Challenging Energy Markets: Stormy Weather or Worse?

Allen Brooks
Managing Director

ICoTA Roundtable
Calgary, Canada

October 20, 2011
Great Political Turmoil

Middle East

Wisconsin

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Great Political Turmoil

Greece

Wall Street

Hitler’s Bankers - Wall St.
Great Economic Turmoil

**Employment**

- **Source:** IMF

**Consumption**

- **Source:** IMF
Economic Growth Assumptions are Falling

Source: IMF
IMF Says Greater Risk to Downside for Growth

Prospects for World GDP Growth

Baseline forecast
50 percent confidence interval
70 percent confidence interval
90 percent confidence interval
90 percent confidence interval from April 2011 WEO

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Questions for 2011

What Political Resolve?

Careening for a 2008 Repeat?

Dow Jones Industrial Average Index (2008 - Present)
Energy Markets in Turmoil

Oil & Gas Prices have Diverged

Global & U.S. Oil Prices Diverged

Crude Oil Prices (2010 - Present)

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Energy Markets in Turmoil

- Arab Spring Impact
  - Libya Production
  - Saudi / OPEC Resolve
  - Israeli / Palestinian Question
- Energy Demand Growth
- Green Energy
- U.S. Oil Production Growth
- Shale Gas Revolution
Shale Gas is Revolutionizing the Industry

PGC Potential Natural Gas Supply

50 years; 100 years; maybe 200 years of supply colors views
Natural Gas is Becoming Bridge to the Future

Golden Gate Bridge under construction in 1936

Anne T. Kent California Room Collection, Marin County Free Library
Bridge in Honduras after Hurricane Mitch in 1998

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How We Used to View Domestic Gas Supply

U.S. Natural Gas Production History

Source: IHS
The Old View of Our Future Gas Supply

![Graph showing historical and projected gas supply figures for various regions including Overseas LNG, Canada, and Mexico.]
The Future Outlook for Domestic Gas Supply

Shale gas offsets declines in other U.S. supply to meet consumption growth and lower import needs

U.S. dry gas trillion cubic feet per year

<table>
<thead>
<tr>
<th>Year</th>
<th>History</th>
<th>2009</th>
<th>Projections</th>
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<tbody>
<tr>
<td>1990</td>
<td>10</td>
<td>11%</td>
<td>45%</td>
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<tr>
<td>1995</td>
<td>15</td>
<td>14%</td>
<td>8%</td>
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<tr>
<td>2000</td>
<td>20</td>
<td>20%</td>
<td>8%</td>
</tr>
<tr>
<td>2005</td>
<td>25</td>
<td>28%</td>
<td>8%</td>
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<tr>
<td>2010</td>
<td>30</td>
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Net imports 11%
Shale gas 45%
Non-associated onshore 8%
Non-associated offshore 8%
Tight gas 22%
Coalbed methane 8%
Associated with oil 2%
Alaska 1%

Richard Newell, December 16, 2010

Source: EIA, Annual Energy Outlook 2011
Unconventional is Now Conventional

Shale Gas Plays, Lower 48 States

Source: Energy Information Administration based on data from various published studies.
Updated: March 10, 2016

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Natural Gas to Play Greater Role in Future

Global demand by fuel

Source: Smil, Energy Transitions; ExxonMobil

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After Decades, Age of Gas May Be Arriving

Natural gas demand growth 2005-2030
Billions of cubic feet per day (BCFD)

- Natural gas demand is growing fastest in the Non OECD, with demand up over 130 BCFD from 2005 to 2030.

- OECD gas demand rises by almost 50 BCFD.

- Other Non OECD reflects strong growth primarily in other Asia Pacific countries such as Indonesia, Thailand and Malaysia.

- Demand growth for natural gas in all other sectors
- Demand growth for natural gas in power generation

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Global Gas Shale Prospects are Potentially Huge
Where Is The Gas Business Heading?

• “Prediction is very difficult, especially about the future.”
  – Niels Bohr
  *Nobel laureate in Physics*

• “Those who have knowledge, don’t predict. Those who predict, don’t have knowledge.”
  – Lao Tzu
  *6th Century Chinese Poet*
An Example of How Extensive Gas Shales Are
LNG Trade Routes May Be About to Change

Major gas trade movements

Major trade movements
Trade flows worldwide (billion cubic metres)
Gas Market Distortions Come from Government Regulation

Source: Energy Information Administration.
Considerations Influencing Our Future – Government Policy

- Land Restrictions
- Energy Mandates
- Climate Change
- GOM Drilling Restrictions
- Fracturing Questions
Where is the Gas Business Heading?

“If you don’t know where you are going, you might wind up someplace else.”

- Yogi Berra
  Yankee legend and philosopher
Classic Case of Getting it Wrong

March 1999

The Economist
Drowning in oil

December 1999

Oil price
Brent crude

$5 oil forecast “soon”

Source: Primark Datastream

*1-month forward

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“It takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that.”

- Queen of Hearts
Alice in Wonderland
Mine’s Bigger Than Yours: Barnett vs. Haynesville

Haynesville and Barnett shale gas production
billion cubic feet per day

Winter well freeze-offs

Barnett

Haynesville

168
151

March 2010
March 2011

Haynesville Shale Rig Count

Source: Schlumberger Brief/Bbls STATS
The Problem for Gas Shales

Barnett Shale Horizontal Wells Static Decline Analysis

- No new wells added for last year of data
- 44% Annual Decline
The Problem for Gas Shales

Newark (East) Field Barnett Shale Gas Production through 11/30/2010
excepting wells reporting first production after 11/30/2009 (1,796 of 15,396 (12%))

- Exponential Calculation from 12/1/2009 forward: EUR=1.33 Bcf
- Hyperbolic Calculation from 12/1/2010 forward: EUR=1.452 Bcf
- Hyperbolic Calculation from 12/1/2009 forward: EUR=2.395 Bcf

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The Problem for Gas Shales

Changing Shape of Natural Gas Well Production Profiles

Source: IHS
Gas Shales and the Economic Challenge

**Profitability**

2Q11 Total Capital Expenditures as a % of Operating Cashflow

- 10 of 43 E&P companies spent more capital than their operating cashflow.

**Capital Markets**

North American E&P Capital Raises by Year

- Data source: Corporate Reports, Bernstein Analysis

Source: Capital IQ and Bernstein

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Performance of the Service Stocks

Dow Jones Industrial Average Index vs. Oil Service Sector Index (2007 - Present)

- DJIA
- OSX
Performance of the Service Stocks

Major Servicers (BHI, HAL, SLB, WFT)

Stock Price

Net Income

3 Month Lag

13 Month Lag

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Performance of the Service Stocks

Major Manufacturers (CAM, DRQ, FTI, NOV)

- Stock Price
- Net Income

6 Month Lag

9 Month Lag

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Performance of the Service Stocks

U.S. Well Servicers (BAS, CPX, KEG, SPN, RES)

- Stock Price
- Net Income

3 Month Lag

9 Month Lag
Building a Bridge Assumes the Future Doesn’t Change

Bridge in Honduras after Hurricane Mitch in 1998

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Thank You