Navigating through the energy landscape.


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Take-Aways

- Lower prices **reduced upstream activity**, but a slow recovery has started given the OPEC-induced price increase. **The bears, however, are starting to wander back out.**

- Natural gas experience shows that **(crude oil) price recovery will be a long time coming.**

- Recent crude oil drilling/production activity is contributing to a significant rebound in associated gas production that **will likely sink the recent, short-lived natural gas price rebound.**

- U.S. producers are **very efficient** and have reduced costs, increased capital & operating efficiencies, and increased well productivity ("the best solution for low prices is low prices.")

- Crude oil and natural gas prices likely to remain **range-bound** with lower relative **pricing volatility**.

- Continued **positive investment/development activity** in mid-stream, refining, and processing/manufacturing – as well as **energy exports.**
Unlike conventional resources, shale plays (natural gas, liquids, and crudes) are located almost ubiquitously throughout the U.S. and are the primary reason for the decrease in overall and regional natural gas prices.

Source: U.S. Energy Information Administration.
Natural gas production and reserves are at levels not seen since the 1970s and both U.S. natural gas production and reserves are now at an all time recorded peak.

Source: U.S. Energy Information Administration.
Crude oil production and reserves are climbing back to levels not seen since the early 1980s (reserves).

Source: U.S. Energy Information Administration.
Recent Market Trends
In the last ten years, global crude oil production has increased at an average annual rate of 1.2 percent. The U.S. share has increased from seven percent to over 12 percent.

OPEC attempts to undermine this loss of market share by flooding the market through the better part of 2015-2016.

Source: U.S. Energy Information Administration.
January-February 2017 production estimates show that on average, OPEC members have achieved 98.5 percent compliance. Total OPEC cuts versus October 2016 are at 1.24 million barrels per day.

Overcompliance by Angola and Saudi Arabia are compensating to overproduction of other OPEC members like Iraq, Venezuela and UAE.
Rig counts have fallen precipitously, but are back on the rise.

Recent Trends

U.S. crude oil prices and rig count.

OPEC-induced recovery.

Source: U.S. Energy Information Administration.
Horizontal rig activity increased by 400 percent to 2015 but fell by over half during the ensuing price collapse. Current rebound is highly concentrated in the Permian basin.
U.S. crude oil production volumes are up by over 75 percent relative to historic trends. While production is down, it is still resilient and relatively strong.

Source: U.S. Energy Information Administration.
U.S. natural gas production has increased 42 percent in the last 10 years.

Strong production resiliency despite exceptional price decrease.

Share of 2016 Production

Source: U.S. Energy Information Administration.
U.S. crude oil stocks have increased at an average annual rate of two percent. Between 2014 and 2015 stocks increased eight percent; and another five percent in 2016.

Supply run-up attributable to anticipated January, 2017 OPEC cuts.

Source: U.S. Energy Information Administration.
Current natural gas storage levels are 16 percent above five year averages and 18 percent below the recent five year maximum.

Source: U.S. Energy Information Administration.
Associated natural gas production (shale production).

Growth in associated natural gas is rebounding quickly and tanking the short-lived rebound in natural gas prices.

Source: U.S. Energy Information Administration.
Monthly drilled but uncompleted wells.

Drilled but uncompleted wells have increased by almost 50 percent in the last few years.

Note: Share of wells is the average of the last six months, September 2016 through February 2017.
Source: U.S. Energy Information Administration.
Since 2013, the average wellhead break-even price for key shale plays has decreased from $80 per barrel to $35 per barrel, representing an average decrease of over 55 percent.
Crude oil rig trends follow crude prices very closely. We are currently at 18 weeks of increases relative to the last trough. Currently levels, while down relative to the 2012-2014 peak, are still above levels in 1990s.

Source: Baker Hughes; and U.S. Energy Information Administration.
Recent Trends

U.S. crude oil rig “peak-to-trough” trends.

The U.S. oil rig count has increased by 7.9 rigs per week since the May 2016 low. This is faster than the 7.6 rig per week recovery from June 2009.

Source: Baker Hughes.
U.S. drilling rig productivity (total lagged production to total drilling rigs, 3 month lag).

U.S. drilling rigs are more productive, in this recovery, than any other recovery in history.

Market outlook.
Most crude oil price projections for 2017 are around $55 per barrel. Prices are expected to increase in 2018, but remain below $75 per barrel.
Natural gas prices are expected to stay below $3.55 per MMBtu in 2017 and under $3.75 in 2018.
US crude production will likely increase to over 10 MMBbls/d by 2020.
U.S. natural gas production continues to be resilient and shows continued strong growth through 2020 and beyond.
Conclusions
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- Crude oil and natural gas markets continue to be resilient. Prices anticipated to remain affordable and less volatile.

- Natural gas supply growth increasingly driven by “associated” natural gas – a byproduct of increasing production coming from higher hydrocarbon-based production (Permian, Eagle Ford, Bakken). Crude production developments will continue to have implications for natural gas markets.

- Economic growth is likely the only near-term factor that will burn-off excessive commodity storage levels. Likely to continue to crude oil and natural gas prices to be range-bound with likely lower relative pricing volatility.

- Continued positive investment/development activity in mid-stream, refining, and processing/manufacturing – as well as energy exports.
Questions, Comments and Discussion.

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