

Winning Technologies and Investments in Energy

Howard Newman
Pine Brook Road Partners, LLC
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Pine Brook Road Partners

- Investment firm that specializes is “business building” and other equity investing, primarily in the energy and financial services industry
- \$1.43 billion fund closed in March 2009
- Current portfolio includes five start up exploration and production companies

Pine Brook Road Partners

- Principals have been investing in the energy business since the mid-1970's
- Have started over 25 energy companies and a clean tech fund
- Experienced in conventional and emerging hydrocarbons, power generation, wind, solar and bio-fuels

The importance of new technologies

It is often said that oil is found in the minds of men, not
in the ground

I have used a powerful, proprietary technology to help me
decide whether to start a company







An investor's view of energy

- Energy is a commodity business that attracts billions of dollars each year
- Expectation should be that capital deployed will earn the required cost of capital
 - Upstream returns are 15%-20%
 - Production returns are 8%-10%
 - Manufacturing vs. inventory speculation
- Key to superior performance and higher returns is being a low cost producer

Low cost producer

- Focus
- Intellectual property
- Technology
 - Develop new technology/intellectual property
 - Be an early adopter of existing technology
 - Existing technology in a new or novel way
- And be lucky

Technology and supply

- Believing in technology means not believing in peak oil
- Our view is that supply is very “price/technology” elastic
- Investors-and policy makers-systematically understate the supply implications of technology changes because of the lags involved

Seismic shifts

- 3-D technology developed in the early 1970's
- First used by independents in the US GOM in the mid-late 1980s (Newfield)
 - Postage stamp to regional application
- First used on an area wide basis by Spinnaker (1996)
 - Development of AVO and other attribute analysis
- Gryphon: first to use AVO regionally (2000)

Technology today

- Gulf of Mexico stories were all about improvements in exploration technologies
 - Key issue: when you drilled, was there anything there?
- New game in town: shale plays
 - Key issue: what does it cost to produce it?

Shale plays

- Barnett Shale was pioneered by Mitchell Energy
 - Cracking the code: 1990-2000
 - Required major advances in drilling technologies
 - Horizontal drilling and fracture stimulation
- Next generation of shales resources
 - Woodford, Fayetteville, Marcellus, Haynesville
- Today: “from shale to shining shale”
 - Well over 800 Tcf identified in 26 shale plays

Typical shale play

- Shale resources vary considerably in their economic potential
- EURs vary from 2-8 Bcf/well
- Cost to drill \$4mm-\$10mm/well
- Finding cost vary from \$2 (or less) to \$5/Mcf
- Some projects return 10% at under \$4/Mcf
- Most projects economic (ROI above 12%) at \$6/Mcf

Implications of gas from shale

- Gas is the new coal
- Owning the resource per se is of little value
- Major shift in mindset
- Cash flow is king
- Back to the future
- And similar potential exists for oil as well

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