A Tale of Two Fuels
- Crude Oil and Natural Gas Supply
Henry Hub Natural Gas vs. WTI Crude

Source: ICE
Natural Gas vs. Crude Oil

- Even with natural gas prices below $4.00, production continues at all time highs; prices remain under downward pressure.
- International demand for liquids fuels is increasing, pushing up global crude oil prices.
- Price divergence between gas and oil is shifting the economics of production, demand, processing and transportation in North America.
- This is a structural shift that will drive market changes for years if not decades to come.
Spot Henry Hub Below $4.00

 Avg. 2007 - $6.94
 Avg. 2008 - $8.85
 Since 1/1/09 - $4.16

Source: ICE
WTI Crude - $40/bbl to $98/bbl

Since 1/1/09 - $40/bbl to $98/bbl

Source: ICE
Crude-to-Gas Price Ratio

Crude prices are high relative to natural gas prices

High Crude/Gas ratio
Natural Gas and Crude Oil

- Producers – shift to oil and liquids rich gas plays
- Buyers – shift to low price gas and plentiful light NGLs
- Midstream – significant opportunities in processing, gathering and transportation
U.S. Production Still on the Rise

Source: BENTEK Supply and Demand Report, Dry Production

2009 Avg. = 56.4 Bcf/d
2010 Avg. = 57.8 Bcf/d
2011ytd Avg. = 58.5 Bcf/d

Maintenance & Freeze-offs
**Shale Production Growth**

Select Shale Basin Production Growth (Bcf/d)

Source: BENTEK Production Market Model & Production Monitor

Over 7 Bcf/d Growth in 4 Years

- **Haynesville**
- **Fayetteville**
- **Pennsylvania (Marcellus)**
Sub $4.00 Breakevens Drive Resource Plays

- **Horn** $4.30
- **Montney** $3.24
- **WCSB** $5.30
- **Bakken** $4.32
- **Pinedale** $2.77
- **PRB** $4.32
- **San Juan** $3.80
- **Piceance** $3.80
- **Haynesville** $3.66
- **Fayetteville** $3.17
- **Marcellus** $2.86
- **Woodford** $4.03 $3.84
- **Granite Wash** $0.92 $3.17
- **Cana Woodford** $0.92 $3.17
- **Woodford** $4.03 $3.84
- **Eagle Ford** $1.67
- **Barnett** $4.01
- **Permian** $0.00
- **Horn** $4.30
- **Montney** $3.24
- **WCSB** $5.30
- **Bakken** $4.32
- **Pinedale** $2.77
- **PRB** $4.32
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- **Permian** $0.00

**Note:** Breakevens computed at 12:1 Crude Ratio and 1:1 NGL Ratio

Green Circles Breakeven's Computed at $80 Crude and 1:3 NGL Ratio

Based on 3Q2010 Financials and State Production Data

Source: BENTEK
Where Did the Gas Go?

- Coal-to-gas switching
- Weather
- Reduced Imports
2009 Coal Switching Saves the Day

2.80 Bcf/d in 2009

Price Low of $1.96
2010 Hottest Summer in Last 60 Years

Total Cooling Degree Days

Note: Population Weighted Cumulative CDD: June-August
Winter Demand by Year (Nov. 1 - Feb. 15)

Brrrrr…

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Canadian Net Imports By Region

Canadian Net Exports by Region (Bcf/d)

- West: 8.9 Bcf/d
- Midwest: 8.2 Bcf/d
- Northeast: 6.9 Bcf/d
- Total: 7.0 Bcf/d

Source: BENTEK Canadian Observer and Supply/Demand Report
US Supply Long: Lower 48 Production Forecast

Lower 48 Dry Gas Production Forecast (Bcf)

4.3% - 2.4 Bcf/d
9.1% - 5.2 Bcf/d

Source: BENTEK Forward Curve
Active Rig Additions Since Recent Low - May 2009

North-South “Liquids” Fairway Developing

Not all rigs/basins shown on map, total lower than 884

Source: RigData, BENTEK
Historical U.S. Crude Production

Source: EIA, Excludes NGLs and Other Liquids
Capital Moving to Oil – Bakken Shale Oil Play, MT and ND

Horizontal Rigs at All Time High

Added 118 Oil Directed Rigs Since May 2009
Global Oil Supply

Source: EIA
Cushing WTI Oversupply?

Brent-WTI Spread

Cushing Crude Oil Inventories

Source: EIA
High NGL Prices

- Natural Gas Liquids prices have historically followed crude prices.
- Relative to natural gas prices, liquids prices have been at high levels.
U.S. NGL Production – Gas Plants

Source: EIA/Bentek NGL Monitor
Producers are shifting budget dollars to high BTU plays

Most new processing plants are high ethane yield cryo plants
Ethane Supply Overhang?

Will Ethane Supply Outpace Demand?

- U.S. Ethane Production
- Capacity to Crack Purity Ethane
- Marcellus Ethane
- Capacity Including E/P

Possible New Large Cracker (1,700 MM lbs/yr)

Additional Unannounced Projects

CP Chem, Eastman, DOW
Conclusions

- Even with natural gas prices below $4.00, production continues at all time highs; prices remain under downward pressure
- International demand for liquids fuels is increasing, pushing up global crude oil prices
- Price divergence between gas and oil is shifting the economics of production, demand, processing and transportation in North America
- Winners: Producers with oil & rich gas, Gas Processors, Petchems, Industrial & Other Gas Consumers, Gas Fired Power Generation, Environment
BENETEK Energy, LLC

BENETEK is an energy market analytics company, focused on the natural gas market and related energy sectors.

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