Current State of Oil and Gas Markets

Presentation to IAEE
March 12, 2009
Dave Pursell

*Disclaimers on page 32 of this document.
Past and Ongoing Real Equity Price Cycles and Banking Crises: Peak-to-trough Price Declines (left panel) and Years Duration of Downturn (right panel)

Percent decline

-55.9 percent

-40 percent

-30 percent

-20 percent

-10 percent

0 percent

Ongoing

Duration in years

3.4 years

Norway, 1899
Argentina, 2001
Hong Kong, 1997
Norway, 1987
Sweden, 1991
UK, 2007
US, 2007
Spain, 2008
Hungary, 2008
Historical Average
Philippines, 1997
Ireland, 2007
Japan, 1992
Finland, 1991
US, 1929
Colombia, 1998
Spain, 1977
Malaysia, 1997
Indonesia, 1997
Korea, 1997
Austria, 2008
Thailand, 1997
Iceland, 2007

*The Aftermath of Financial Crises
Reinhart & Rogoff - December 2008
Energy Industry Implications

- Duration Of Soft Commodity Prices?
- Ongoing Spending Reductions
- Less Exploration
- Squeeze Vendors
- The Strong Survive And Thrive
- Some Weak Will Perish
- It’s Still A Hydrocarbon economy

Must Be Present To Win!
Natural Gas 12 Month Strip

At Peak

<table>
<thead>
<tr>
<th>7/13/08</th>
<th>Gas Strip</th>
<th>TPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$14</td>
<td>$10</td>
</tr>
<tr>
<td>2010</td>
<td>$13</td>
<td>$9</td>
</tr>
<tr>
<td>2011</td>
<td>$11</td>
<td>$9</td>
</tr>
</tbody>
</table>

Current

<table>
<thead>
<tr>
<th>2/26/09</th>
<th>Gas Strip</th>
<th>TPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$4.50</td>
<td>$4.50</td>
</tr>
<tr>
<td>2010</td>
<td>$6.00</td>
<td>$5.50</td>
</tr>
<tr>
<td>2011</td>
<td>$6.70</td>
<td>$7.50</td>
</tr>
</tbody>
</table>
Commodities (before peak)

CRUDE OIL

NATURAL GAS

COAL

WHEAT

US DOLLAR

GOLD

TUDOR PICKERING HOLT & CO

ENERGY INVESTMENT & MERCHANT BANKING
Commodities (to current)

CRUDE OIL

NATURAL GAS

COAL

WHEAT

US DOLLAR

GOLD
Gas Market Thoughts

- Supply Easier To Add Than Before
- 2009 Is Toast
- Self-Corrective Nature of Business
  - Oil Service Costs
  - Drilling Activity
- Shale Has Changed Game
- Low Cost Imperative
- Demand Will Recover

Price Guesstimate

2009 @ $4.50/mcf
2011+ @ $7-$8/mcf
Futures - Are They Accurate?

"That's mathematics, son. You can argue with me, but you can't argue with figures."

Foghorn Leghorn
Storage Shows Gas Market Out-Of-Balance

\[ R^2 = 0.930 \]

Long Term Trend 45 Degree Angle

Actual Storage Change, bcf
Storage Will Reach Maximum Levels

- We are headed for full storage in 2009 without something dramatic happening soon.

2009e maximum storage capacity ~ 3,800 bcf
Recent Electricity Data - Soft Demand

**Source:** EEI

\[ R^2 = 0.7918 \]

*Weekly Data Regression
Most Recent Data Points
Best Fit*

**Weekly Data Regression**

Most recent data points showing weak electricity demand (weather adjusted)

**Table: Electricity Demand, bcf/day**

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>18.7</td>
<td>18.3</td>
<td>17.8</td>
<td>17.8</td>
</tr>
</tbody>
</table>
## Industrial Demand Components

<table>
<thead>
<tr>
<th>Sector</th>
<th>Electricity (million kWh/day)</th>
<th>Electricity % Sector</th>
<th>Natural Gas bcf/day</th>
<th>Natural Gas Sector %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td>2,280</td>
<td>100%</td>
<td>17.3</td>
<td>100%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>419</td>
<td>18%</td>
<td>6.2</td>
<td>36%</td>
</tr>
<tr>
<td>Petroleum/Coal</td>
<td>102</td>
<td>4%</td>
<td>2.3</td>
<td>14%</td>
</tr>
<tr>
<td>Primary Metals</td>
<td>396</td>
<td>17%</td>
<td>1.9</td>
<td>11%</td>
</tr>
<tr>
<td>Paper</td>
<td>179</td>
<td>8%</td>
<td>1.3</td>
<td>8%</td>
</tr>
<tr>
<td>Food</td>
<td>185</td>
<td>8%</td>
<td>1.6</td>
<td>9%</td>
</tr>
<tr>
<td>Nonmetallic Mineral</td>
<td>113</td>
<td>5%</td>
<td>1.1</td>
<td>7%</td>
</tr>
<tr>
<td>Others</td>
<td>885</td>
<td>39%</td>
<td>2.9</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: DOE

- Chemicals, Petroleum and Metals...not exactly roaring right now
US Production - Declining in 2009 and 2010
Onshore Supply Growth

-42% (400) rigs activity decline in 2001 impacted supply growth in 2002:
  - 2000 42.8 bcf/day
  - 2001 43.9 bcf/day
  - 2002 43.6 bcf/day

6% onshore supply growth with ~flat rig count from early 2006 - early 2008 - see our March 2007 report “The Yin and Yang of Natural Gas…”

Onshore supply growing 8% y/y in 2008, with temporary dip a result of Ike/Gustav impacts.

Source: Baker Hughes, EIA, TPH Estimates
Shale Plays Changing The Game

Year 1 Production Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Well</th>
<th>Shale Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>1x</td>
<td>2x +</td>
</tr>
</tbody>
</table>

Onshore Gas Wells Drilled, Annually

"I can hardly remember how I built my bankroll, but I can't stop thinking about the way I lost it."  
Mike.... Rounders
The only thing better than a crawfish dinner, is five crawfish dinners.

Coach Red Beaulieu           The Waterboy
Dramatic Industry Reaction

US Onshore Gas Rigcount Since September 2008

August '08 Peak
1,543 rigs

Current
869 rigs

Source: Baker Hughes
Onshore Rig Count and Production Growth Relationship

Source: TPH
Basin Breakeven Analysis

Breakeven Gas Price, $/mcf

Average Well

Marginal Well

Pinedale
East Texas Freestone
Appalachia CBM
Fayetteville
Haynesville Well 7.5mmpd IP
James Lime
Marcellus Horizontal
Core Barnett
Barnett Tier 1
Barnett Tier 2
Woodford Core
Carthage Field
Wolfcamp (Permian)
Woodford Fringe
Piceance
Gulf Coast LA
NE BC Shale
Gulf of Mexico Shelf

$13.45
$11.61
$11.40
$10.45
$9.75
$9.65
$9.15
$8.45
$7.94
$7.30
$7.14
$6.86
$6.85
$6.44
$6.37
$5.87
$5.48
$5.59
$5.72
$6.39
$6.80
$8.07
$13.45
LNG - Neutral For Now

- Global LNG demand down with GDP/oil
- LNG supply adds 2010 = 6bcf/day
LNG Imports - Increasing in 2009/2010

Global Liquification Projects

<table>
<thead>
<tr>
<th>2009 LNG Projects</th>
<th>Estimated Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
<td><strong>Project</strong></td>
</tr>
<tr>
<td>Qatar</td>
<td>Qatargas II</td>
</tr>
<tr>
<td>Russia</td>
<td>Sakhalin</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Tangguh</td>
</tr>
<tr>
<td>Yemen</td>
<td>Yemen LNG</td>
</tr>
<tr>
<td>Russia</td>
<td>Sakhalin</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Tangguh</td>
</tr>
<tr>
<td>Qatar</td>
<td>RasGas</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
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<th>2010/2011 LNG Projects</th>
<th>Estimated Capacity</th>
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<tr>
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<td><strong>Project</strong></td>
</tr>
<tr>
<td>Qatar</td>
<td>QatarGas II</td>
</tr>
<tr>
<td>Qatar</td>
<td>Ras Gas</td>
</tr>
<tr>
<td>Qatar</td>
<td>QatarGas III</td>
</tr>
<tr>
<td>Peru</td>
<td>Camisea</td>
</tr>
<tr>
<td>Australia</td>
<td>Pluto</td>
</tr>
<tr>
<td>Australia</td>
<td>Gladstone 1</td>
</tr>
<tr>
<td>Algeria</td>
<td>Skikda Revamp</td>
</tr>
<tr>
<td>Qatar</td>
<td>QatarGas IV</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
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</table>

Source: Waterborne
Where Could We Be Wrong?

- Economy, Credit Crunch, Shale Play = Complicated!!!
- Not Much Can Save 2009
- 2010 = Wide Error Bar
- Upside Case = $7/mcf 2010, $8/mcf 2011
  - Successful economic stimulus
  - Supply reacts quickly to rigcount
- Downside Case = $4/mcf 2009, <$5/mcf 2010
  - Demand worse than expected...into 2010
  - Supply response = slow
  - LNG imports accelerate
Oil Market Thoughts

- Supply Hard to Add
- 2009 Is Toast
- Non-OPEC and OPEC supply falling
  - Oil Service Costs
  - Drilling Activity
- Demand Will Recover

Price Guesstimate

2009 @ $45/bbl
2011+ @ $90/bbl
Global Demand

Global Demand Change, y/y

- Demand contraction in early 1980’s was profound and a repeat would create several years of low oil prices.
- Compared to 1980, for this cycle we forecast a more rapid recovery in demand (and price) with demand down 1.6% in 2009 and flat in 2010.
- Unlike the 1980’s, excess capacity is being created only by demand contraction.
US Inventories Showing Demand Weakness

- Mid-Nov 2008 US petroleum inventories normal.
- In last 3 months, inventories at seasonal max levels.
- Inventory builds occurring even though OPEC cutting production.

U.S. Inventories - Crude and Key Products

- 2008
- 2009
- Median
- Max
- Min

Values:
- Median 650 to 800 million barrels
- Max 850 to 900 million barrels
- Min 550 to 700 million barrels

Dates:
- 01-Jan-09 to 02-Jan-10
Dramatic increase in OPEC excess capacity was driven by 1) weak global demand and 2) growing non-OPEC production.

Excess capacity represented ~23% of total demand in 1985

Excess capacity will build slower in 2009 as non-OPEC supply is forecast to decline.
Low oil prices matter to OPEC. Aggressive cuts implemented from early 2008 highs.

OPEC has helped to stabilize prices in a soft demand environment.

Saudi Arabia accounts for ~55% of the 2.5mmbpd cuts implemented so far.

Current excess capacity is ~4mmbpd...or 5% of total demand.

It will likely take demand recovery to push oil prices back toward the $70 to $90/bbl range.

Sources: IEA and TPH
Non-OPEC Supply

- Non-OPEC supply poised to decline 0.5% in 2009.
- Further 1% decline in 2010.
- Low oil price and volatile capital markets combine for tough sledding for oil production.
- Components of 2009/2010 decline include:
  - Mexico - continues.
  - Russia - decline after growing continuously since 1998.
  - North Sea declines continue.
- These 3 regions account for ~40% of non-OPEC supply.

Source: IEA and TPH
Change!  Gas Market Implications

- Carbon Tax (er....Legislation) is Coming
  - Natural Gas should benefit
    - Lower carbon than oil and coal
  - Drilling
    - Wait and see
  - Magnitude of Tax?
    - Initial budget very negative treatment of IDC’s...maybe gas not getting free pass?

- Demand side management
  - Expect legislation to encourage lower consumption

"Oh, uh, there won't be any money, but when you die, on your deathbed, you will receive total consciousness." So I got that goin' for me, which is nice.  
Caddyshack - Carl Spackler
Conclusion

Formula for success:

“Rise early, work hard, strike oil.”

J. Paul Getty

Formula for success - 2008:

“Rise early, work hard, buy acreage.”

Anonymous landman

Formula for success - 2009:

“Rise early, work hard, survive.”

Anonymous landman
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Contact Us
Houston (Research, Sales and Trading): 713-333-2960
Houston (Investment Banking): 713-333-7100
Denver (Sales): 303-300-1902
Denver (Investment Banking): 303-300-1905

www.TudorPickering.com