The North American Energy Opportunity

A must-read 46-slide data presentation exploring the transformative relationship between private capital and the energy market

Contributing research editor: David Haarmeyer
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Introduction

The North American energy revolution is transforming the industry and broader economy. Technology unleashed the region’s shale oil and gas revolution and, today, capital is driving it. The opportunity is enormous: an estimated $5T in investment is expected to be required across the energy value chain through 2035.

An investment opportunity of this size raises a host of questions for investors, fund managers, and industry participants:

- Why is private equity especially advantaged to play a leading role in what will be a multi-decade, multi-trillion-dollar investment program?
- What are the different vehicle options investors have if they want to participate in the North America capital revolution?
- What has been the asset class’s track record in generating returns for investors in the energy business?
- What are the opportunities offered by the significant restructuring efforts of the oil and gas majors?

Fundraising trends suggest investor confidence. During the past three years, the 10 top firms have collectively raised more than $53B for energy and related investments—and six of the top 10 have raised at least five funds. At the same time, first-time fund manager Kerogen Capital closed a $1B-plus maiden oil and gas vehicle in 2012.

The sector’s growing capital requirements are driving deal activity, which spans the oil and gas value chain. Last year there was a slowdown in transactions, as the earlier upstream deals were digested. Going forward, how will deal dynamics evolve as the industry turns its attention to production, consolidation, and putting in place the midstream infrastructure to move oil and gas to the market?

The shale gas and oil opportunity raises a number of risks, some of which private equity is better able to shoulder than others. What is clear is that North America has proven to be an especially fertile ground for today’s energy revolution, thanks to secure property rights, available infrastructure, and a deep skill base.

Ultimately, as a proven model for creating tremendous value, the long-term disciplined capital that private equity brings is a perfect match for both participating in, as well as driving, the North American energy revolution.

Today, capital is driving it.

Technology developments such as hydraulic fracking and horizontal drilling have created unprecedented growth in domestic oil and natural gas production, from previously inaccessible, unconventional resources.

Other key ingredients of the North American energy revolution are secure and transferable land rights, readily available infrastructure, and a skilled labor force.

The final key ingredient is capital—in this case, the continent’s efficient capital markets and the growing role of private equity groups in allocating private capital to a rising number of opportunities.

Global energy demand, particularly in emerging market economies, is spurring the search for supply. The International Energy Agency expects demand to grow 50% by 2030.
“They [U.S. developers] have the regulatory structure that is stable and predictable. We have a very well-developed architecture around who owns minerals, who gets paid when you develop those minerals. We have the best pipeline system of any country in the world. There’s a lot about the U.S. that actually is fairly unique.”

–Marc Lipschultz, Global Head of Energy and Infrastructure, KKR

(Sources: Ryan Dezember, “KKR on Shale, a Q&A With the Firm’s Head Oil Man,” Wall Street Journal Deal Journal, November 13, 2012)
The U.S. is currently the largest gas producer in the world, recently overtaking Russia.

- U.S. oil production is up 40% since 2008, with an increase of 1M barrels per day in 2013 — the largest annual increase in the country’s history and more than the aggregate increases in the rest of the world.

- The IEA predicts the U.S. will overtake Saudi Arabia as the world’s largest oil producer before the end of the decade.

- After being one of the largest importers of energy, the U.S. is on track to become one of the largest exporters of energy products during the next decade.

(Sources: Kayne Anderson Annual Report, November 2013; Funds Evaluation Report 2013; and EIA)

$5T Required to Fuel Continued Development

Continued investment to expand supply capacity in production, storage/transportation, and processing/refining, as well as to upgrade existing and future supply facilities, is expected to require $5T through 2035, according to IEA estimates.

The energy revolution is a multi-decade, multi-trillion-dollar investment story.
An Enormous Gas Resource Base
Enough to supply the continent for almost 150 years, says INGAA

Gas supply estimates

- Current U.S. and Canadian gas production originates from more than 300T cubic feet (Tcf) of proven gas reserves.

- The North American natural gas resource base is estimated to total 4,000 Tcf when adding unproved resources to discovered-but-undeveloped gas resources.

- This resource base can supply U.S. and Canadian gas markets for almost 150 years at current consumption levels.

(Source: INGAA Foundation Report; Executive Summary, March 18, 2014)
...And a Vast, Variegated Shale Formation

(Source: INGAA Foundation Report, Executive Summary, March 18, 2014)
...And an Enormous Liquids Base

North American petroleum liquids production (oil + NGL) projected to nearly double by 2035, according to INGAA

**Petroleum liquids estimates**

- U.S. and Canadian petroleum liquids production will grow from a recent level of roughly 10M barrels per day (BPD) to 18.2M.

- More than half of the growth is from unconventional (often referred to as “tight”) oil supplies, which include production from the Bakken, Niobrara, Eagle Ford, and Cline plays.

- In addition, the oil sands in Western Canada account for a significant portion of the growth in oil production.
The shale revolution is “only in the first inning of a nine-inning game,” and we’ve “only scratched the surface” to see how the technology will continue to unfold.

–Ryan Lance, ConocoPhillips Chairman and CEO

“The unconventional-oil-and-gas revolution—shale gas and what’s become known as ‘tight oil’—is the most important energy innovation so far in the 21st century.”

–Dan Yergin, vice-chairman of IHS and author of The Prize: The Epic Quest for Oil

(Source: McKinsey Quarterly, April 2014)

The U.S. shale revolution is “the best thing going on in the world since the computer chip.”

–Harold Hamm, chairman and chief executive of Continental Resources

The PE Advantage
Private equity investment brings several key positives to the North American energy sector =

- **Capital** – a core ingredient in realizing the energy revolution
  - Tremendous needs
  - PE has low penetration rate in the energy sector

- **Capital Discipline** – the oil and gas industry is a huge consumer of capital; how it is spent is more important than how much is consumed

- **Alternative Models, Investment Strategies and Vehicles**
  - Better able to better adapt to local market circumstances
  - Better able to appeal to a broader class of investors seeking different risk/return objectives

“The development of shale resources will be contingent on the ability of companies to raise funds.”

– Marcum Cronus Partners LLC
### Alternative Models and Investment Strategies

- Back management teams in early start-up investments
  - Early pioneering firms such as EnCap Investments and Natural Gas Partners (NGP) established this model when they started in 1988
  - Once assets were developed and sold to larger firms, a successful team would gain a new round of capital
- Buy companies
  - Merit Energy Company and other oil and gas firms in the late 1980s went down another path, choosing to directly buy and own oil- and gas-producing assets—generally a less risky strategy, given assets were generating revenue

### Alternative Investment Vehicles – provide investors different sets of risk/reward opportunities, often along value chain

- Buyout model – higher risk and return
- Infrastructure – lower risk and return; inflation protection
- MLPs – tax advantaged, with little exposure to commodity prices, today represent a full-fledged asset class with a market capitalization of over $475B; in 2013, 21 IPOs raised $8.2B, with 114 MLPs currently trading

(Source: Kayne Anderson Annual Report, 2013)
Capital Needs for Gas Production are Tremendous

Estimated natural gas capital expenditures going forward (2014-2035) are likely to reach more than $310B

“The industry is long inventory, short capital” with respect to larger backlog of drillable locations at U.S. E&P companies

–Pine Brook Partners, Annual Meeting Presentation 2013

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<td><strong>Total Capital Expenditures</strong></td>
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</table>

(Source: North American Midstream Infrastructure Through 2035: Capitalizing on Our Energy Abundance, INGAA, March 18, 2014)
...And for Liquids and Oil
Estimated natural gas liquids (NGL) and oil capital expenditures going forward (2014-2035) are likely to reach nearly $330B

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<td>Crude Oil Transmission Mainline (pipe and pump)</td>
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<td><strong>Pipe</strong></td>
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<td><strong>Pump</strong></td>
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<td><strong>$12.4</strong></td>
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</table>

(Source: North American Midstream Infrastructure Through 2035: Capitalizing on Our Energy Abundance, INGAA, March 18, 2014)
“The challenge is now about capital discipline and investing, because the industry needs to invest more than its free cash flow.”

–Ken Hersh, operating executive, The Carlyle Group

Consensus on Need for Capital
Going forward, access to capital is the most important financing issue the industry faces.

What financing issues do you think will be most important to your company in 2014?

Capital One Bank conducted a survey of conference attendees at the North American Prospect Expo (NAPE) International in Houston, Feb. 6-7, 2014.

(Source: http://www.ogfj.com/content/dam/ogfj/online-articles/2014/04/NAPE%20Survey%20Results%20-%20FINAL.pdf)
Nature of the Opportunity

- Efficient “production” vs. development—unlike the majors’ development-focused model, the decentralized PE model is particularly focused on operations and cost management, which better fit the manufacturing-like challenges of fracking.
- Oil and gas is a fragmented industry, which represents significant opportunities for consolidation—PE’s sweet spot.
- Oil major restructuring:
  - Exploration and production firms are selling gas assets to finance their oil push.
  - In explaining why it is targeting the midsize part of the oil and gas market with the launch of a public vehicle, Riverstone Energy pointed to a “gap between the supermajors and the small explorers.”


Track Record

Across the long-term track records of private energy funds, most have operated successfully through multiple commodity price cycles.
Private Equity Competes With, but More Often Complements, the Oil Majors
It’s a buyer’s market, with an estimated $300B of oil assets for sale worldwide

Majors Under Pressure
- The “majors”—the major integrated oil companies led by BP, Shell, Exxon, Total, and Chevron—came to the unconventional oil and gas revolution late and with a few handicaps
- Attempts to generate returns from U.S. shale have proven challenging—Shell took a $2.1B write-down on its U.S. assets last year, and its upstream Americas business made a loss
- The shareholders have demanded that the majors trim capital expenditures, divest non-core assets, and create more decentralized units for faster and better decision-making
- Royal Dutch Shell recently announced it would sell $15B worth of assets during the next two years; BP last year promised another $10B of disposals to help fund higher returns to shareholders, on top of the $38B of divestments it has made in the past three years

Private Equity Positioned as the Industry Catalyst
- Operating under a much more focused and performance-aligned operating model, but with longer-term capital
- With a limited fund life, private equity needs companies to buy assets from and sell them to, so oil and gas majors are valuable industry partners
- “It is a buyer’s market,” says Marcel van Poecke, managing director of Carlyle International Energy Partners. “I’ve never seen a market where there are so many good assets for sale.”
- “We see more and more assets being sold by major oil companies,” putting the estimated value at $300B worldwide
PE Advantage – Returns

PE energy fund returns show long track record of outperformance

In the long term (10+ years), PE energy returns have outperformed the PE index and significantly outpaced the S&P 500, according to Cambridge Associates.

The energy index is an end-to-end calculation based on data compiled from 268 energy-related funds, including liquidated partnerships formed between 1986 and 2012.

The PE index is an end-to-end calculation based on data compiled from 1,125 U.S. private equity funds (buyout, growth equity, private equity energy, and mezzanine funds), including fully liquidated partnerships, formed between 1986 and 2013.

(Source: Cambridge Resources, Dec. 31, 2013)
Returns, Another Vantage Point
Natural resource funds have consistently outperformed

- During the past seven years, Preqin’s Natural Resources Index has consistently outperformed its All Private Equity Index.

- As indicated, the outperformance has increased with time. This has generated significant interest from investors and has driven the launch of new funds by GPs.

(Source: Natural Resources Private Equity Investment, Preqin Private Equity Spotlight, April 2013)
https://www.preqin.com/docs/newsletters/pe/Preqin_PESL_Apr_2013_Natural_Resources.pdf)
Returns are Quicker
The median hold times for PE investments in energy companies have generally been the lowest of any industry

- PE investments in the energy industry have generally been held for fewer years than any other industry—making for quicker returns.

- In 2013, the median hold time for all industries outside of energy was about six years, while the hold time for energy investments was about 4.5 years, according to PitchBook.

(Source: Q4 2013 Private Equity Company Inventory Report, PitchBook)
PE Energy IPOs – Attractive Exit Route for Returns
Two of the top PE-backed IPOs in 2013 were oil and gas companies

Oil pipeline holding company Plains GP Holdings’ October 2013 IPO was the largest for a U.S.-based company since Facebook Inc.’s $16B debut in May 2012.

The company owns the right to receive a share of the cash distributions of the master limited partnership, Plains All American Pipeline.

The MLP operates oil pipelines, natural gas storage facilities, and other energy-related assets in the U.S. and Canada.

The Warburg Pincus- and Yorktown Partners–controlled oil and natural gas E&P company Antero Resources Corp. went public last October with a valuation of more than $11B.

The Denver-based company holds 433,000 acres in the Marcellus Shale and Ohio’s Utica Shale.

Since the $1.6B IPO, shares have climbed 44% (as of mid-April).

PE Energy IPOs, an Attractive (and Quick) Exit Route

EP Energy provides a bird’s-eye view of PE’s role in transforming public company assets quickly and profitably

**EP Energy: Case Study in PE Value Creation**

EP Energy went public less than 18 months after an Apollo-led group, which included Riverstone Holdings LLC, Access Industries Inc., and Korea National Oil Corp., purchased the oil and gas company from El Paso for $7.2B in February 2012.

The transaction fits PE’s role in picking unloved corporate units (in this case, mature oil and gas fields) and adding value. EP Energy was El Paso’s oil and gas exploration business. Kinder Morgan had recently purchased El Paso and decided to sell the unit to help finance its $21.1B purchase.

During the 18-month period, the group proceeded to increase the value of the company by making it more oil-focused:

- Sold off some of its natural gas and coal-bed methane properties for $1.3B
- Sold its Brazilian and Egyptian operations

Operations were focused on its Eagle Ford and Wolfcamp shales, Utah Uinta basin, and its highest-return natural gas asset in the Haynesville shale.

EP Energy reported last August that its oil production in the second quarter of 2013 was up 59% from a year ago and that it expected higher profit margins following the asset sales.

A month earlier, Apollo was successful in another oil and gas company IPO: Athlon Energy went public to yield $316M.

Evolution of an Asset Class

Energy infrastructure attracts a growing number of top managers offering an array of fund types

**Early Pioneers**
- Merit Energy Co
- EnCap Investments and Natural Gas Partners
- First Reserve

**Second Generation**
- Quantum Energy Partners
- Kayne Anderson (PE)
- Lime Rock Partners
- Envest
- Yorktown Energy Partners

**Megafund Era**
- GS Partners $6.5B
- Macquarie $4.6B
- GIP $5.6B
- KKR’s 1st Infrastructure Fund
- Blackstone 1st Energy Fund
- EIG Energy Fund XVI $6B

**Global Asset Managers**
- Carlyle Group acquires stake in NGP

**In the market:**
- First Reserve $5B
- Carlyle Group $4B
- Morgan Stanley $3B

(Source: Privcap research)
Fundraising
Fundraising on the Rise and Concentrated in North America

- Riverstone Holdings says about 86% of its fund’s capital goes to North American targets. (Source: Deal Pipeline, February 2014)

- First Reserve Corp. deploys half of its fund outside the U.S. but stresses that opportunities in the country are plentiful. (Source: Deal Pipeline, February 2014)

- Preqin data shows that 82% of the $27B in capital garnered by the 26 natural resources funds that closed in 2013 was raised by funds targeting oil and gas opportunities specifically and that 20 of those funds target opportunities in North America. In 2012, 26 natural resources funds raised $23B.

- Blackstone, KKR, Carlyle, and Apollo have all launched first-time energy/natural resource funds

(Source: Fund Evaluation Group, Private Capital Overview, Q1 2013)
Fundraising for Natural Resources is Growing
Funds including oil and gas tend to be global and more diversified

- Investors are increasingly establishing target allocations for natural resources.
- Resource funds tend to target energy, including oil and gas investments, but also commodities such as minerals, precious metals, and agriculture.
- Reflecting the North American shale gas opportunity, 82% of the $27B in capital garnered by the 26 natural resources funds that closed in 2013 was raised by funds targeting oil and gas opportunities specifically (Preqin). And 20 of those funds target opportunities in North America.
- According to Preqin, 22 natural resources funds raised $22.5B in capital commitments in 2012, which was more than triple the $6.8B raised by 13 funds that closed in 2011.

(Source: https://www.preqin.com/docs/newsletters/pe/Preqin_PESL_Apr_2013_Natural_Resources.pdf)
Fundraising: 2014 Off to a Quick Start

$15B in energy-focused or related funds has been raised

<table>
<thead>
<tr>
<th>Group</th>
<th>Fund</th>
<th>Investment Focus</th>
<th>Region</th>
<th>Fund Size ($B)</th>
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<td>Diversified Energy</td>
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<td>Oil Field Services</td>
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<td>$0.40</td>
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North American is the prominent destination—as the industry prepares for the next phase of the shale gas and oil revolution

(Source: Privcap research)
## More Than $30B of Active or Expected Fundraising

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<tr>
<th>Group</th>
<th>Fund</th>
<th>Investment Focus</th>
<th>Region</th>
<th>Target ($B)</th>
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(Source: Privcap research)
10 Firms Have Dominated Fundraising
Collectively, in the past three years, they have raised more than $53B for energy and related investments

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<th>Group</th>
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<td>$5.00</td>
<td>2014</td>
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<td>Energy Capital Partners</td>
<td>II</td>
<td>Diversified Energy</td>
<td>N Am</td>
<td>$4.30</td>
<td>2010</td>
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<td>Natural Gas Partners</td>
<td>X</td>
<td>Diversified Oil &amp; Gas</td>
<td>N Am</td>
<td>$3.60</td>
<td>2012</td>
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<td>Denham Capital</td>
<td>VI</td>
<td>Diversified Energy &amp; Mining</td>
<td>Global</td>
<td>$3.60</td>
<td>2012</td>
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<tr>
<td>ArcLight Partners</td>
<td>V</td>
<td>Diversified Energy</td>
<td>N Am</td>
<td>$3.30</td>
<td>2011</td>
</tr>
</tbody>
</table>

(Source: Privcap research)

Insights on Mega Energy/Infrastructure Funds
▪ Success breeds success: six of the top 10 have raised at least five funds
▪ Yet first-time fund manager Kerogen Capital closed a $1B+ maiden oil and gas vehicle in 2012
▪ The larger funds have tended to be diversified (infrastructure or energy) and global
▪ Only two oil-and-gas-only funds in the top 10
▪ Rapid fundraising: EnCap Investments closed its ninth fund in 2012 with $5B in committed capital after less than six months in the market
Fundraising: Average Fund Size Grows
More costly projects and increasing global and sector breadth

Average fund size has been growing over the years with a number of factors at play:
- Business is capital-intensive
- Drilling costs are accelerating (it costs more to drill horizontal wells than vertical wells)
- Deals are becoming larger
- GPs' geographic ambitions are growing
- Sector diversification beyond energy to natural resources is seen as attractive

Average natural resource fund size was $979M in 2012—more than double the $443M average fund size for all private equity funds, according to Preqin

(Source: Fund Evaluation Group, Private Capital Overview, Q1 2013)
Deal Activity
U.S. PE Energy Deal Activity Expected to Pick Up
More capital headed to a market hungry for investment

There was a drop in the value of deals closed during 2013, but the trend is expected to reverse given these drivers:

- Significant dry powder needs to be deployed
- 2013 was a big year for distributions
- 2012-13 was a very robust fundraising period for energy-focused funds
- Pickup in oil and gas industry restructuring (e.g., oil majors’ divestments)
- Growing capital requirements

A recent Mergermarket survey of deal professionals supports this outlook, with energy identified as the most attractive sector for acquisition targets in 2014

(Source: Marcum Cronus Partners Oil & Gas Sector Bulletin, January 2014)
Deal Activity Drivers to Kick In
The number one driver: growing capital requirements, with $700B slated

- More and bigger projects are driving the need for more capital across the oil and gas value chain. An estimated $700B is slated for projects under development.

- In its survey of industry leaders, Mergermarket found that “capital requirements” were cited as the principal driver for PE involvement in oil and gas.

(Source: Financing the Future Energy Landscape: regional differences in private equity for oil and gas, EY)
Activity is Across the Oil and Gas Industry Value Chain

Offers investors a diverse set of risk/reward profiles

- **Upstream** - Largest driver of PE activity is the sheer abundance of attractive investment targets.

- **Midstream** - Primary driver is the potential for consistent and predictable returns; reduced exposure to volatile commodity prices is more important.

- **Downstream** - Primary driver is the potential for consistent and predictable returns.

- **Oilfield services** - Primary driver is the potential for consistent and predictable returns; reduced exposure to volatile commodity prices is more important.
Upstream Activity – Land Grab Days Over
Industry shifts from exploration to production and consolidation

- In the opinion of most participants, the shale land grab is over for exploration and production companies. In 2013, there was $137.7B in total upstream M&A activity compared to $270.8B in 2012, according to Whitley Penn and Energy Spectrum, 2014.

- The focus of exploration and production companies is now on developing the highest-value opportunities and consolidation rather than acreage expansion.

- Less exploration and more production should translate into accelerated flow of oil and gas into the midstream.

- In 2013, exploration and production companies spent around $105B on drilling and completion in shale plays alone, according to Rystad Energy.


(Source: Fund Evaluation Group Private Capital Overview, Q1 2013)
Activity Includes a Shift in Gas Assets from Majors to PE

Larger players exit gas for oil, benefiting PE and MLPs

BP PLC sold its Jonah acreage to Linn Energy LLC, a master limited partner, for about $1.03B in 2012, while Ecana recently shed its Jonah field in Wyoming to TPG Capital

- Since the start of 2013, more than four-fifths of asset acquisitions by private equity were gas-weighted, according to IHS (see chart).

- Exploration and production companies have preferred oil. Its globally set prices have remained strong, while local gas prices sank on the shale boom.

- Deal multiples also reflect this split as oil-weighted assets have risen from less than $17 a barrel of proven reserves in 2009 to more than $21 this year, while gassier assets have stayed stuck in a range of between $8 and $12 a barrel of oil equivalent (Source: IHS).

- Bottom line: PE’s longer-term outlook gives it an advantage in picking up discarded assets on the cheap and waiting for demand to pick up—which is not likely to be long, with new gas-fired plants in construction and gas exports on the horizon.

"The public markets now attach the highest valuations to companies that have demonstrable drilling success and a large inventory of undrilled locations in the oil- or liquids-rich plays."

–David Miller, co-founder, EnCap Investments LP

(Source: Liam Denning, “Life After TXU Gas Buyouts,” WSJ, April 13, 2014)

"The public markets now attach the highest valuations to companies that have demonstrable drilling success and a large inventory of undrilled locations in the oil- or liquids-rich plays."

–David Miller, co-founder, EnCap Investments LP

(Source: David Carey, “Apollo Trumps KKR in Shale Buyouts After Wildcatting Ends,” Bloomberg, March 21, 2014)
Upstream – Top Producers are private-equity-related

Three of the top five largest private gas producers are owned by, or partnered with, private equity groups

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Owner/Partner</th>
<th>Million BOE</th>
<th>Total Wells</th>
<th>Largest Fields</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Samson Investments Co.</td>
<td>KKR Acquired Nov 2011 ($7.2B)</td>
<td>41</td>
<td>3947</td>
<td>Ignacioa-Blanco</td>
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<td>2</td>
<td>Merit Energy Co.</td>
<td>Diversified Energy</td>
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<td>4950</td>
<td>Painter Reservoir East</td>
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<td>3</td>
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<td>Energy and Finance Investments</td>
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<td>2589</td>
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<td>40</td>
<td>Eagleville</td>
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<td>5</td>
<td>Mewbourne Oil Co.</td>
<td>Oil &amp; Gas Upstream/Midstream/Oilfield</td>
<td>20</td>
<td>1617</td>
<td>Pan Petro</td>
</tr>
</tbody>
</table>

(Source: Private Company Update, Oil & Gas Financial Journal, April 2014)
Impact on Upstream Returns from Shift to Production?

“The land grab phase of the gold rush, where you could flip acreage early on, has largely passed…”

“There will be more development drilling that will require more capital, and it will take longer.”

–David Foley, oversees energy investments at Blackstone Group LP

The change could end a 10-year run in which energy-dedicated buyout funds have beaten average private equity returns by 2.4% and topped the Standard & Poor’s 500 Index by 9% annually through September, according to Cambridge Associates LLC.

(Source: David Carey, “Private equity shifts shale strategy as land grab ends,” Bloomberg, March 21, 2014)
Midstream – Lower Risk, Stable Returns, More Competition

Move from exploration to production is putting focus on getting fuel to market

Midstream assets include oil and gas gathering and transportation systems, processing and treating facilities, and storage facilities

2013 Deals Fell, but Significant Investment Ahead

- In 2013, the number of deals closed in midstream, equipment, and services sectors, decreased to 152 compared to 219 deals in 2012 while aggregate deal value declined 65% to $35.6B in 2013.

- As highlighted in the INGAA / ICF International study, more than $205B is expected to be spent on midstream capital investment in North America over the next 25 years, with an additional $46B in capital investment for natural gas liquids and oil pipeline infrastructure.

A Growing Number of Players

- The investment needs combined with the long-term contract, and fee-based business model, which provide steady returns, make the sector attractive.

- Consequently, there are estimated to be “90 private equity-backed midstream companies,” according to Tony Weber, managing partner of Natural Gas Partners.

(Source: Mikaila Adams, “HIS CeraWeek: Financing the Shale Infrastructure Boom, OGFJ, March 5, 2014)
Downstream – Attracting Less Attention

The enormous oil and gas supply wave will create significant new consumption opportunities.

Private equity has thus far been less active downstream, which covers businesses involved in bringing oil and gas to the final consumer.

Some of these businesses include:

- Refining – As indicated in the chart, PE has a history of involvement in refineries stepping in with others as the crude-oil and refined-product value chain was unbundled.

- Power Plants – The diversified energy funds such as Energy Capital Partners and ArcLight Capital have included power generation facilities in their portfolios.

- LNG Facilities – These large and complex projects can cost more than $10B each and hence are less likely to attract PE capital.

Oilfield Services – Taking on Strategic Importance
As business moves into production phase and cost control becomes paramount

- Oilfield services generally serve the bigger integrated oil and gas companies by providing infrastructure, equipment, and technical services necessary to explore, extract, and transport oil and gas from the ground to the refinery.

- These firms have become increasingly important as the industry moved from drilling shallow vertical wells to deeper horizontal wells, which are more expensive and the drilling more intense.

- The drive for scale and efficiency in what has become a large-scale manufacturing operation plays into PE’s sweet spot of operational value add and cost control.

- Oilfield service margins have steadily declined since 2011, according to Rystad Energy (see chart). Pressure on margins is coming from an increased cost base for OFS companies as salaries and costs from subcontractors have escalated. In the period 2007–2013 costs have increased annually by a rate of 13%.

![Average EBITDA margins* for the OFS companies and average annual oil price](chart.png)

* EBITDA margin is defined as the revenue minus operational costs divided by the revenue. Source: Rystad Energy SCube

(Source: Rystad Energy website, March 17, 2014)

Among the GPs focused on oilfield service are:

- Lime Rock Partners – Closed an $825M sixth fund in March 2013
- Intervale Capital – Closed a $495M third fund in Feb 2014
- Hastings Equity – Targeting a $200M third fund
- White Deer Energy – closed $1.39B second fund in Feb 2014
Key Risks
The shale oil and gas opportunity raises a number of risks, some of which PE is better able to shoulder than others

- **Commercial risks** – PE is especially well-suited for mitigating operational and financial risks by carefully building the teams it partners with, aligning interests, and structuring investments.

- **Political/regulatory risks** – Real and perceived environmental and safety risks could slow development if the industry experienced a regulatory backlash. A Deep Horizon–like event could significantly harm the industry’s reputation; and with trains delivering more than 10% of crude produced in the country, up from nearly zero in 2009, safety is an increasing concern.

- **Macroeconomic risks** – With much of the shale oil and gas resource consumption presently taking place in North America, the industry is less exposed to outside exogenous macroeconomic risks; but as the export opportunity grows, this should change.

- **Commodity price risks** – The industry’s exposure to oil and gas swings can impact future activity; e.g., the typical oil shale wells need a price of roughly $50 a barrel to break even.

- **Technology risks** – Drilling technology has continued to improve over the past years, enabling an extraction from core shale areas to expand to more marginal peripheral parts of fields.
Conclusion

The perfect match: long-term disciplined capital for a multi-decade opportunity

The North American energy revolution is transforming the industry and broader economy. Private equity is particularly well positioned to play a leading role in this multi-decade, multi-trillion-dollar revolution, given its ability to harness the necessary institutional capital but, and more important, the discipline to efficiently put capital to work in creating value.

The industry has a long track record of generating attractive returns in the energy sector. Moreover, the private equity model is exceptionally adaptable for operating across the oil and gas value chains and offering investors an array of different risk / reward fund types (e.g., buyout, infrastructure, etc.) to match their needs.

As the deal activity makes clear, private capital not so much competes with but complements the business of the oil and gas majors. By virtue of its deal-driven asset transformation and fundraising focus, the asset class is able to quickly facilitate energy industry restructuring.

Last year saw a slowdown in transactions, particularly as the earlier upstream deals were digested. Going forward, activity will increasingly be focused on production, consolidation, and putting in place the midstream infrastructure to move oil and gas to the market.

North America has proven to be an especially fertile ground for today’s energy revolution, thanks to secure property rights, available infrastructure, and a deep skill base. That said, the industry faces real political and regulatory risks that are inherent in a business that requires public acceptance. Perhaps the biggest risk comes with exposure to oil and gas commodity price swings that can impact future activity.

Ultimately, as a proven model for creating tremendous value by aligning investor, fund manager, and operating team interests, private equity offers a robust vehicle for both driving and participating in the North American energy revolution.