Oil & Gas Investment

USEIA, April 7-8, 2009
Trends Drivers

- Upstream cost structures and margins relative to financing
- Demand-side pricing policies by governments (oil)
- Impact of financial markets
- Resources and opportunities – “frontier” oil
- “Frontier” natural gas
- Cross-commodity pricing (fuel competition) – the challenge of building value for nat gas
- Climate
- Investment trends – invest in what you know
Players and Cost Structures

North America marginal cost of production was $69.44/boe

*North America marginal cost of production was $69.44/BOE. Source: Bernstein Research
Improvements in NOCs’ reserve replacement rate are supported by improvements in governance, more effective and stable alliances between NOCs and IOCs, sound competitive frameworks, and progressive fiscal regimes…
...and enables them to create and optimize value from assets.
Non-Commercial Performance Contributions by Type/Revenue (%)

- StatHydro: 24% Taxes, Roys., Bonuses, -4% Price Subsidies, -4% Direct Social Expenses, 22% Excess Labor Cost
- Petrobras: 31% Taxes, Roys., Bonuses, -4% Price Subsidies, -4% Direct Social Expenses, 23% Excess Labor Cost
- Sinopec: 6% Taxes, Roys., Bonuses, 22% Price Subsidies, 31% Direct Social Expenses, 31% Excess Labor Cost
- Petrochina: 16% Taxes, Roys., Bonuses, 58% Price Subsidies, -20% Direct Social Expenses, 0% Excess Labor Cost
- Pemex: 16% Taxes, Roys., Bonuses, 58% Price Subsidies, -20% Direct Social Expenses, 0% Excess Labor Cost
Oil Demand Growth by Region, 2006-2008 (YTD)

WTI Price (Real), 2006-2008 (YTD)

Subsidies and Demand
Not All Opportunities are the Same

http://www.searchanddiscovery.net/documents/abstracts/2005hedberg_vail/abstracts/extended/holditch01/holditch01.htm
Electron Imagery of Barnett Fractures

The Endless Resource


Source: NPC 2007
Natural Gas vs. Petroleum Prices

What kind of business are we in?

Sources: U.S. EIA; NYMEX; CEE
Public Acceptance: Sample LNG Projects in Same Region

What caused the differences?
Onshore vs. Offshore?
Developer posture?
Early dialogue?

Unlicensed Onshore Project

Licensed Offshore Project

Sources: CEE, Community and Economic Benefits of LNG, 2008
Sample Projects in Different Regions

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Sources: CEE, Community and Economic Benefits of LNG, 2008
Math Whiz

- Total annual CO2 emitted is 188 bn ton
- 8bn is derived from human activity
  - US produces 2 bn
- Net generation from US coal plants is ~170mm MWh
  - CO2 production is ~2,250 lbs/MWh, or 191mm tons
- The total atmosphere is 5 quadrillion tons
  - We would be removing 0.00000382% if all CO2 from US coal-fired power gen was captured
  - We would be removing 0.00016% if all CO2 attributed with human activity were captured or eliminated
Technology – Our Industry’s Investments (2000-2007)

$188 Billion

$121.4 Billion (65%)
$58.3 Billion (31%)
$8.3 Billion (4%)

$109.8 Billion (60%)

$45.5 Billion (25%)
$32.7 Billion (15%)

Source: T² and Associates and CEE

End Use: $45.5 Billion

- Other Private Companies: $28 Billion (61%)
- Oil and Gas Companies: $15.9 Billion (35%)
- Federal Government: $1.6 Billion (4%)

Non-hydrocarbons: $32.7 Billion

- Other Private Companies: $12 Billion (86%)
- Oil and Gas Companies: $1.7 Billion (5%)
- Federal Government: $3 Billion (9%)

Source: IER and CEE
Carbon Mitigation (2000-2006)

$94 Billion

- $42 Billion (45%)
- $37 Billion (39%)
- $15 Billion (16%)

Source: T2 & Associates and CEE
Impact of Technology – Deferring Declines

- Oil discovered in Titusville, Pennsylvania, 1859; natural gas replaces town gas, 1870s
- Advances in drilling, early seismic, shallow offshore E&P
- Offshore below 10,000ft
- 4-d seismic, offshore below 5,000ft
- 3-d seismic, horizontal drilling, measurement while drilling, offshore below 1,000ft
- Pipeline trenching and welding, compression, pressure control, metering; national grid develops
- Directional drilling, offshore below 250ft water depth
- Long-line pipeline transmission
- Advances in drilling, early seismic, shallow offshore E&P
- Oil discovered at Spindletop (Texas), 1901
- Oil discovered in Titusville, Pennsylvania, 1859; natural gas replaces town gas, 1870s

Conventional porosity/permeability

Unconventional

Nano

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<th>Minis</th>
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<td>1930</td>
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<td>1950</td>
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Cumulative U.S. Oil & Gas Production, 1936-2007 BBOE (Includes Alaska)

Still looking for the peak...

- Arctic?
- Hydrates?
- Offshore below 10,000ft
- 4-d seismic, offshore below 5,000ft

Still looking for the peak...
Center for Energy Economics

www.beg.utexas.edu/energyecon

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