cretaceous Fan Play, and offshore deepwater east Africa. In fact, the OECD-based Majors have only materially replaced production in two out of the past nine years. (See Exhibit 10) Despite the Majors' continued generation of attractive ROCE and free cash flow, equity valuations have de-rated 1 ½ EV/DACF multiple points over the last two years and more over the last decade as investors seek higher growth entities. Given lackluster exploration programs and limited access to resources for companies of this size, the enormous shale and oil sands resource development potential in the US and Canada which both offer stable, attractive fiscal terms is an opportunity too attractive to ignore for Majors seeking profitable growth.

Exhibit 9: OECD Based Integrateds Aggregate Free Cash Flow, 2002-2015E




Source: Company documents and UBS estimates
Free cash flow defined as operating cash flow less capital expenditures and dividends.
Note: companies included in aggregate calculation are: BG Group, BP, Chevron Corp., ConocoPhillips, Eni, ExxonMobil, GALP, Hess Corp., Husky Energy, Imperial Oil, Lukoil, Novatek, OMV, Repsol YPF, Royal Dutch Shell, Statoil, Suncor, Surgutneftegaz, TNK-BP Holding, and TOTAL

Exhibit 10: Reserve replacement (ex. acquisitions /disposals)




Source: Company documents and UBS estimates
Note: companies included in aggregate calculation are: BG Group, BP, Chevron Corp., ConocoPhillips, Eni, ExxonMobil, Hess Corp., Lukoil, Novatek, OMV, Repsol YPF, Royal Dutch Shell, Statoil, Suncor, TNK-BP Holding, and TOTAL.

NOCs pursue US shale for both access to resource and desire to transfer knowledge to be applied to international assets

— **The NOCs' desire to transfer US shale knowledge to overseas asset bases.** Since 2008, we estimate there have been 17 JV carry transactions in shale or unconventional oil plays whereby an E&P company sells a portion of undeveloped acreage in exchange for a larger company paying cash upfront and the promise to "carry" the E&P company's proportionate capex obligations on a pre-determined capital amount. These relatively new type of transactions were pioneered by Chesapeake Energy in 2008 with the BP/Fayetteville deal and the Statoil/Marcellus deal. The benefit to the seller in these JV/carry deals is threefold: 1) cash proceeds to recoup costs from leasing the play; 2) the drilling carry reduces future capital expenditures, easing potential financing burdens and improving capital efficiency; and 3) the transaction provides a per acre market value on these nascent plays, potentially boosting the seller's equity value. The benefit to the buyer in these transactions is twofold: 1) access to resources in unconventional oil and gas plays the buyer may have missed during the leasing phase; and 2) transfer of knowledge from the JV seller as the buyer benefits from the accumulated expertise of the seller in the play.

  — **Since 2008, there have been 17 material JVs disclosed in the U.S. with an aggregate transaction value of $29.5 billion for over 3.3 million net acres**.

  — **Other than one transaction each in the Niobrara and Horizontal Mississippi, all of these JVs have been in shale plays. The buyers**

**in all cases except one have been Major Oil companies and/or NOCs**.

— **Of the 17 transactions, over three quarters of the buyers were companies that have little or no operating expertise in the US at the time of the transaction**. Notably, several of these buyers – Reliance, Total, and Statoil – have expressed a desire to increase their presence in unconventional shale plays in the US and ultimately operate assets. And several buyers – Reliance, KNOC, Repsol, and Total – would like to gain expertise of unconventional shale development in the US to deploy on assets internationally.

Exhibit 11: Buyers of JV/Carry Transactions Tend to be Majors/NOCs with Little or No Onshore US Expertise

| Date | Buyer | Seller | Purchase Price (Bn) | Net Acres | Location |
|---|---|---|---|---|---|
| | | | **2012** | | |
| 1/3/2012 | Sinopec | Devon Energy | $2.5 | 466,620 | 5 New Venture Plays |
| | | | **2011** | | |
| 12/22/2011 | Repsol | SandRidge Energy | $1.0 | 363,000 | Horizontal Mississippi |
| 11/3/2011 | Total | CHK, Enervest | $2.4 | 156,250 | Utica |
| 9/7/2011 | HESS | CONSOL | $0.6 | 100,000 | Utica |
| 8/18/2011 | NBL | CONSOL | $3.4 | 331,675 | Marcellus |
| 6/29/2011 | Mitsui | SM Energy | $0.7 | 39,000 | Eagle Ford |
| 3/21/2011 | KNOC | APC | $1.6 | 96,000 | Eagle Ford/Pearsall |
| 1/31/2011 | CNOOC | CHK | $1.3 | 266,400 | Niobrara |
| | | | **2010** | | |
| 10/10/2010 | CNOOC | CHK | $2.2 | 200,000 | Eagle Ford |
| 6/24/2010 | Reliance | PXD | $1.3 | 118,208 | Eagle Ford |
| 5/10/2010 | BG | EXCO | $1.0 | 93,000 | Marcellus |
| 4/9/2010 | Reliance | ATLS | $1.7 | 120,000 | Marcellus |
| 2/16/2010 | Mitsui | APC | $1.4 | 100,000 | Marcellus |
| | | | **2009** | | |
| 12/30/2009 | Total | CHK | $2.3 | 67,500 | Barnett |
| 6/30/2009 | BG | EXCO | $1.1 | 120,000 | Haynesville |
| | | | **2008** | | |
| 11/11/2008 | Statoil | CHK | $3.4 | 585,000 | Marcellus |
| 9/2/2008 | BP | CHK | $1.9 | 135,000 | Fayetteville Shale |

Source: Company documents

Majors can pay premiums given lower cost of capital and financial capacity to accelerate development

— **The Majors can more efficiently deploy capital in shale development than E&P companies.** For starters, Majors are generating significant free cash flow while the average E&P company in our coverage universe has a negative 2012E projected free cash flow yield of -5.5% based on consensus estimates. *While poorly capitalized E&Ps have to tap capital markets, sell down working interests or JV plays to fund development, a better capitalized Major would not face this funding pressure and can accelerate development and pull net present value forward when developing these large scale resources*. *Additionally, the lower cost of capital of Majors enables them to pay a higher price for assets than an E&P company*. For example, we estimate the NAV for a long lived shale-rich company like Range Resources is $83 per share assuming the typical E&P discount rate of 10%; however, if we drop the discount rate to 8% (more typical of a rate that a larger, better capitalized Major might use when evaluating acquisitions), Range's NAV would climb 37% to $114 per share.

## Which E&Ps are the Most Attractive to Acquisitive Majors?

E&Ps with high unbooked resource potential to proved reserve ratios are the most attractive to potential acquirers

- **We believe E&Ps with the highest unbooked resource potential relative to proved reserves are the most attractive take-out candidates.** When acquiring companies, we believe the buyer generally expects to receive a cost of capital return on proved reserves acquired and generate incremental economic returns on the development of unbooked resources. Thus, the larger the ratio of unbooked resources relative to proved reserves, the more attractive the asset base or company appears to an acquirer. Following the initial land grab and appraisal stage in various shale plays, many early entrants to resource plays are now sitting on a vast and largely de-risked resource base. And many of these companies have limited financial capacity to develop these resources in a timely fashion. Given slower than optimal development pace and ongoing concerns around capex funding, E&Ps with a large resource base are typically valued at a discount to NAV and at a low EV/3P Boe resource multiple as investors are unwilling to give full credit for resources that will not be developed in the near or even medium term. Meanwhile, potential acquirers seeking large pools of resources have the financial capabilities to accelerate activity levels leading to higher present value of assets, employ a lower cost of capital, and they also have the longer term investment horizon to be willing to value resource plays at normalized commodity prices higher than what the market may be embedding in equity valuations. This last point is particularly important as we believe some Majors appear to be willing to use a long term gas price assumption of $6.00/MMBtu, above 2016 curve of $4.90/MMBtu.

RRC, SFY, COG, XCO and OAS rank the highest on this metric

- **Exhibit 12 ranks unbooked resource potential to proved reserve ratios for 36 E&P companies based either on Herold's resource potential estimates or company documents.** Among the listed, **RRC, SFY, COG, XCO** and **OAS** have the highest ratios, and three of these companies are specialized in a single resource play which account for the majority of the companywide resources, potentially attracting an acquirer interested in building a position in a single basin. Notably, outsized resources in the **Marcellus** and **Eagle Ford** Shale plays contribute to companywide resources for a majority of the companies that rank favorably on this metric. We provide key highlights for each of these companies below:

  - **Range Resources** has the highest unbooked resource potential to proved reserve ratio of 10.8x in the companies surveyed with a total resource potential base of 48 Tcfe. RRC is the second biggest operator in the Marcellus Shale in terms of resources (following CHK which has more than double the acreage) with 17-24 Tcfe of net unproven resource potential in the Southwest liquids-rich Marcellus and 5-8 Tcfe in the Northeast dry-gas Marcellus. It also holds 10-14 Tcfe in the Upper Devonian Shale and 8-10 Tcfe in the Nora, Midcontinent, and Permian plays.

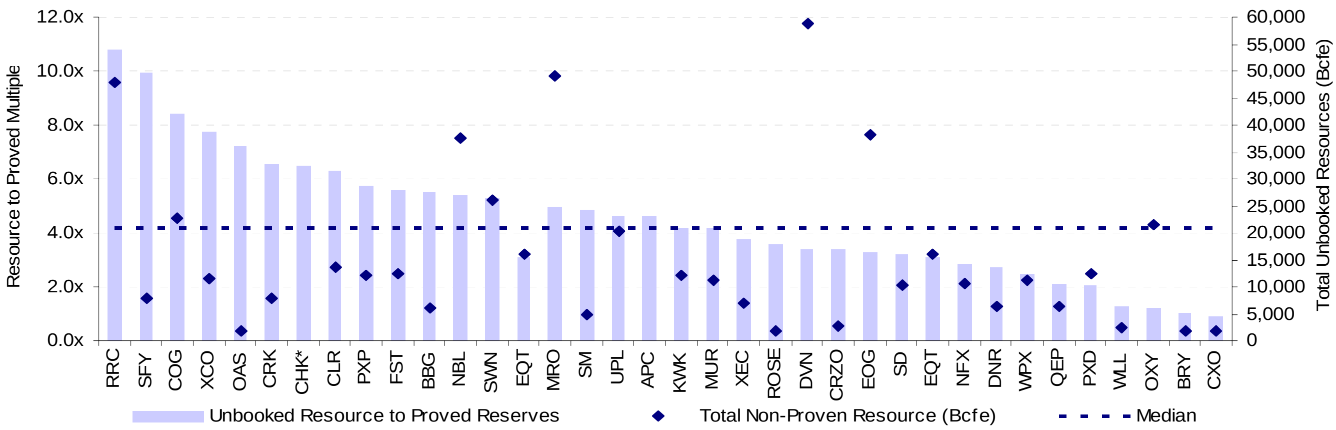
  - **Swift Energy** estimates that it holds 7.9 Tcfe of unbooked resources, nearly ten times its proved reserve base of 797 Bcfe at year-end 2010. The emerging Eagle Ford Shale play accounts for 6 Tcfe of the companywide resources, where the company has ~80,000 net acres with two thirds in McMullen County; we believe the majority of SFY's Eagle Ford shale acreage is in the dry gas window. SFY is the lone operator targeting the horizontal Olmos development, which overlies the Eagle Ford Shale, where it holds an estimated 1.2-1.8 Tcfe of net unbooked resources. Lastly, the Austin Chalk development in Central Louisiana/East Texas adds another 55-85 MMBoe of unbooked resources.

— **Cabot Oil and Gas** has the third highest resource base in the Marcellus with 15-27 Tcfe of unbooked resources entirely in Susquehanna County. The company is also increasing its oil exposure through development of the Eagle Ford Shale play, where its ~60,000+ net acre position in the oil window offers 120-240 MMBoe of net recoverable resources. In addition, COG holds ~1.4 Tcf of net potential in the Haynesville/Bossier plays where its working interest was reduced to 66% following 3 joint venture agreements in 2011.

— **EXCO Resources** is estimated to hold 11.6 Tcfe of unproven resource potential, with 7 Tcfe in Haynesville/Bossier shale plays, 4.4 Tcfe in Appalachia and 200 Bcfe in the Permian. XCO has 152,000 net acres in East Texas/North Louisiana, 379,000 net acres in Appalachia with ~140,000 net acres prospective for the Marcellus Shale and ~83,000 net acres in the Permian. We would note that the greater percentage of unbooked resource in the higher cost Haynesville Shale may prove less attractive to potential buyers, which may be a factor in EXCO management failing to obtain sufficient financing in a buyout effort in 2011.

— **Oasis Petroleum** is a pure play Bakken E&P with all of its unbooked resources in the Bakken and Three Forks Sanish formations in the Williston Basin. We estimate its unbooked Bakken resource potential at ~288 MMBoe, more than 7 times its proved reserves at year-end 2011. Notably, OAS' unbooked resource to proved reserve ratio excludes ~196 MMBoe of unbooked resources in the Three Forks given limited drilling activities to date. If we include unbooked Three Forks resource potential, OAS' ratio would be a much higher >12x.

Exhibit 12: Which Companies Have the Highest Unbooked Resource-to-Proved Reserve Ratio in the E&P Universe?




Source: Herolds and company documents
*CHK total resource potential is 110.7 Tcfe

- **We believe M&A activity will be most active in shale plays with the highest returns and most fragmented corporate/asset landscape.** Given these two prerequisites, the Eagle Ford Shale, Marcellus Shale and the Permian Basin are likely to see the highest level of M&A activity given their superior economics relative to other shale plays and a rather large number of independent operators in the play. With the resource land grab largely over, access to the most attractive plays is challenged as existing operators looking to expand their footprint must pursue corporate or asset acquisitions as traditional leasing in these plays dries up. As a result, new players seeking entry to an established resource play are more likely to take the route of corporate acquisitions, as shown by CVX's acquisition of Atlas Energy and Chief Oil and Gas in the Marcellus. We would also point out the Fayetteville Shale as an example of a basin less likely to see consolidation going forward as it is already dominated by a handful of operators (primarily SWN, XOM and BHP) with limited opportunities for additional entrants. **We outline below key players and their associated resource potential in each leading shale play where we believe we should see the most M&A activity in the next several years:**

Eagle Ford Shale, Marcellus Shale and Permian Basin are likely to see the most M&A activity going forward given attractive returns and fragmented corporate/asset landscape

Exhibit 13: Key Eagle Ford Shale operators and associated resource potential

| Eagle Ford Shale Company | Estimated Company Net Acreage | Estimated Company Unbooked Reserves (Bcfe) | Source (Acreage/Resource) |
|---|---|---|---|
| EOG Resources | 610,000 | 5,400 | Company |
| Apache Corporation | 450,000 | Not Available | WoodMackenzie |
| Chesapeake Energy | 460,000 | 8,000 | Company |
| BHP (Petrohawk Energy) | 347,600 | 13,480 | Petrohawk Estimates (April 2011) |
| Shell | 250,000 | Not Available | WoodMackenzie |
| ConocoPhillips | 240,000 | Not Available | WoodMackenzie |
| SM Energy | 196,000 | 3,235 | Company/ WoodMackenzie |
| Marathon | 285,000 | 4,200 | Company |
| Anadarko | 300,000 | 2,100 | Company |
| Murphy Oil | 220,000 | 7,002 | Company/ Herold |
| CNOOC | 200,000 | 3,478 | WoodMackenzie/ Pro rata CHK Est |
| El Paso | 170,000 | 2,184 | Company |
| Pioneer Natural Resources | 147,000 | 5,520 | Company/ Herold |
| Reliance | 118,000 | Not Available | WoodMackenzie |
| Forest Oil | 118,000 | 924 | Company |
| Swift Energy | 80,000 | 6,000 | Company |
| BP | 100,000 | Not Available | WoodMackenzie |
| Talisman | 80,000 | 3,300 | Company |
| Statoil | 80,000 | 3,300 | Talisman (50/50 JV) |
| Rosetta Resources | 65,000 | 1,716 | Company/ Herold |
| Cabot Oil & Gas | 60,000 | 1,080 | Company/ Herold |
| Plains Exploration | 58,700 | 978 | Company |
| Carrizo Oil & Gas | 41,000 | 487 | Company |
| Comstock | 28,000 | 498 | Company |

Source: Herold, WoodMackenzie and company documents

CHK, MUR, EOG, PXD and SFY hold the highest identified resource potential in the Eagle Ford among E&Ps

## Exhibit 14: Key Marcellus Shale operators and associated resource potential

CHK, RRC, and COG hold the highest identified resource potential in the Marcellus Shale

| Marcellus Shale Company | Estimated Company Net Acreage | Estimated Company Unbooked Reserves (Bcfe) | Source (Acreage/Resource) |
|---|---|---|---|
| Chesapeake Energy | 1,780,000 | 37,800 | Company |
| Chevron | 825,000 | NA | WoodMackenzie |
| Range Resources Corp | 790,000 | 27,000 | Company |
| Seneca Resources (National Fu | 745,000 | 11,500 | Company |
| Statoil | 682,000 | Not Available | Company |
| EQT Corporation | 530,000 | 9,300 | Company |
| ExxonMobil | 425,000 | Not Available | WoodMackenzie |
| CNX Gas | 423,000 | 11,333 | Company/ UBS Estimate |
| Shell | 350,000 | Not Available | WoodMackenzie |
| Noble Energy | 314,000 | 7,400 | Company |
| Ultra Petroleum | 260,000 | 9,500 | Company |
| Anadarko | 260,000 | 6,000 | Company |
| Talisman | 223,000 | 6,000 | Company |
| EOG Resources | 210,000 | 3,073 | Company |
| Cabot Oil & Gas | 200,000 | 20,975 | Company |
| Southwestern Energy | 173,009 | 7,000 | Company/ UBS Estimate |
| EXCO Resources | 140,000 | 4,400 | Company/ Herold |
| Reliance | 137,000 | Not Available | WoodMackenzie |
| Mitsui | 122,000 | 2,815 | WoodMackenzie/ Pro rata APC Est |
| Enerplus | 110,000 | 2,300 | Company |
| Carrizo Oil & Gas | 100,595 | 1,711 | Company |
| WPX Energy (Williams) | 99,301 | 1,600 | Company |
| BG Group | 93,000 | 2,400 | Company (Base on EXCO JV details) |
| Rex Energy | 64,100 | 403 | Company/ WoodMackenzie |

Source: Herold, WoodMackenzie and company documents

## Exhibit 15: Key Permian Basin operators and associated resource potential

APA, OXY, CHK, PXD, SD, and DVN have the most exposure to the Permian Basin among the E&Ps

| Permian Basin Company | Estimated Company Net Acreage | Estimated Company Unbooked Reserves (Bcfe) | Source (Acreage/Resource) |
|---|---|---|---|
| Apache | 2,651,000 | Not Available | WoodMackenzie |
| Occidental petroleum | 2,235,000 | 15,000 | WoodMackenzie/ Herold |
| ExxonMobil | 2,156,000 | Not Available | WoodMackenzie |
| Chevron | 1,130,000 | Not Available | WoodMackenzie |
| ConocoPhillips | 1,040,000 | Not Available | WoodMackenzie |
| Devon Energy | 950,000 | 6,000 | WoodMackenzie/Company |
| Chesapeake Energy | 830,000 | 2,700 | Company |
| Pioneer Natural Resources | 755,000 | 6,900 | WoodMackenzie/ Herold |
| SandRidge Energy | 728,000 | 1,152 | WoodMackenzie/ Herold |
| EOG Resources | 490,000 | 602 | WoodMackenzie/ Herold |
| Cimarex Energy | 448,000 | 2,534 | Company/WoodMackenzie |
| SM Energy | 373,000 | Not Available | WoodMackenzie |
| Concho Resources | 342,000 | 1,770 | WoodMackenzie/ Herold |
| Anadarko | 330,000 | Not Available | Company |
| El Paso | 138,000 | 889 | Company |
| Range Resources | 115,000 | 750 | WoodMackenzie/Company |
| Whiting Petroleum | 89,852 | 288 | Company/ Herold |
| EXCO Resources | 83,000 | 200 | Company/ Herold |
| Forest Oil | 51,000 | Not Available | Company |
| Comstock Resources | 44,000 | 929 | Company |

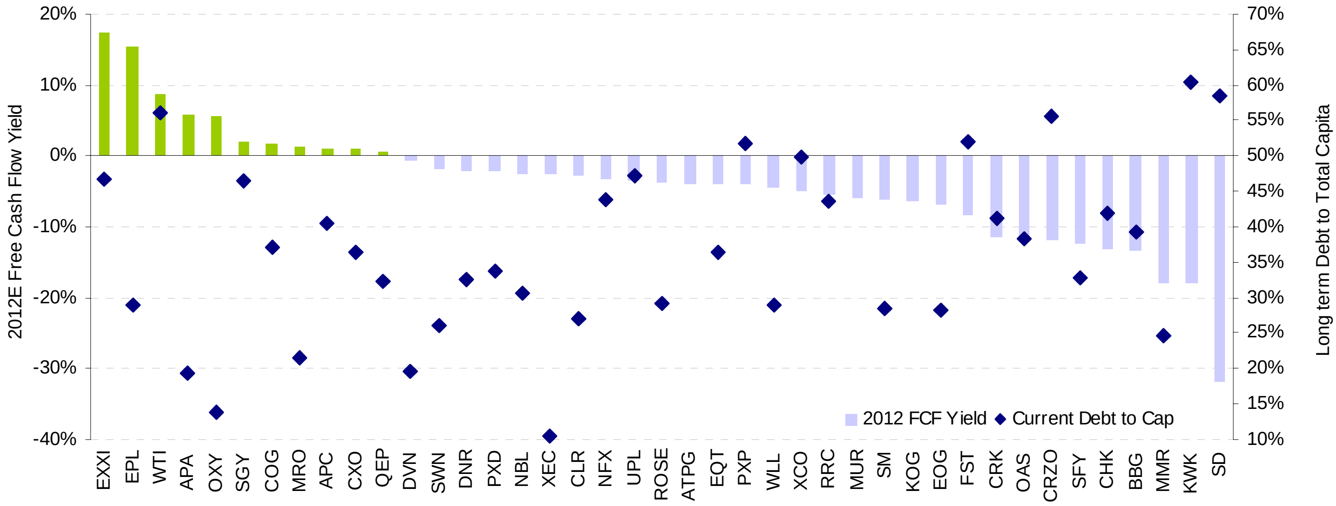
Source: Herold, WoodMackenzie and company documents

Financially strapped companies may be more likely acquisition targets... such as SD, KWK, and SFY

- **Gas weighted independents with a weak balance sheet may prove to be more likely acquisition targets in the near term commodity price environment.** Out of the 41 E&Ps studied in this report, 30 companies are projected to outspend cash flow in 2012 based on consensus estimates, a decrease of just 3 companies from 2011 level. We believe E&P companies outspend cash flow partly due to 1) drilling to hold acreage prompts drilling activity at levels higher than what economics may otherwise dictate– a phenomena that is now more pronounced in emerging liquids rich resource plays such as the Eagle Ford, Horizontal Mississippian and the Utica Shale plays than the maturing shale gas plays e.g., Fayetteville, Haynesville, and

Barnett Shales; and 2) E&P equity performance is highly correlated to production growth rather than ROCE, often prompting managements to pursue aggressive growth strategies even at the expense of returns. We believe financially strained companies are more likely to be involved in M&A activity to either fund future capital programs or divest acreage that cannot be developed organically. And for those that hold outsized resource bases, the most sensible outlet may just be an outright sale. And with many Majors seemingly willing to assume a higher long term natural gas price than what is currently on the long dated futures curve ($4.90/MMBtu in 2016) and employ their lower cost of capital, we believe financially strapped, gas weighted E&Ps with large resource bases are more likely to attract acquisition minded Majors.

Exhibit 16: E&P universe 2012E free cash flow yield and current debt to capitalization ratio based on consensus estimates




Source: Factset

## Who are the Motivated Sellers?

**We believe one of the motives for a CEO to sell a company is an attractive compensation package associated with a change of control.** A study of proxies of the largest 40 publicly traded E&Ps enables us to determine which CEOs would benefit most financially from being acquired.

We assume a 25% takeout premium when ranking payout packages

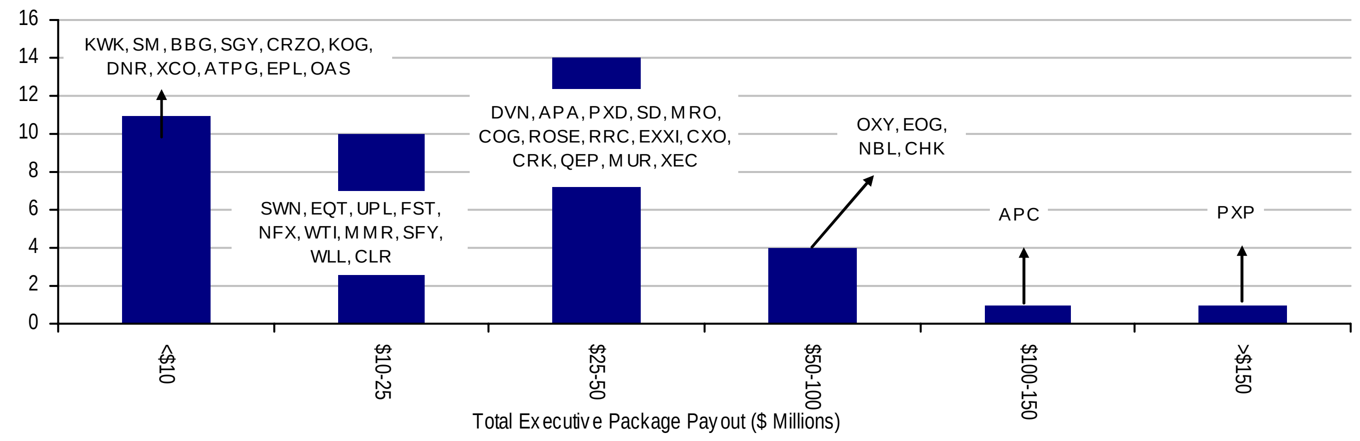
- **By studying the most recent Proxy statements of 41 of the largest publicly traded E&P companies, we calculated the total payout packages of the CEOs of each company.** Where applicable, total payout packages consist of vested and unvested stock options, unvested stock, cash severance, bonus payment, health and retirement benefits, unused vacation and any other payments associated with a change in control (ex. certain companies include payments for placement services and tax gross-ups). We assume a 25% takeout premium from stock price as of December 30th, 2011 for all payout packages, and note that changing the assumed premium could change the value of outstanding options and stock that would vest upon change in control. For companies which have a different Chairman from the CEO (Occidental Petroleum, Devon Energy, Southwestern Energy, and Range Resources), the payout was calculated for both executives.

— **Out of the 41 CEO payout packages we calculated, over half have payouts in the range of $10-$50 million.** There are 2 outliers who have estimated change in control payouts above $100 million which include James C. Flores of **Plains Exploration & Production (Not Covered)** and James Hackett of **Anadarko Petroleum (Buy)**. We would also note that Dr. Ray Irani, Executive Chairman of OXY has a total payout well above $100 million. While we do not view OXY as a takeout candidate due to its large size, we see APC as an attractive acquisition candidate, given its large unbooked resource potential in the US onshore, premier deepwater international portfolio amongst independents, and CEO Jim Hackett's history as a willing seller. We estimate the top 10 highest payout packages for CEOs of the publicly traded E&P universe in order are: **PXP, APC**, **Occidental Petroleum (Buy)**, **EOG Resources (Neutral), Noble Energy (Buy), Chesapeake Energy (Neutral), Devon Energy (Buy), Apache (Buy), Pioneer Natural Resources (Neutral),** and **SandRidge (Neutral)** – all of which we estimate come in at >$45 million per CEO.

CEOs of APC, OXY, EOG, NBL, CHK, DVN, APA and PXD have the highest absolute payout packages among the large cap E&Ps…

…while CEOs of PXP, SD, COG, ROSE, EXXI, CXO, CRK and QEP have the highest packages among the SMID cap E&Ps

Exhibit 17: Number of E&P CEOs Per Payout Package Range




Source: SEC filings, company documents, and UBS estimates

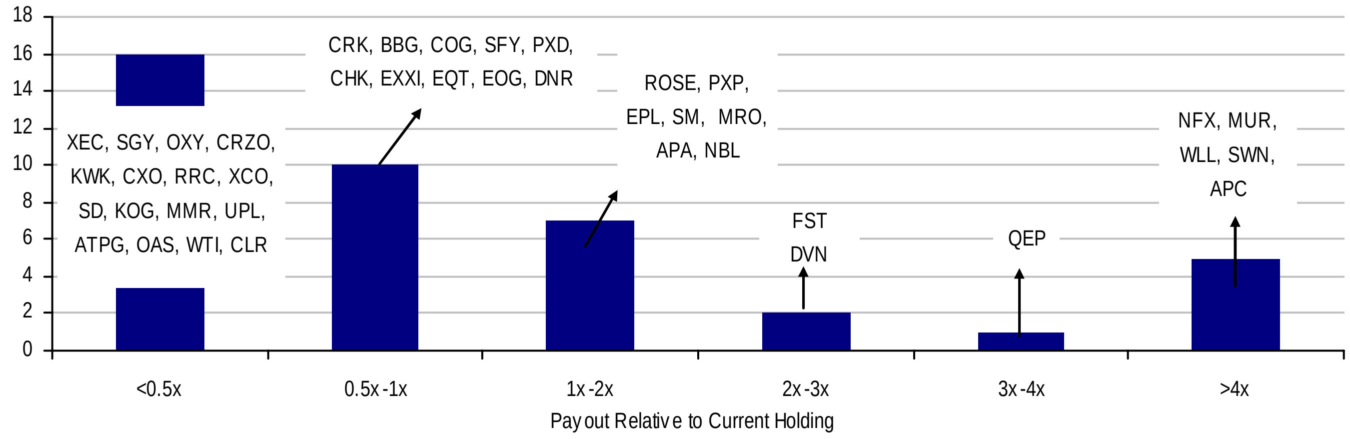
- **In addition to comparing total payout packages among CEOs, we also believe it is pertinent to compare payout relative to the executives' current holdings.** We believe this is a relevant metric as executives would be more incentivized to sell if their change in control payouts are significantly larger than their current vested stock in the company which they presumably could liquidate at any time. Meanwhile, executives are less likely to sell if they already have a proportionately high vested stake in the company. Thus, a higher payout relative to current holdings ratio indicates more incentive to sell the company.

— In the E&P universe, our calculations show that CEOs Lee Boothby at **Newfield Exploration (Buy)**, David Wood at **Murphy Oil (Neutral)** and James Volker at **Whiting Petroleum (Not Covered)** have the highest payout/holding ratios. The 10 E&P CEOs with the highest payout vs. current holdings ratios include: NFX, MUR, WLL, **Southwestern Energy (Buy), Anadarko Petroleum (Buy), QEP Resources (Buy),**

NFX, MUR, WLL, SWN, and APC have the highest ratios of total payout value relative to current holding value… more indicative of a CEO's financial motivation to sell

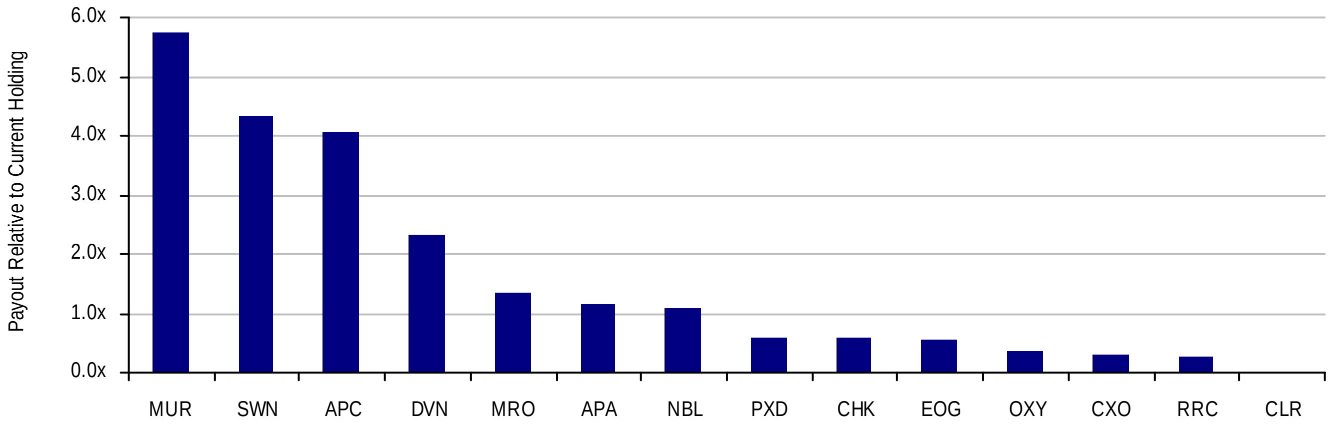
**Forest Oil (Not Covered), Devon Energy (Buy), Rosetta Resources (Not Covered) and Plains Exploration & Production (Not Covered).**

Exhibit 18: Number of E&P CEOs Based on Takeover Payout vs Current Holding Value



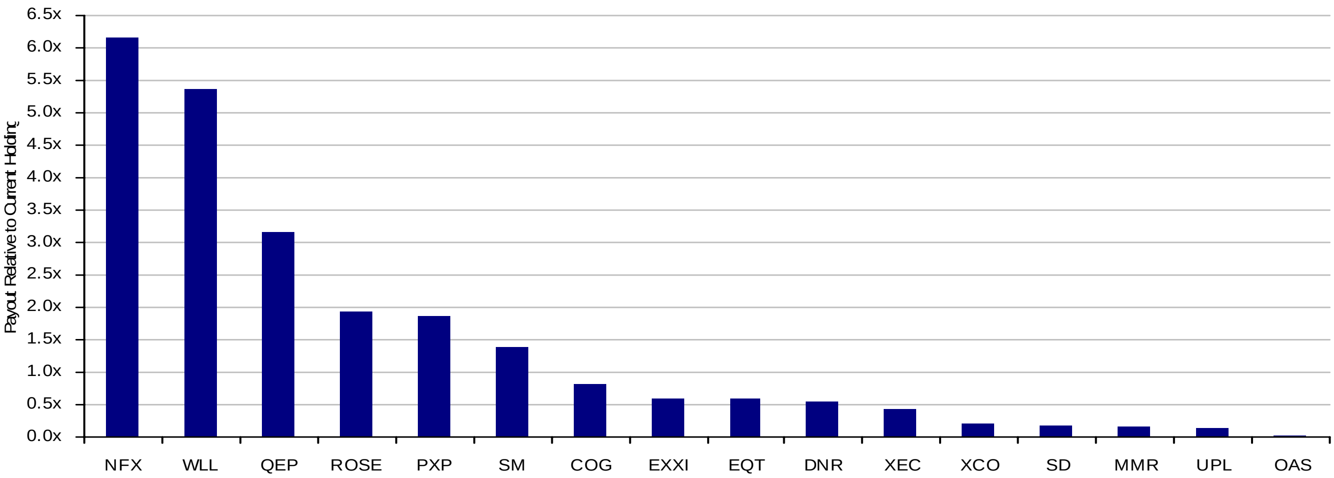

Source: SEC filings, UBS estimates, FactSet

Exhibit 19: Top 20 E&P CEO Change in Control Payout to Current Holding Ratios for Large Cap E&Ps



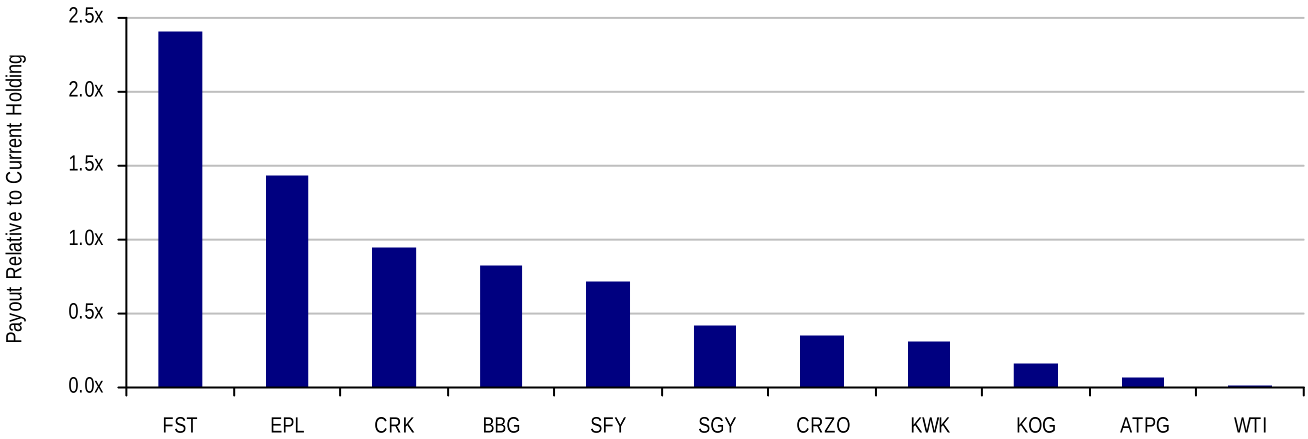

Source: SEC filings, UBS estimates, FactSet

Exhibit 20: Top 20 E&P CEO Change in Control Payout to Current Holding Ratios for Mid Cap E&Ps



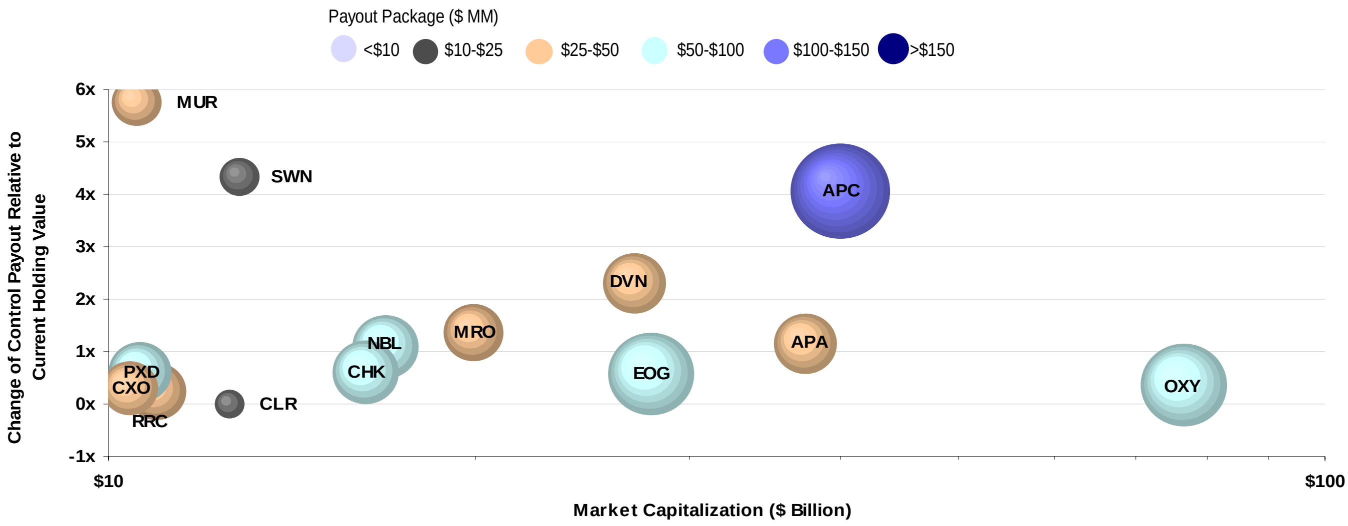

Source: SEC filings, UBS estimates, FactSet

Exhibit 21: Top 20 E&P CEO Change in Control Payout to Current Holding Ratios for Small Cap E&Ps




Source: SEC filings, UBS estimates, FactSet

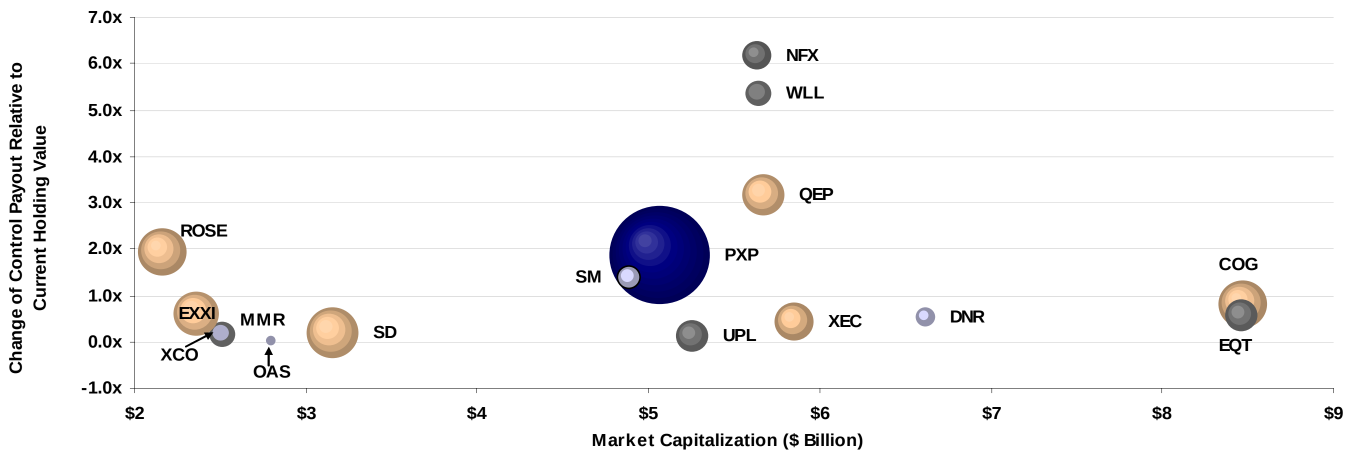
## Exhibit 22: CEO Compensation for Large Cap E&Ps




Source: Company Proxy Statements, FactSet, UBS estimates

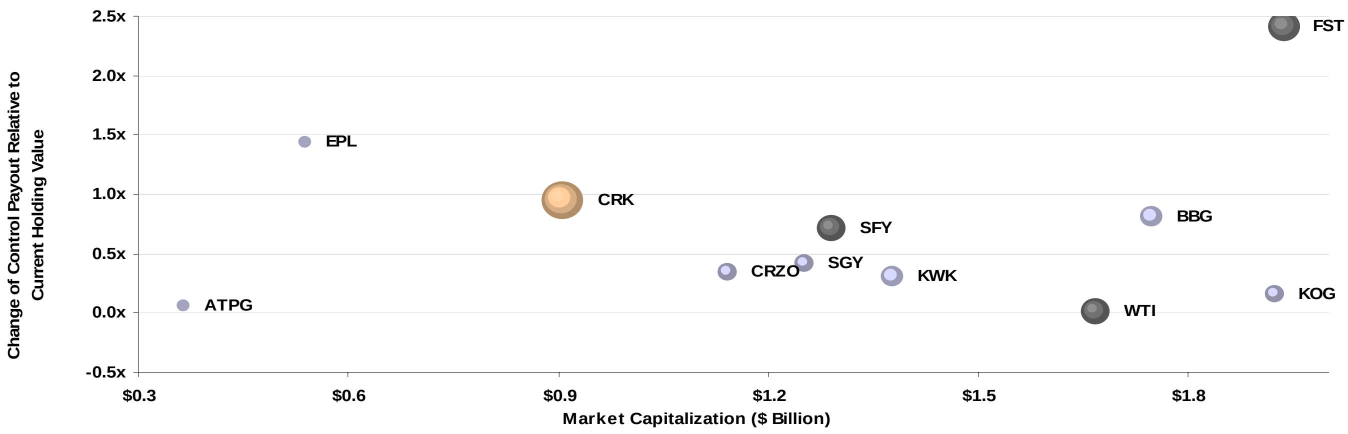
Note: X-axis is on a logarithmic scale

## Exhibit 23: CEO Compensation for Mid Cap E&Ps




Source: SEC filings, UBS estimates, FactSet

## Exhibit 24: CEO Compensation for Small Cap E&Ps




Source: SEC filings, UBS estimates, FactSet

# CEOs Approaching Retirement More Likely to Sell: Myth or Reality?

There is no meaningful correlation between the CEO's age and their willingness to sell

- **For our study, we retraced domestic corporate E&P M&A transactions of >$1 billion over the past decade involving publicly-traded companies.** Initially, we approached the data with an admitted bias that E&P CEOs are more likely sellers as they near retirement age. Accordingly, one would then presume that the average age of the *seller* would be higher than the average age of the *buyer*. ***However logical our predetermined view may have seemed, the data we analyzed yielded no meaningful correlation between the CEO's age and the willingness to sell.*** In the 30 largest corporate transactions in our sample from 2000 to present, we estimate the average CEO age at time of sale was 57.1 years old. Of this sample, the CEO of the seller was older than the buyer in 12 instances, younger than the buyer in 15 instances, with 3 transactions consummated by CEOs of equal age. Exhibit 25 highlights the transactions we analyzed with a break out of the CEO age of buyer and seller as well as transaction size.

Exhibit 25: Major U.S. E&P Corporate M&A Transactions, 2000 to 2011

| Date | Buyer | CEO | Age | Seller | Transaction Size ($ MM) | CEO | Age | |
|---|---|---|---|---|---|---|---|---|
| Oct-11 | Statoil | Helge Lund | 49 | Brigham Exploration | 4,700 | Ben M. Brigham | 51 | seller older |
| Jul-11 | BHP Billiton Group | Marius Kloppers | 49 | Petrohawk Energy | 15,223 | Floyd Wilson | 64 | seller older |
| Nov-10 | Chevron | John Watson | 53 | Atlas Energy Inc | 4,315 | Edward E. Cohen | 70 | seller older |
| Apr-10 | Apache | Steve Farris | 61 | Mariner Energy Inc | 4,685 | Scott Josey | 52 | seller younger |
| Apr-10 | SandRidge Energy | Tom Ward | 50 | Arena Resources, Inc. | 1,287 | Phillip Terry | 62 | seller older |
| Dec-09 | Exxon Mobil | Rex Tillerson | 57 | XTO Energy | 40,496 | Bob Simpson | 62 | seller older |
| Nov-09 | Denbury Resources | Gareth Roberts | 56 | Encore Acquisition Company | 4,465 | Jon Brumley | 70 | seller older |
| Apr-08 | Stone Energy | David Welch | 59 | Bois d'Arc Energy Inc | 1,750 | Gary Blackie | 59 | push |
| Jul-07 | Plains Exploration & Production | James Flores | 47 | Pogo Producing Company | 3,749 | Paul Van Wagenen | 61 | seller older |
| Jan-07 | Forest Oil Corporation | Craig Clark | 57 | The Houston Exploration Company | 1,827 | William Hargett | 56 | seller younger |
| Jun-06 | Anadarko Petroleum | James Hackett | 52 | Kerr-McGee | 19,623 | Luke Corbett | 59 | seller older |
| Jun-06 | Anadarko Petroleum | James Hackett | 52 | Western Gas Resources | 5,385 | Peter Dea | 52 | push |
| Apr-06 | Petrohawk Energy | Floyd Wilson | 59 | KCS Energy Incorporated | 2,008 | James Christmas | 58 | seller younger |
| Dec-05 | ConocoPhillips | Jim Mulva | 58 | Burlington Resources | 36,400 | Bobby Shackouls | 54 | seller younger |
| Oct-05 | Occidental Petroleum | Ray Irani | 70 | Vintage Petroleum | 4,119 | Charles Stephenson | 68 | seller younger |
| Sep-05 | Norsk Hydro ASA | Eivind Reiten | 51 | Spinnaker Exploration Company | 2,592 | Roger Jarvis | 51 | push |
| Jul-05 | Chevron | David O'Reilly | 58 | Unocal Corporation | 19,898 | Chuck Williamson | 56 | seller younger |
| Jan-05 | Cimarex Energy Co. | Frank Merelli | 69 | Magnum Hunter Resources, Inc. | 2,211 | Gary C. Evans | 47 | seller younger |
| Dec-04 | Noble Energy Incorporated | Charles Davidson | 55 | Patina Oil & Gas | 3,610 | Thomas Edelman | 53 | seller younger |
| May-04 | Pioneer Natural Resources | Scott Sheffield | 51 | Evergreen Resources | 2,175 | Mark Sexton | 48 | seller younger |
| Apr-04 | Encana | Gwyn Morgan | 58 | Tom Brown Incorporated | 2,744 | Jim Lightner | 51 | seller younger |
| Apr-04 | Kerr-McGee | Luke Corbett | 57 | Westport Resources | 3,664 | Donald Wolf | 60 | seller older |
| Feb-03 | Devon Energy | Larry Nichols | 60 | Ocean Energy | 5,280 | James Hackett | 49 | seller younger |
| Sep-01 | Dominion Resources Inc | Thomas Capps | 65 | Louis Dreyfus Natural Gas | 2,359 | Mark Monroe | 50 | seller younger |
| Aug-01 | Devon Energy Corporation | Larry Nichols | 58 | Mitchell Energy & Development | 3,502 | George Mitchell | 81 | seller older |
| May-01 | Kerr-McGee Corporation | Luke Corbett | 54 | HS Resources Inc | 1,841 | Nicholas Sutton | 56 | seller older |
| May-01 | Williams Companies Inc | Keith Bailey | 58 | Barrett Resources Corp | 2,995 | Peter Dea | 47 | seller younger |
| May-00 | Devon Energy | Larry Nichols | 51 | Santa Fe Snyder Corp | 3,468 | James Payne | 63 | seller older |
| Apr-00 | Anadarko Petroleum | Robert Allison | 61 | Union Pacific Resources Group Inc | 7,911 | George Lindahl | 53 | seller younger |
| Mar-00 | BP plc | John Browne | 52 | Vastar Resources Inc | 1,795 | Charles Davidson | 50 | seller younger |
| **Average age** | | | **56.2** | | | | **57.1** | |
| | | | | | | **# of times seller older** | **12** | |
| | | | | | | **# of times seller younger** | **15** | |
| | | | | | | **tie** | **3** | |

Source: Company documents, IHS Herold M&A database

- **The average buyer has been 56.2 years old while the average seller has been 57.1 years old in the largest E&P corporate transactions since 2000.** Correspondingly, the average CEO age for the 16 E&Ps in our coverage universe falls squarely in the middle at 56.8 years old. Analyzing a broader segment of the industry including many more resource plays and Small-to-Mid Cap E&Ps, we find an average CEO age of 57.4 years. Admittedly, this dataset does little to help isolate the age variable and its importance in the M&A calculus. However, we would note the following insights:

  - **Of the seller CEOs in the historical data we examined, three are still active and running publicly traded companies**: James Hackett of

**Anadarko Petroleum (Buy)**, Charles Davidson of **Noble Energy (Buy)**, and Gary Evans of **Magnum Hunter Resources (Not Covered).**

- **Of the seven most recent $1 billion+ corporate transactions involving publicly-traded companies since 2009, 5 companies (Brigham Exploration, Petrohawk, Atlas Energy, XTO Energy, and Encore Acquisition) were sold by their founders**. In each of these deals, the CEO of the seller was older than the buyer. The remaining two sellers, Arena Resources and Mariner Energy, involved companies which had been publicly traded in the current forms for less than ten years (ARD went public in 2001 while Mariner re-emerged out of the Enron bankruptcy)

- **In Appendix 4, we list age of Chairman/CEO for E&Ps studied in this report based on 2011 proxy filings.**

## How Much Shale Resource is in the U.S.?

Shale gas production now accounts for ~25% of domestic production

- **Unlocking the potential to develop shale resources has drastically changed the landscape of the US natural gas market and has the potential to meaningfully impact global supply.** US natural gas production was flat to declining before more widespread use of hydraulic fracturing and horizontal drilling unlocked significant shale gas resource potential starting in the Barnett Shale in 2004. Since then, the industry has discovered/unlocked vast shale gas resources in a number of very large shale plays, including the Haynesville, Fayetteville and Marcellus Shales in the US and the Montney and Horn River Shales in Canada. Virtually ignored at the turn of the millennium, a surge in shale gas development has enabled production from shales to account for ~25% of domestic production currently from less than 1% in 2000. Shale gas proved reserves reported by the EIA's annual reserve report has also grown nearly three-fold since 2007 to over 60.6 Tcf as of year end 2009, comprising 22% of total U.S. natural gas reserves. (Please note the Energy Information Administration will not disclose 2010 proved reserve data until April 2012). And with the fall in natural gas prices, oil and gas producers have shifted focus toward developing "liquids rich" plays in tight oil reservoirs including oil-prone shales.

EIA estimates total undeveloped shale gas resources at 750 Tcf

- **Recent study by the EIA estimates total *undeveloped* shale gas resources from 20 plays in the U.S. at a massive 750 Tcf as of *January 1st 2009*.** Given U.S. shale gas developments have seen tremendous activity growth and technological advance since the last assessment of the resource estimate, we believe current undeveloped resources could well exceed EIA's 750 Tcf estimate. To put the extraordinary size of the U.S. unconventional resource base into perspective, even EIA's stale resource estimate is more than 12 times the proven shale gas reserves and ~2.75 times the total proven gas reserves at year-end 2009. We also note that this figure excludes proven reserves and resources from newly discovered plays, such as the emerging Utica Shale play in Ohio. According to the Energy Information Administration, the Marcellus Shale is estimated to hold the highest resource potential at ~410 Tcf, with the Haynesville

Shale and Barnett Shale plays coming in at distant second and third with ~75 Tcfe and ~43 Tcfe of resource potential, respectively.

Base on our company level analysis, undeveloped U.S. shale oil resources could be more than double EIA's stale estimate of ~24 BBoe

- **U.S. oil supply is also being re-shaped by the discovery of several liquids-rich and oil shale plays, and recoverable resource estimate have yet to be properly estimated by the EIA given recent developments.** Base on 2009 data, EIA assessed resource potential from four shale oil plays in the U.S at a very conservative 24 BBoe. The largest formation according to the EIA is the Monterey/Santos play in California, which is estimated to hold 15.4 BBoe of shale oil resources. While we would not dispute the California resource potential, EIA's resource estimates for the other unconventional plays, Bakken, Eagle Ford and emerging Permian Basin plays seem very conservative based on our company analysis. In addition, the EIA places no estimate on the Niobrara Shale while we can reach a 2 BBoe resource estimate from just APC and NBL's assets alone in the play.
  - **The total of the available company resource estimates in the *Eagle Ford Shale* play according to our analysis is over 12 BBoe, well above EIA's estimate of 6.5 BBoe**. Our estimate even excludes resources from some of the biggest acreage holders, including **Apache, BHP, Royal Dutch Shell,** and **ConocoPhillips**.
  - **In the *Bakken Shale*, EIA's 3.6 BBoe resource estimate is only a fraction of the latest industry estimate of ~24 BBoe** which more accurately reflects the tremendous growth in drilling activities since 2009 (rig count rose from ~60 in Jan 2009 to ~150 in December 2011) and the more recent de-risking of the Three Forks/Sanish formation which underlies the Bakken Shale play.
  - **Lastly, our aggregate company resource estimates in the emerging unconventional plays in the *Permian Basin* exceed 6.6 BBoe, well above EIA's 2 BBoe estimate for the *Avalon and Bone Spring* plays combined**. Understandably, unconventional oil plays in the Permian Basin, such as the Avalon, Bone Springs, Wolfcamp, and Wolfberry, are all relatively recent developments over the last 2 years and after the date of the EIA study.
  - **We would also note that EIA's estimate does not even reflect potentially vast resources in the emerging *Horizontal Mississippian and Utica Shale* plays**. Based on our company level analysis, we preliminarily believe unconventional recoverable resources in the U.S. could easily more than double EIA's stale estimate. Nonetheless, the emergence of these plays has reversed a multi-decade slide in oil production, enabling US oil production to rise 2.1% in 2010 and 3.1% YTD through October.

Exhibit 26: EIA Estimates of Undeveloped Technically Recoverable Shale Resources as of ***Jan 1st, 2009***

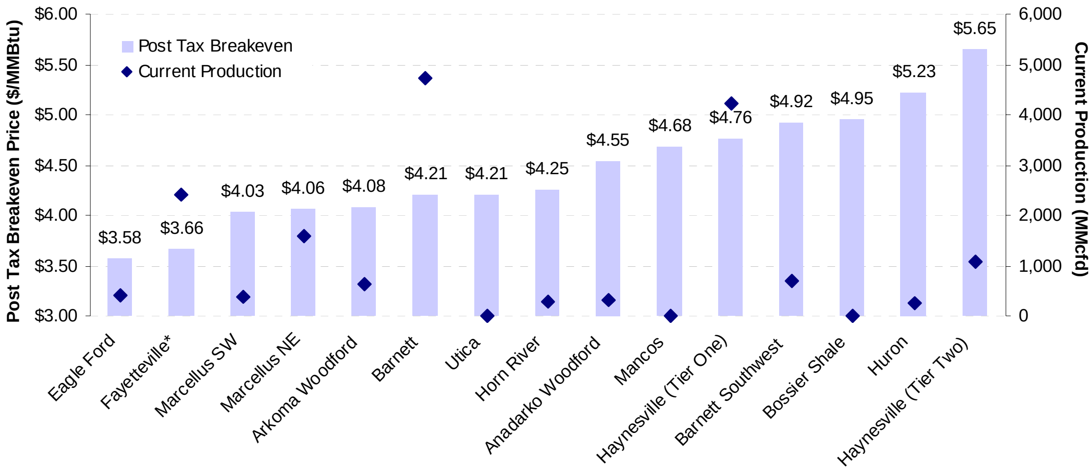
| Shale Play | Shale Gas Resource (Tcf) | Shale Oil Resource (BBbl) |
|---|---|---|
| Northeast | 471 | |
| Marcellus | 410 | - |
| Antrim | 20 | - |
| Devonian | 14 | - |
| New Albany | 11 | - |
| Greater Siltstone | 8 | - |
| Big Sandy | 7 | - |
| Cincinnati Arch | 1 | - |
| Gulf Coast | 100 | 3 |
| Haynesville | 75 | - |
| Eagle Ford | 21 | 3 |
| Floyd-Neal & Conasauga | 4 | - |
| Mid-Continent | 60 | |
| Fayetteville | 32 | - |
| Woodford | 22 | - |
| Cana Woodford | 6 | - |
| Southwest | 75 | 2 |
| Barnett | 43 | - |
| Barnett-Woodford | 32 | - |
| Avalon & Bone Springs | - | 2 |
| Rocky Mountain | 44 | 4 |
| Mancos | 21 | - |
| Lewis | 12 | - |
| Williston-Shallow Niobraran* | 7 | - |
| Hilliard-Baxter-Mancos | 4 | - |
| Bakken | - | 4 |
| West Coast | | 15 |
| Monterey/Santos | - | 15 |
| Total Onshore Lower-48 States | 750 | 24 |

Source: EIA

Low development costs make shale gas resources attractive to acquire

- **While we believe the economics of shale gas drilling are challenged at current price levels, shale gas is the lowest cost resource in the US and Majors with much longer investment time horizons are showing a desire to build positions in the best shale plays.** Excluding cost of acreage, Wood Mackenzie estimates that the Big-5 shale gas plays have development breakevens at less than \$5.00/MMBtu after factoring drilling, completion, and overhead. In particular, the Eagle Ford and Marcellus Shales have breakevens at or less than \$4.00/MMBtu. (see Exhibit 27) While Wood Mackenzie estimates the Fayetteville to have better economics than the Marcellus, our analysis shows that Fayetteville breakeven for the majority of the play acreage is actually at or above the \$4.00/MMBtu level. In addition, we believe the most prolific parts of the Marcellus Shale are economical at natural gas prices of \$2.75-\$3.00/MMBtu, below WoodMackenzie's estimate of ~\$4.00/MMbtu. However, if factoring in acreage spending and additional costs from midstream infrastructure development, full-cycle breakeven prices are obviously higher given the high leasehold acquisition costs during the land grab in the last several years. Nevertheless, development costs for shale gas plays are still much more competitive than that of conventional assets and operators continue to make advances in drilling and completion technology, which enable further reduction to unit costs.

Exhibit 27: Lower-48 Development Breakevens 10% IRR

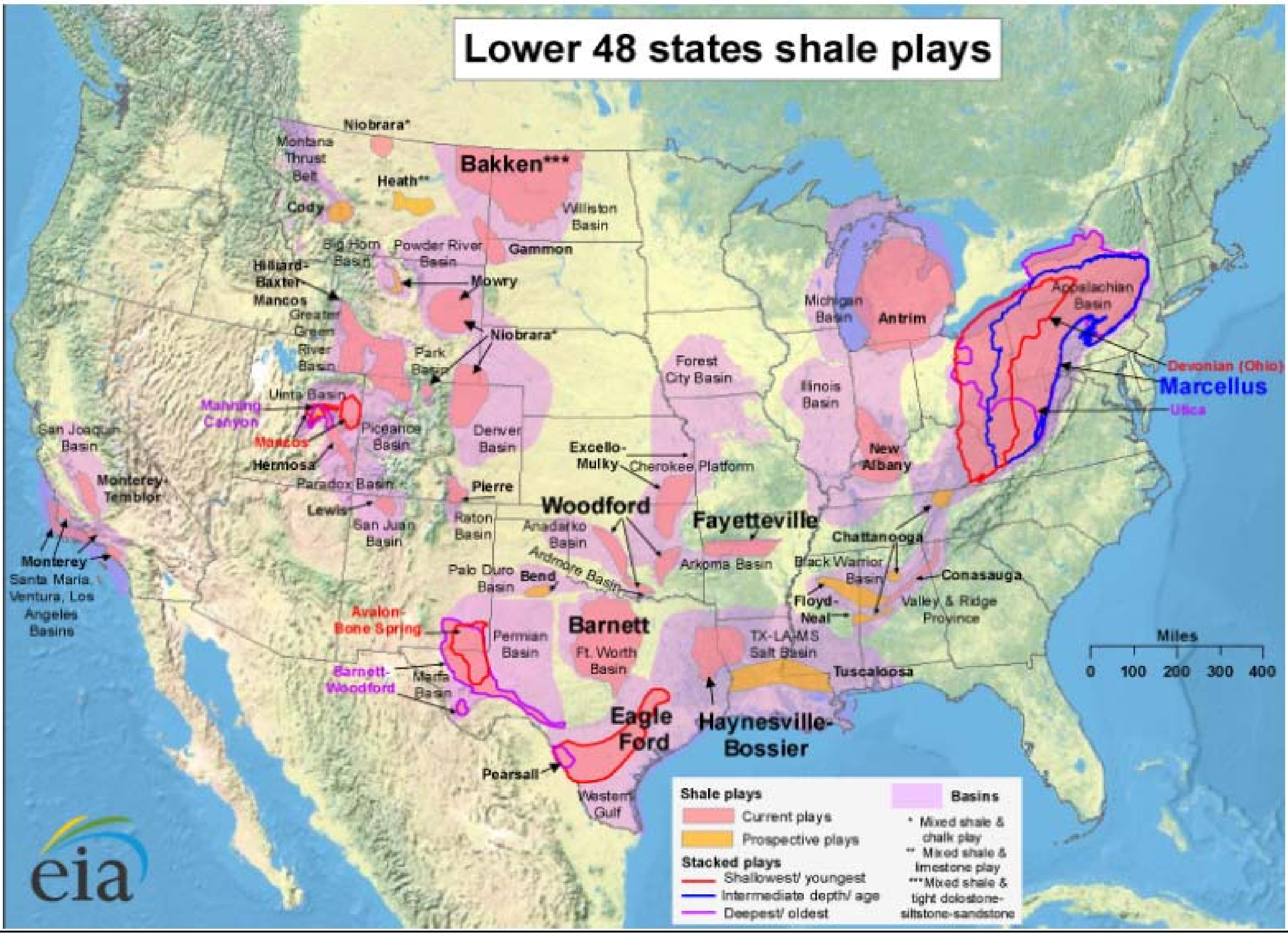



Source: WoodMackenzie

*While our analysis shows that the Fayetteville shale has inferior economics than the Marcellus shale, we presented WoodMackenzie's estimate in this exhibit in order to be consistent with data for other plays.

# Appendix

## Appendix 1: Map of U.S. Shale Plays (as of May 9th, 2011)




Source: U.S. Energy Information Administration based on data from various published studies

## Appendix 2: Unproved Resources and Unproved Resource Potential-to-Proved Reserve Ratio by Company

| Company | Company | Total Non-Proven Resource (Bcfe) | Unbooked Resource to Proved Reserves | Resource Potential Data Source |
|---|---|---|---|---|
| RRC | Range Resources | 48,000 | 10.8x | Company |
| SFY | Swift Energy | 7,920 | 9.9x | Company |
| COG | Cabot Oil & Gas | 22,750 | 8.4x | Company |
| XCO | EXCO Resources | 11,600 | 7.7x | Herold |
| OAS | Oasis Petroleum | 1,728 | 7.2x | UBSe |
| CRK | Comstock Resources | 7,815 | 6.6x | Company |
| CHK* | Chesapeake Energy | 110,700 | 6.5x | Company |
| CLR | Continental Resources | 13,680 | 6.3x | Herold |
| PXP | Plains Exploration & Production | 12,096 | 5.8x | Company |
| FST | Forest Oil | 12,290 | 5.6x | Herold |
| BBG | Bill Barrett | 6,133 | 5.5x | Herold |
| NBL | Noble Energy | 37,448 | 5.4x | Company |
| SWN | Southwestern Energy | 26,044 | 5.3x | Herold/UBSe |
| EQT | EQT Corp. | 16,000 | 3.1x | Company |
| MRO | Marathon Oil | 48,960 | 5.0x | Herold |
| SM | SM Energy | 4,748 | 4.8x | WoodMackenzie |
| UPL | Ultra Petroleum | 20,200 | 4.6x | Company |
| APC | Anadarko Petroleum | 66,500 | 4.6x | Company/UBSe |
| KWK | Quicksilver Resources | 12,100 | 4.2x | Company |
| MUR | Murphy Oil | 11,334 | 4.2x | Herold |
| XEC | Cimarex Energy | 7,034 | 3.7x | Company/WoodMackenzie |
| ROSE | Rosetta Resources | 1,716 | 3.6x | Herold |
| DVN | Devon Energy | 58,896 | 3.4x | Herold |
| CRZO | Carrizo Oil & Gas | 2,847 | 3.4x | Company |
| EOG | EOG Resources | 38,233 | 3.3x | Herold |
| SD | SandRidge Energy | 10,443 | 3.2x | Herold/UBSe |
| EQT | EQT Corp. | 16,000 | 3.1x | Company |
| NFX | Newfield Exploration | 10,530 | 2.8x | Company/UBSe |
| DNR | Denbury Resources | 6,444 | 2.7x | Herold |
| WPX | WPX Energy | 11,342 | 2.5x | Company |
| QEP | QEP Resources | 6,413 | 2.1x | Company |
| PXD | Pioneer Natural Resources | 12,420 | 2.0x | Herold |
| WLL | Whiting Petroleum | 2,310 | 1.3x | Herold |
| OXY | Occidental Petroleum | 21,648 | 1.2x | Herold |
| BRY | Berry Petroleum | 1,704 | 1.0x | Herold |
| CXO | Concho Resources | 1,770 | 0.9x | Herold |

Source: Company documents, John S. Herold, Wood Mackenzie and UBS estimates

## Appendix 3: Compensation of CEO in the Event of Company Acquired at 25% Premium to Dec 30th 2011 closing price

| | | Values of Change in Control Payouts | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **CEO** | **Vested Stock Options** | **Unvested Stock Options** | **Unvested Stock** | **Cash Severance** | **Bonus** | **Health & Retirement Benefits** | **All Other** | **Total Payout Package** |
| **Large-Cap** | | | | | | | | | |
| APC | James Hackett | $15,759,874 | $5,994,871 | $39,389,521 | $10,815,750 | $2,037,750 | $23,878,392 | $21,369,342 | **$119,245,500** |
| OXY | Stephen Chazen | $0 | $0 | $88,560,596 | $0 | $0 | $0 | $937,982 | **$89,498,578** |
| EOG | Mark Papa | $16,377,288 | $0 | $65,411,133 | $4,690,600 | $0 | $41,878 | $159,589 | **$86,680,487** |
| NBL | Charles Davidson | $19,314,644 | $5,972,861 | $6,958,805 | $7,878,650 | $1,060,000 | $11,307,641 | $0 | **$52,492,602** |
| CHK | Aubrey McClendon | $0 | $0 | $41,934,734 | $8,778,000 | $0 | $0 | $1,291,215 | **$52,003,949** |
| DVN | John Richels | $6,637,410 | $2,209,105 | $10,222,250 | $0 | $9,900,000 | $34,561 | $20,863,738 | **$49,867,064** |
| APA | Steven Farris | $2,763,477 | $1,238,070 | $26,318,019 | $8,531,250 | $10,000,000 | $321,628 | $0 | **$49,172,444** |
| PXD | Scott Sheffield | $0 | $13,947,880 | $27,098,673 | $5,716,885 | $956,000 | $137,914 | $79,667 | **$47,937,018** |
| MRO | Clarence Cazalot | $18,817,438 | $9,474,538 | $1,350,079 | $14,960,216 | $0 | $0 | $0 | **$44,602,270** |
| RRC | John H. Pinkerton | $11,412,925 | $8,086,874 | $9,865,106 | $5,242,000 | $0 | $110,871 | $6,102,663 | **$40,820,440** |
| MUR | David Wood | $2,334,113 | $6,967,500 | $16,753,702 | $0 | $2,039,086 | $0 | $0 | **$28,094,401** |
| SWN | Steven L. Mueller | $252,645 | $663,621 | $4,630,801 | $2,392,000 | $6,779,140 | $89,833 | $5,250,583 | **$20,058,623** |
| CLR | Harold Hamm | $0 | $0 | $11,257,313 | $0 | $0 | $0 | $0 | **$11,257,313** |
| **Average** | | **$7,205,370** | **$4,196,563** | **$26,903,902** | **$5,308,104** | **$2,520,921** | **$2,763,286** | **$4,311,906** | **$53,210,053** |
| **Mid-Cap** | | | | | | | | | |
| PXP | James C. Flores | $0 | $0 | $128,038,050 | $4,800,000 | $4,800,000 | $110,134 | $29,969,738 | **$167,717,922** |
| COG | Dan O. Dinges | $4,911,483 | $3,291,325 | $23,766,662 | $8,003,103 | $3,446,250 | $46,545 | $98,100 | **$43,563,468** |
| CXO | Timothy A. Leach | $9,336,898 | $5,686,918 | $18,105,059 | $1,200,000 | $1,787,500 | $29,901 | $0 | **$36,146,276** |
| QEP | Charles B. Stanley | $5,762,333 | $830,320 | $6,171,972 | $16,390,783 | $0 | $0 | $0 | **$29,155,408** |
| XEC | F. H. Merelli | $6,536,640 | $0 | $12,380,000 | $5,177,500 | $1,760,000 | $540,527 | $0 | **$26,394,667** |
| EQT | David L. Porges | $3,423,005 | $2,387,464 | $3,660,451 | $6,395,000 | $3,044,897 | $468,414 | $172,583 | **$19,551,815** |
| UPL | Michael D. Watford | $3,703,750 | $0 | $9,091,891 | $1,812,500 | $4,375,000 | $11,208 | $0 | **$18,994,349** |
| NFX | Lee Boothby | $0 | $0 | $8,995,492 | $6,450,000 | $425,000 | $91,522 | $30,000 | **$15,992,014** |
| WLL | James J. Volker | $1,240,110 | $2,585,494 | $4,282,757 | $0 | $937,318 | $0 | $3,789,100 | **$12,834,779** |
| SM | Anthony J. Best | $0 | $0 | $7,917,374 | $1,237,500 | $0 | $44,380 | $0 | **$9,199,254** |
| DNR | Phil Rykhoek | $15,281 | $0 | $3,596,745 | $2,533,297 | $500,000 | $60,877 | $0 | **$6,706,200** |
| **Average** | | **$3,175,409** | **$1,343,775** | **$20,546,041** | **$4,909,062** | **$1,915,997** | **$127,592** | **$3,096,320** | **$35,114,196** |
| **Small-Cap** | | | | | | | | | |
| SD | Tom L. Ward | $0 | $0 | $34,190,767 | $4,500,000 | $6,794,057 | $0 | $0 | **$45,484,824** |
| ROSE | Randy L. Limbacher | $1,629,619 | $2,245,205 | $27,381,891 | $3,750,000 | $0 | $25,683 | $6,928,063 | **$41,960,460** |
| EXXI | John D. Schiller | $1,195,500 | $0 | $20,722,000 | $2,025,000 | $2,531,250 | $89,568 | $11,097,706 | **$37,661,024** |
| CRK | M. Jay Allison | $0 | $0 | $15,491,250 | $1,704,300 | $11,960,000 | $1,428,145 | $0 | **$30,583,695** |
| FST | H. Craig Clark | $1,543,372 | $0 | $7,003,656 | $4,186,560 | $0 | $0 | $3,593,958 | **$16,327,546** |
| WTI | Tracy Krohn | $0 | $0 | $11,330,117 | $3,000,000 | $1,234,000 | $0 | $0 | **$15,564,117** |
| MMR | James R. Moffett | $11,912,813 | $1,700,750 | $0 | $0 | $0 | $0 | $0 | **$13,613,563** |
| SFY | Terry Swift | $868,490 | $1,174,771 | $3,440,127 | $7,523,854 | $0 | $31,884 | $0 | **$13,039,126** |
| KWK | Glenn Darden | $383,499 | $248,902 | $1,168,031 | $5,445,540 | $2,200,000 | $42,808 | $0 | **$9,488,780** |
| BBG | Fredrick J. Barrett | $2,441,465 | $1,502,625 | $1,474,008 | $2,462,500 | $0 | $82,769 | $1,154,729 | **$9,118,095** |
| SGY | David Welch | $130,515 | $734,972 | $1,319,033 | $3,109,600 | $442,000 | $13,701 | $1,537,943 | **$7,287,764** |
| CRZO | S.P. Johnson IV | $1,923,774 | $2,971,036 | $0 | $2,143,600 | $0 | $8,914 | $0 | **$7,047,324** |
| KOG | Lynn Peterson | $3,556,439 | $0 | $1,335,938 | $1,015,000 | $974,400 | $0 | $0 | **$6,881,777** |
| XCO | Douglas H. Miller | $4,611,063 | $103,650 | $0 | $1,000,000 | $0 | $0 | $0 | **$5,714,713** |
| ATPG | T. Paul Bulmahn | $0 | $0 | $439,944 | $614,667 | $0 | $29,724 | $2,896,287 | **$3,980,622** |
| EPL | Gary C. Hanna | $172,656 | $754,207 | $0 | $1,750,000 | $0 | $16,691 | $0 | **$2,693,554** |
| OAS | Thomas Nusz | $0 | $0 | $698,160 | $1,690,000 | $260,000 | $30,545 | $0 | **$2,678,705** |
| **Average** | | **$1,786,424** | **$672,713** | **$7,411,466** | **$2,701,213** | **$1,552,689** | **$105,908** | **$1,600,511** | **$15,830,923** |

Source: 2011 proxy filings, company documents and UBS estimates

## Appendix 4: Energy Universe Chairman/CEO Age as of the Latest Proxy Filing

| Large Cap E&Ps | Ticker | Chairman/CEO | Age | As of |
|---|---|---|---|---|
| Apache | APA | Steven Farris | 62 | March 30th, 2011 |
| Anadarko Petroleum | APC | James Hackett | 57 | March 27th, 2011 |
| Chesapeake Energy | CHK | Aubrey McClendon | 51 | April 30th, 2011 |
| Continental Resources | CLR | Harold G. Hamm | 65 | April 13th, 2011 |
| Devon Energy | DVN | Larry Nichols (Chairman) | 69 | April 27th, 2011 |
| | | John Richels (CEO) | 60 | April 27th, 2011 |
| EOG Resources | EOG | Mark Papa (CEO until June '13) | 64 | March 25th, 2011 |
| | | William R. Thomas (Successor) | 58 | September 7th, 2011 |
| Marathon Oil | MRO | Clarence Cazalot | 60 | March 9th,2011 |
| Murphy Oil | MUR | David Wood | 54 | March 27th, 2011 |
| Noble Energy | NBL | Charles Davidson | 61 | March 23th, 2011 |
| Occidental Petroleum | OXY | Dr. Ray Irani (Chairman) | 76 | March 24th, 2011 |
| | | Stephen I. Chazen (CEO) | 64 | March 24th, 2011 |
| Pioneer Natural Resources | PXD | Scott Sheffield | 58 | April 30th, 2011 |
| Range Resources | RRC | John H. Pinkerton (Chairman) | 57 | June 27th, 2011 |
| | | Jeffrey L. Ventura (CEO) | 53 | June 27th, 2011 |
| Southwestern Energy | SWN | Harold M. Korell (Chairman) | 66 | March 30th, 2011 |
| | | Steven L. Mueller (CEO) | 57 | March 30th, 2011 |

| Mid Cap E&Ps | Ticker | Chairman/CEO | Age | As of |
|---|---|---|---|---|
| Cabot Oil & Gas | COG | Dan O. Dinges | 57 | March 28th, 2011 |
| Cimarex Energy | XEC | F. H. Merelli | 75 | April 5th, 2011 |
| Concho Resources | CXO | Timothy A. Leach | 51 | April 28th, 2011 |
| Denbury Resources | DNR | Phil Rykhoek | 54 | April 21st, 2011 |
| EQT Corp. | EQT | David L. Porges | 53 | March 14th, 2011 |
| Newfield Exploration | NFX | Lee Boothby | 49 | March 1st, 2011 |
| Plains Exploration & Production | PXP | James C. Flores | 51 | March 24th, 2011 |
| QEP Resources | QEP | Charles B. Stanley | 52 | April 7th, 2011 |
| SM Energy | SM | Anthony J. Best | 61 | April 12th, 2011 |
| Ultra Petroleum | UPL | Michael D. Watford | 57 | April 9th, 2011 |
| Whiting Petroleum | WLL | James J. Volker | 64 | April 1st, 2011 |

| Small Cap E&Ps | Ticker | Chairman/CEO | Age | As of |
|---|---|---|---|---|
| ATP Oil & Gas | ATPG | T. Paul Bulmahn | 67 | April 28th, 2011 |
| Bill Barrett | BBG | Fredrick J. Barrett | 50 | March 25th, 2011 |
| Carrizo Oil & Gas | CRZO | S.P. Johnson IV | 55 | April 29th, 2011 |
| Comstock Resources | CRK | M. Jay Allison | 55 | April 4th, 2011 |
| Energy Partners | EPL | Gary C. Hanna | 53 | April 15th, 2011 |
| Energy XXI | EXXI | John D. Schiller, Jr. | 52 | October 3rd, 2011 |
| EXCO Resources | XCO | Douglas H. Miller | 63 | August 23th, 2011 |
| Forest Oil | FST | H. Craig Clark | 54 | March 28th, 2011 |
| Kodiak Oil & Gas | KOG | Lynn A. Peterson | 57 | April 26th, 2011 |
| McMoRan Exploration | MMR | James R. Moffett | 72 | April 28th, 2011 |
| Oasis Petroleum | OAS | Thomas B. Nusz | 51 | March 16th, 2011 |
| Quicksilver Resources | KWK | Glenn Darden | 55 | April 8th, 2011 |
| Rosetta Resources | ROSE | Randy L. Limbacher | 53 | March 25th, 2011 |
| SandRidge Energy | SD | Tom Ward | 51 | March 31st, 2011 |
| Stone Energy | SGY | David H. Welch | 62 | March 24th, 2011 |
| Swift Energy | SFY | Terry E. Swift | 55 | April 8th, 2011 |
| W&T Offshore | WTI | Tracy W. Krohn | 56 | March 25th, 2011 |

| U.S. Major | Ticker | CEO | Age | As of |
|---|---|---|---|---|
| Chevron | CVX | John S. Watson | 54 | May 25th, 2011 |
| ConocoPhillips | COP | Ryan M. Lance | 48 | February 15th, 2011 |
| ExxonMobil | XOM | R.W. Tillerson | 59 | April 13th, 2011 |
| Hess Corp. | HES | John Hess | 56 | March 26th, 2011 |

Source: Company SEC proxy filings

(1) Ryan Lance will become CEO of ConocoPhillips following the 2Q12 spinout of its downstream business.

## ■ Statement of Risk

E&P companies are subject to risks associated with unexpected movements in volatile natural gas and crude oil prices, as well as the impact that political, economic and meteorological events could impart. Moreover, E&P companies are subject to geologic risk (i.e., exploration risk).

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### UBS Investment Research: Global Equity Rating Allocations

| UBS 12-Month Rating | Rating Category | Coverage[1] | IB Services[2] |
|---|---|---|---|
| **Buy** | **Buy** | 59% | 35% |
| **Neutral** | **Hold/Neutral** | 35% | 33% |
| **Sell** | **Sell** | 6% | 14% |
| **UBS Short-Term Rating** | **Rating Category** | **Coverage[3]** | **IB Services[4]** |
| **Buy** | **Buy** | less than 1% | 0% |
| **Sell** | **Sell** | less than 1% | 20% |

1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3:Percentage of companies under coverage globally within the Short-Term rating category.
4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS. Rating allocations are as of 30 September 2011.

### UBS Investment Research: Global Equity Rating Definitions

| UBS 12-Month Rating | Definition |
|---|---|
| **Buy** | FSR is > 6% above the MRA. |
| **Neutral** | FSR is between -6% and 6% of the MRA. |
| **Sell** | FSR is > 6% below the MRA. |
| **UBS Short-Term Rating** | **Definition** |
| **Buy** | Buy: Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event. |
| **Sell** | Sell: Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event. |

**KEY DEFINITIONS**

**Forecast Stock Return (FSR)** is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.
**Market Return Assumption (MRA)** is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium).
**Under Review (UR)** Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation.
**Short-Term Ratings** reflect the expected near-term (up to three months) performance of the stock and do not reflect any change in the fundamental view or investment case.
**Equity Price Targets** have an investment horizon of 12 months.

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**UBS Securities LLC:** William A. Featherston; Betty Jiang, CFA; Daniel Drum; Margaret O'Connor.

## Company Disclosures

| Company Name | Reuters | 12-mo rating | Short-term rating | Price | Price date |
|---|---|---|---|---|---|
| **Anadarko Petroleum Corp.**[4, 6a, 6c, 7, 16, 22] | APC.N | Buy | N/A | US$78.65 | 03 Jan 2012 |
| **Apache Corporation**[4, 6a, 6c, 7, 16] | APA.N | Buy | N/A | US$95.93 | 03 Jan 2012 |
| **Cabot Oil & Gas Corporation**[16] | COG.N | Not Rated | N/A | US$76.80 | 03 Jan 2012 |
| **Chesapeake Energy Corp.**[4, 6a, 16] | CHK.N | Neutral | N/A | US$23.60 | 03 Jan 2012 |
| **Comstock Resources, Inc.**[16] | CRK.N | Not Rated | N/A | US$16.34 | 03 Jan 2012 |
| **Continental Resources Inc**[2, 4, 6a, 16] | CLR.N | Not Rated | N/A | US$69.86 | 03 Jan 2012 |
| **EOG Resources**[4, 6a, 16] | EOG.N | Neutral | N/A | US$101.45 | 03 Jan 2012 |
| **EXCO Resources Inc.**[4, 5, 6a, 6b, 6c, 7, 16] | XCO.N | Not Rated | N/A | US$10.32 | 03 Jan 2012 |
| **Forest Oil Corporation**[4, 6a, 16] | FST.N | Not Rated | N/A | US$14.24 | 03 Jan 2012 |
| **Oasis Petroleum Inc**[2, 4, 5, 6a, 16] | OAS.N | Buy | N/A | US$30.52 | 03 Jan 2012 |
| **Plains Exploration & Production Company**[2, 4, 5, 6a, 16] | PXP.N | Not Rated | N/A | US$38.75 | 03 Jan 2012 |
| **Range Resources Corp.**[2, 4, 6a, 16] | RRC.N | Neutral | N/A | US$61.18 | 03 Jan 2012 |
| **SM Energy Company**[16] | SM.N | Not Rated | N/A | US$76.29 | 03 Jan 2012 |
| **Southwestern Energy Company**[4, 6a, 16] | SWN.N | Buy | N/A | US$32.70 | 03 Jan 2012 |
| **Swift Energy Co.**[16] | SFY.N | Not Rated | N/A | US$31.61 | 03 Jan 2012 |

Source: UBS. All prices as of local market close.
Ratings in this table are the most current published ratings prior to this report. They may be more recent than the stock pricing date

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Additional Prices: Devon Energy Corporation, US$66.11 (03 Jan 2012); Marathon Oil Corporation, US$30.96 (03 Jan 2012); Murphy Oil Corporation, US$58.11 (03 Jan 2012); Newfield Exploration Co., US$39.60 (03 Jan 2012); Noble Energy, Inc., US$97.76 (03 Jan 2012); Occidental Petroleum Corp., US$96.63 (03 Jan 2012); Pioneer Natural Resources Co., US$92.63 (03 Jan 2012); Quicksilver Resources Inc., US$6.96 (03 Jan 2012); SandRidge Energy Inc, US$8.35 (03 Jan 2012); Ultra Petroleum Corp., US$30.45 (03 Jan 2012); Source: UBS. All prices as of local market close.

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