Outlook on Energy Private Equity

Mike Heinz

January 2013
CURRENT THEMES IN THE OIL & GAS SECTOR

TECHNOLOGICAL ADVANCEMENTS HAVE CHANGED THE GAME
• Horizontal drilling allows producers to expose the wellbore to dramatically higher percentages of the reservoir than vertical drilling
• This is particularly helpful in low permeable (or “tight”) formations such as shales

Source: Fossil Oil Company.
HORIZONTAL DRILLING IS NOW THE PREFERRED METHOD OF DRILLING OIL & GAS WELLS

RIG COUNT BY DRILLING TYPE - #

RIG COUNT BY DRILLING TYPE - %

Source: Baker Hughes, Inc.
(1) Horizontal wells are drilled to increase the length of the well that contacts the reservoir in order to increase the productivity of the well.
(2) Directional wells are typically drilled when the surface location of the well cannot be located directly above the reservoir.

The use of horizontal drilling has exploded since 2006 and now accounts for 63% of all drilling activity...
CONSEQUENTLY, GAS PRODUCTION HAS CONTINUED TO CLIMB DESPITE REDUCED DRILLING ACTIVITY

WELL PRODUCTIVITY VS. % HORIZONTAL RIGS (1991 – 2011)

NATURAL GAS PRODUCTION VS. WELLS DRILLED (1991 – 2011)

Widespread adoption of horizontal drilling and fracture stimulation

Source: Baker Hughes, Inc., EIA and Ross Smith Energy Group.
(1) Well productivity is defined as the annual natural gas production additions in the U.S. divided by total natural gas wells drilled in a given year.
(2) Dry natural gas production equals marketed production less extraction loss.

Well productivity has increased 340% since 2006 due to longer lateral lengths and higher frac intensity allowing the U.S. to grow gas production with reduced drilling activity.
HIGHER INTENSITY FRACS ARE IMPROVING WELL PERFORMANCE

RANGE RESOURCES – MARCELLUS SHALE COMPLETION HISTORY

<table>
<thead>
<tr>
<th>Year</th>
<th>Proppant (lbs)</th>
<th>Water (gallons)</th>
<th>Frac Stages</th>
<th>Lateral Length (ft)</th>
<th>Gross D&amp;C Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>923,000</td>
<td>2,225,000</td>
<td>3</td>
<td>1,794'</td>
<td>–</td>
</tr>
<tr>
<td>2007</td>
<td>2,765,000</td>
<td>2,646,000</td>
<td>7</td>
<td>2,198'</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>2008</td>
<td>3,418,000</td>
<td>3,127,000</td>
<td>8</td>
<td>2,495'</td>
<td>$3,500,000</td>
</tr>
<tr>
<td>2009</td>
<td>3,241,000</td>
<td>3,227,000</td>
<td>8</td>
<td>2,514'</td>
<td>$4,500,000</td>
</tr>
<tr>
<td>2010</td>
<td>5,154,000</td>
<td>3,887,000</td>
<td>10</td>
<td>3,038'</td>
<td>$5,400,000</td>
</tr>
</tbody>
</table>

Source: Range Resources.
HORIZONTAL DRILLING AND FRACTURE STIMULATION – BREATHING LIFE IN “TIGHT” RESERVOIRS

MISSISSIPPIAN LIME EXAMPLE – VERTICAL VS. HORIZONTAL

<table>
<thead>
<tr>
<th>Mississippian Single Well Economics</th>
<th>Vertical</th>
<th>Horizontal</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR (MBOE)</td>
<td>50</td>
<td>200</td>
<td>4.0x</td>
</tr>
<tr>
<td>IP Rate (BOE/D)</td>
<td>24</td>
<td>186</td>
<td>7.7x</td>
</tr>
<tr>
<td>D&amp;C Cost ($000s)</td>
<td>$1,000</td>
<td>$3,000</td>
<td>3.0x</td>
</tr>
<tr>
<td>IRR (%)</td>
<td>4.8%</td>
<td>25.5%</td>
<td></td>
</tr>
<tr>
<td>ROI (x)</td>
<td>1.3x</td>
<td>2.5x</td>
<td></td>
</tr>
<tr>
<td>PV-10% ($000s)</td>
<td>($185)</td>
<td>$1,543</td>
<td></td>
</tr>
</tbody>
</table>

Source: Plymouth Exploration. Note: Flat NYMEX price deck of $85.00/bbl oil used.
Improved well productivity and associated gas production from liquids rich plays will likely continue to dilute the supply side impacts from a decline in gas drilling.
THE POTENTIAL IMPACT OF THE MARCELLUS SHALE ON U.S. PRODUCTION/SUPPLY IS ENORMOUS

Source: ITG
Success from horizontal drilling technology in oil weighted resource plays has changed the outlook for domestic oil production from that of precipitous decline to substantial growth.
CURRENT THEMES IN THE OIL & GAS SECTOR

IMPLICATIONS OF THE TECHNOLOGY REVOLUTION
THE OIL & GAS BUSINESS IS UNDERGOING A “SEA CHANGE”

Resource Plays Are Transforming The Industry

- Public companies are rushing to gain access to resource plays because Wall Street grades oil and gas companies on quarterly production growth and predictability
- In general, resource plays deliver:
  - “Repeatability” across a large area
  - Wells with high initial production rates
  - Predictable long-term “manufacturing-like” operations
- Resource plays are very capital-intensive

Significant Impact on M&A Activity

- Majors and international oil companies have been active buyers in the U.S. M&A market after years of inactivity
- Early activity focused on JV transactions by the independents
- Now, large corporate M&A activity is beginning to accelerate (e.g., Petrohawk, Brigham, etc)
- Public companies are shedding non-core conventional assets to fund capital requirements in resource plays
- Public companies are no longer “serial acquirers” so private equity is competitive again in the acquisition arena
THE INDUSTRY WILL NEED TO INVEST ENORMOUS AMOUNTS OF CAPITAL TO FULLY DEVELOP THE RESOURCE PLAYS

ESTIMATED FUTURE CAPITAL REQUIREMENTS BY BASIN ($BN)

<table>
<thead>
<tr>
<th>Basin</th>
<th>Capital Requirement ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marcellus</td>
<td>$563</td>
</tr>
<tr>
<td>Haynesville</td>
<td>$338</td>
</tr>
<tr>
<td>Eagle Ford</td>
<td>$263</td>
</tr>
<tr>
<td>Utica</td>
<td>$263</td>
</tr>
<tr>
<td>Niobrara</td>
<td>$188</td>
</tr>
<tr>
<td>Mississippian</td>
<td>$109</td>
</tr>
<tr>
<td>Bossier</td>
<td>$100</td>
</tr>
<tr>
<td>Fayetteville</td>
<td>$94</td>
</tr>
<tr>
<td>Barnett</td>
<td>$70</td>
</tr>
<tr>
<td>Woodford</td>
<td>$69</td>
</tr>
<tr>
<td>Bakken</td>
<td>$66</td>
</tr>
<tr>
<td>Total Shale Plays</td>
<td>$2,123</td>
</tr>
<tr>
<td>S&amp;P 500 - Energy Index</td>
<td>$1,406</td>
</tr>
</tbody>
</table>

Source: Jefferies.

The estimated capital to fully develop some of the largest resource plays is 50% greater than the entire market capitalization of the S&P 500 Energy Index!
MANY PRODUCERS ARE SELLING NON-CORE ASSETS TO FOCUS ON RESOURCE PLAYS

2011 – 2013 CONVENTIONAL ASSET TRANSACTIONS

<table>
<thead>
<tr>
<th>Date</th>
<th>Buyer</th>
<th>Seller</th>
<th>Transaction Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/5/2012</td>
<td>Harbinger Group Inc</td>
<td>EXCO Resources, Inc.</td>
<td>597.5</td>
</tr>
<tr>
<td>11/7/2012</td>
<td>Legacy Reserves LP</td>
<td>Concho Resources Inc.</td>
<td>520.0</td>
</tr>
<tr>
<td>1/3/2013</td>
<td>Hilcorp Energy Company</td>
<td>Forest Oil Corporation</td>
<td>325.0</td>
</tr>
<tr>
<td>7/24/2012</td>
<td>Sheridan Holding Co., LLC</td>
<td>Noble Energy Incorporated</td>
<td>309.0</td>
</tr>
<tr>
<td>9/27/2011</td>
<td>NFR Energy</td>
<td>SandRidge</td>
<td>231.0</td>
</tr>
<tr>
<td>10/12/2012</td>
<td>Texas Petroleum Investment Co.</td>
<td>Forest Oil Corporation</td>
<td>220.0</td>
</tr>
<tr>
<td>12/12/2011</td>
<td>Patara Oil &amp; Gas LLC</td>
<td>Apache</td>
<td>200.0</td>
</tr>
<tr>
<td>2/24/2011</td>
<td>Vintage Petroleum</td>
<td>Rosetta Resources</td>
<td>200.0</td>
</tr>
<tr>
<td>3/9/2012</td>
<td>Linn Energy, LLC</td>
<td>Southwestern Energy</td>
<td>175.0</td>
</tr>
<tr>
<td>1/12/2012</td>
<td>Petro Harvester Oil &amp; Gas</td>
<td>Denbury Resources</td>
<td>155.0</td>
</tr>
<tr>
<td>8/13/2012</td>
<td>Citation Oil &amp; Gas Corp.</td>
<td>Noble Energy Incorporated</td>
<td>140.0</td>
</tr>
<tr>
<td>6/4/2012</td>
<td>Morgan Stanley Global Private Equity</td>
<td>SandRidge Energy Inc.</td>
<td>130.0</td>
</tr>
<tr>
<td>11/8/2012</td>
<td>Undisclosed company(ies)</td>
<td>Continental Resources, Inc.</td>
<td>125.0</td>
</tr>
<tr>
<td>8/7/2012</td>
<td>PetroPoint Energy Partners LP</td>
<td>Rosetta Resources Operating L.P.</td>
<td>95.0</td>
</tr>
<tr>
<td>9/18/2012</td>
<td>Memorial Production Partners LP</td>
<td>Goodrich Petroleum Corporation</td>
<td>93.2</td>
</tr>
<tr>
<td>4/11/2012</td>
<td>Nacejo Nation Oil and Gas; Resolve Energy</td>
<td>Denbury Resources</td>
<td>75.0</td>
</tr>
<tr>
<td>2/25/2011</td>
<td>Augustus Energy Partners</td>
<td>Rosetta Resources</td>
<td>55.0</td>
</tr>
<tr>
<td>8/17/2011</td>
<td>EnergyQuest II</td>
<td>Swift Energy</td>
<td>53.5</td>
</tr>
<tr>
<td>6/17/2011</td>
<td>Wapiti Energy</td>
<td>Delta Petroleum</td>
<td>43.2</td>
</tr>
<tr>
<td>4/18/2011</td>
<td>Momentum Oil &amp; Gas</td>
<td>Newfield</td>
<td>40.0</td>
</tr>
<tr>
<td>11/5/2012</td>
<td>Ursa Resources Group</td>
<td>Antero Resources LLC</td>
<td>407.0</td>
</tr>
<tr>
<td>5/1/2012</td>
<td>Denbury Resources</td>
<td>Undisclosed private company</td>
<td>360.0</td>
</tr>
<tr>
<td>3/19/2012</td>
<td>QR Energy, LP</td>
<td>Prize Petroleum LLC</td>
<td>230.0</td>
</tr>
<tr>
<td>3/22/2012</td>
<td>Parallel Energy Trust</td>
<td>Bravo Natural Gas LLC</td>
<td>169.4</td>
</tr>
<tr>
<td>1/28/2011</td>
<td>Petro Harvester Oil &amp; Gas</td>
<td>Sagebrush Resources</td>
<td>175.0</td>
</tr>
<tr>
<td>9/30/2011</td>
<td>Newton Energy Partners</td>
<td>Merit Energy</td>
<td>172.0</td>
</tr>
<tr>
<td>12/28/2012</td>
<td>QR Energy, LP</td>
<td>Quantum Resources</td>
<td>145.0</td>
</tr>
<tr>
<td>10/4/2012</td>
<td>Argent Energy Trust</td>
<td>EnergyQuest II LLC</td>
<td>132.5</td>
</tr>
<tr>
<td>12/5/2012</td>
<td>Argent Energy Trust</td>
<td>Wapiti Energy, LLC</td>
<td>120.0</td>
</tr>
<tr>
<td>8/22/2011</td>
<td>Silver Oak Energy</td>
<td>Addison Oil</td>
<td>95.0</td>
</tr>
<tr>
<td>1/18/2011</td>
<td>Gulf Coast Energy Resources</td>
<td>Cypress E&amp;P</td>
<td>95.0</td>
</tr>
<tr>
<td>6/1/2011</td>
<td>Cordilera Energy</td>
<td>Highland Oil &amp; Gas</td>
<td>74.0</td>
</tr>
<tr>
<td>5/3/2012</td>
<td>LRR Energy</td>
<td>Lime Rock Resources</td>
<td>67.0</td>
</tr>
<tr>
<td>8/16/2011</td>
<td>Hayden Harper Energy KA</td>
<td>Undisclosed</td>
<td>59.5</td>
</tr>
</tbody>
</table>

Source: IHS Herold conventional transaction screen of $40MM to $1,000MM.
Note: Bolded items represent private equity-backed transactions. Blue shading signifies Kayne Anderson portfolio company.

Private equity has recently been the primary buyer of conventional assets in the market.
Advancements in drilling and completion technology are unlocking huge amounts of reserves – “old, tight” rock as well as shales

Public companies are chasing resource plays

Public companies are expected to continue (accelerate?) to shed non-core conventional assets and remain on the sidelines for non-resource play acquisitions

KAEF portfolio companies see a lot of opportunities to develop lower-entry-cost resource plays and capitalize on conventional asset sales

U.S. is back in play
Overview of Energy Private Equity
Private equity helps finance A to B and B to C opportunities, however A to B situations require a more complex understanding of the reserves.

### Life Cycle of Small to Medium Sized Oil and Gas Companies

<table>
<thead>
<tr>
<th>Risk Profile:</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Type:</td>
<td>Engineering Geologic</td>
<td>Drilling Operational</td>
<td>Operational Commodity Price</td>
</tr>
<tr>
<td>Fund Type:</td>
<td>Private Venture</td>
<td>Private</td>
<td>Mezzanine Tranche B</td>
</tr>
<tr>
<td>Expected IRR:</td>
<td>30-50%</td>
<td>15-30%</td>
<td>10-15%</td>
</tr>
<tr>
<td>Investment Horizon:</td>
<td>2-6 years</td>
<td>2-4 years</td>
<td>7+ years</td>
</tr>
</tbody>
</table>
Private equity is typically used to accelerate a company’s reserve and production growth

**PDP** Proven Developed Producing reserves, which are reserves attached to drilled wells

**PUD** Proven Undeveloped reserves for which wells need to be drilled, greater than 90% chance of success

**PROB** Probable reserves for which wells need to be drilled, greater than 50% chance of success
E&P CAPITAL STRUCTURE

Target Rate of Return (%)

- Private Equity
  - Common Equity
  - Preferred Equity
- Mezzanine Debt
- 2nd Lien Bank Debt
- Senior Bank Debt

--- Development/Exploitation (Engineering Risk) ---

- PDP (Low)
- PDNP
- PUD
- Probable Reserve Risk
- Possible (High)

--- Exploration (Geologic/Geophysical Risk) ---
• **Investment strategy**
  - Operator-focused investments in private oil and gas companies
  - Proven management teams – experienced in 1-2 basins
  - Diversified portfolio, although portfolio companies are not necessarily geographically diversified
  - “Equity” return upside and “quantifiable” risk

• **Investment structure**
  - Investment size $50 to $150 million
  - Returns primarily from capital appreciation
  - Targeted gross ROI of 2.0x to 2.5x and gross IRR of 20% to 30%
  - Typical holding period of three to five years
  - Active investor (usually with majority control)
  - Typically common investments through LLCs

• **Outstanding Track Record**
  - 43 realizations since inception (over $2.0 billion of total value)
  - 2.4x ROI and 52% IRR from realized investments
Balanced portfolio of Acquiring & Exploit (A&E) and Lease & Drill (L&D) companies

Resource play revolution is driving a “game changing” transformation in the energy industry
- E&P industry requires trillions of dollars of capital to fully develop capital intensive resource plays
- Public E&P companies will continue to sell conventional, legacy assets to fund resource play development

We run two price decks (Base Case and Downside Case):
- Base Case price deck – strip prices capped at $85/bbl for oil and $5.00/MMbtu for gas
- Downside Case price deck – strip prices capped at $60/bbl for oil and $4.00/MMbtu for gas
- Targeting equity rates of return (25+) at Base Case price deck and reasonable returns (10%) at Downside Case price deck

We continue to focus on risk mitigation and capital preservation
- Moderate levels of leverage via senior credit facilities
- Prudent hedging
- Avoid overpaying for drilling locations or acreage
- Moderate initial pace of drilling until we know a project works
- Potentially sell-down to industry partners
LEAVE AND DRILL STRATEGY

- **Lease & drill strategy: Assemble a lease position and derisk the acreage with development activity**
  - Identify underexploited reservoir or new development concept
  - Assemble meaningful acreage position (usually 10,000 to 40,000 acres)
  - Drill wells to “prove up” acreage position
  - Sell to larger E&P company who will pay for low risk drilling inventory

- **Keys to success:**
  - Ability to acquire acreage at a reasonable cost (need to be ahead of the “land grab”)
  - Managing amount of capital exposed before knowing whether a project is working
  - Ability to drill wells on budget
  - Gathering and interpreting technical data
  - Monitoring activity of other operators in the area
  - Derisking reserves (acreage \(\rightarrow\) PROB \(\rightarrow\) PUD \(\rightarrow\) PDP)
KAEF PORTFOLIO COMPANIES ARE DEVELOPING RESOURCE PLAYS ACROSS THE U.S.

**Williston Basin**
- Canyon Midstream (EF V & EF VI)
- Kraken (EF V)
- Sagebrush II (EF IV & EF V)

**Niobrara/Uinta/Powder River**
- Axia (EF IV & EF V)
- Three Forks (EF V)

**Granite Wash/Tonkawa/Cleveland**
- Great Plains (EF IV)
- Plano (EF IV)
- Plymouth (EF IV)
- Trail Ridge (EF IV)
- Corlena II (EF V)

**Mississippian/Woodford/St. Louis**
- Calyx I & II (EF IV)
- Plymouth (EF IV)
- KA Vess (EF V)

**A-1 Carbonate**
- Beacon (EF IV)
- Axia (EF IV & EF V)

**Utica Shale**
- Canyon Midstream (EF V & EF VI)

**Marcellus Shale**
- Grenadier (EF III)
- Great Plains (EF IV) / Endless Mountain (EF V)

**Fayetteville Shale**
- Riverbend (EF IV)

**Barnett Shale**
- Beacon (EF IV)

**Cotton Valley**
- Cross Creek (EF III)

**Pearsall Shale**
- Momentum (EF V)

**Abo/Devonian/Strawn/Grayburg/W. TX Miss.**
- Pedernales (EF III)
- Adventure II (EF V)
- KA Henry (EF V)
- Alamo II (EF V)
- Raptor II (EF V)

**Utica Shale**
- Canyon Midstream (EF V & EF VI)
KAEF FOCUSES ON RESOURCE PLAYS WITH LOWER ENTRY COSTS

- Bakken
- Haynesville
- Utica
- Eagle Ford
- Marcellus
- Barnett
- Wolfberry/Wolfcamp
- Bone Spring
- Niobrara
- Cleveland Sand
- Miss.

Acquire & exploit strategy: Acquire producing oil and gas properties with upside opportunities

- Drill new wells
- Workover/recomplete/commingle existing wells
- Reduce operating costs
- “Prove up” new productive zones
- Incorporate new technologies (horizontal drilling, modern fracs, large volume water handling)

Keys to success:

- Ability to source, evaluate and negotiate acquisitions
- Avoid overpaying for upside
- Ability to identify and execute on upside opportunities to add value
- Exit in an attractive environment (long-lived reserves offer flexibility around exit timing)
KEY TAKEAWAYS

Resource play revolution is driving a “game changing” transformation in energy
E&P industry requires trillions of dollars of capital to fully develop the resource plays
Companies will continue to sell non-core assets to help fund resource play development programs

Tremendous Investment Opportunity in Energy

ALWAYS maintained a consistent strategy
- Onshore North America
- Middle market private oil and gas companies

Team – competitive advantage
- Close-knit culture (no turnover)
- Technically-focused with 6 petroleum engineers

Conservative bias
- Focused on risk mitigation and capital preservation
- Active partner with our management teams

Outstanding track record in energy private equity
- Committed over $3.4 billion to 87 investments since inception
- 43 realizations since inception (over $2.0 billion of total value)
- 2.4x ROI and 52% IRR from realized investments
# Executive Leadership

- **Danny Weingeist**
  - Managing Partner

- **Bob Sinnott**
  - Managing Partner
  - President/CEO of Kayne Anderson

- **Chuck Yates**
  - Partner

- **Mike Heinz**
  - Partner

## Finance / Structuring

- **James Broach**
  - Managing Director

- **Kevin Brophy**
  - Senior Vice President

- **Tray Black**
  - Senior Vice President

- **Todd Burgamy**
  - Associate

- **Greg Davis**
  - Senior Vice President

- **Mark Teshoian**
  - Senior Vice President

- **Buddy Clarke**
  - Vice President

- **Jack Foster**
  - Associate

## Engineering / Operations

- **David Iverson**
  - Managing Director

- **David Habachy**
  - Senior Vice President

- **Heather Hafemann**
  - Engineering Associate

- **Giff Wilkerson**
  - Senior Vice President

- **Patrick Lissonet**
  - Vice President

## Prior Work Experience:

- Akin Gump
- Credit Suisse First Boston
- Goldman Sachs
- JP Morgan
- Lehman Brothers
- Simmons & Company
- Stephens

- ARCO
- Exxon
- Manti Resources
- Netherland Sewell
- Vastar