

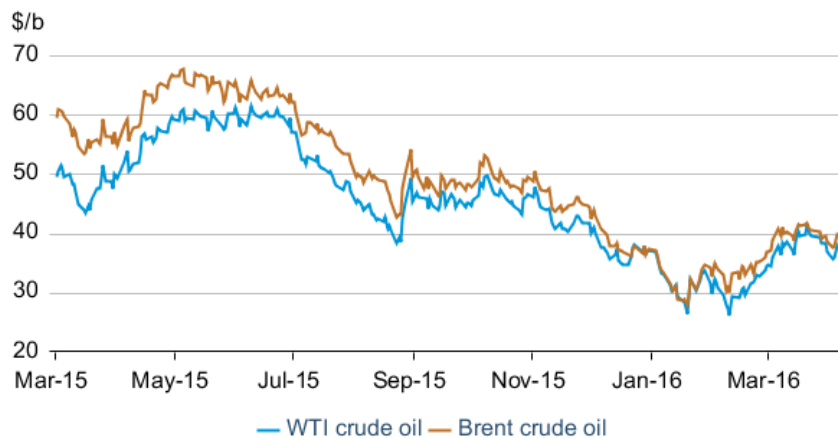


## Short-Term Energy Outlook Market Prices and Uncertainty Report

### Crude Oil

**Prices:** After increasing at the start of March, crude oil prices stabilized and traded within a relatively narrow range through the first week of April. The North Sea Brent front month futures price rose \$2.62 per barrel (b) from March 1 to settle at \$39.43/b on April 7 (**Figure 1**). The West Texas Intermediate (WTI) front month futures price rose \$2.86/b and settled at \$37.26 over the same period.

Figure 1. Historical crude oil front month futures prices



The increase in crude oil prices alongside other global asset markets suggests that lower concerns associated with a slowdown in global economic growth were partly responsible. Purchasing manager indexes for manufacturing and services in the United States were above expectations and a rise in confidence surrounding emerging market economies also contributed to price increases. On the supply side, field maintenance in the United Arab Emirates (UAE), as well as lower crude oil exports out of Nigeria and Northern Iraq amid higher tensions, led to a reduction in supply. While maintenance in the UAE is scheduled to end soon, it is unclear when exports in Nigeria and Northern Iraq will reach previous levels.

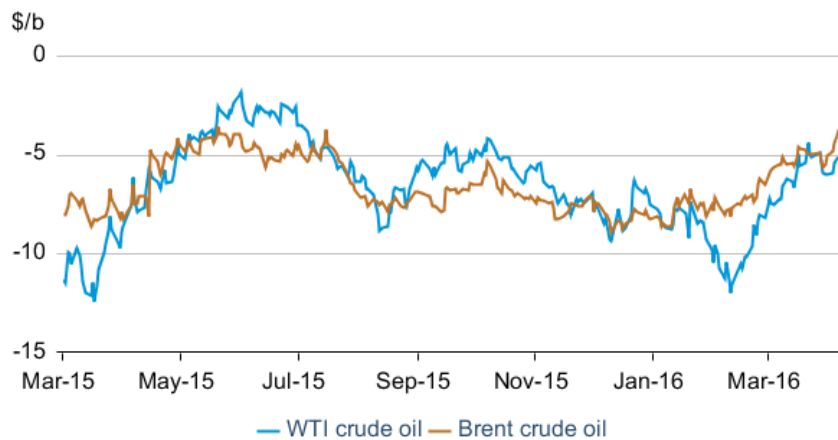
This is a regular monthly companion to the EIA *Short-Term Energy Outlook*

(<http://www.eia.gov/forecasts/steo/>)

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The increase in front month prices for crude oil resulted in reduced contango (the discount of near-term contract prices to farther-dated ones) in both the Brent and WTI futures curves. The 1st-13th spread settled at -\$5.10/b and -\$3.72/b for WTI and Brent, respectively, on April 7, near the smallest discounts since October 2015 (**Figure 2**). Temporary reductions in supply may be reducing inventory builds. Current time spreads are well below levels needed to encourage floating storage and suggest the market expects enough land-based storage capacity is available to meet current and future inventory builds.

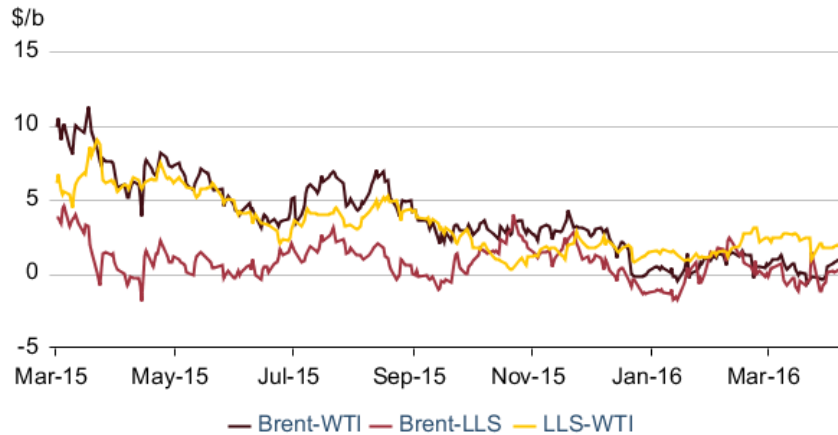
**Figure 2. Crude oil front month - 13th month futures price spread**



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High Louisiana Light Sweet (LLS) prices compared with other crude oil prices may have encouraged additional crude oil imports and pipeline movements into the U.S. Gulf Coast (PADD 3). The Brent-LLS price spread settled at 32 cents/b on April 7, with LLS prices reaching a premium to Brent prices on several days in March (**Figure 3**). Crude oil imports into PADD 3 were 3.2 million barrels per day (b/d) for the four weeks ending April 1, 160,000 b/d above import levels in March 2015. The LLS-WTI price spread settled at \$1.85/b on April 7, above levels for most of December and January. The average price differential in March was \$2.31/b, greater than some pipeline tariffs and could be enough to move additional barrels of crude oil via pipeline from Cushing, Oklahoma, to refining centers on the U.S. Gulf Coast. PADD 3 refinery runs were also higher compared to last year, with increasing petroleum product crack spreads and a light spring maintenance schedule allowing more crude oil to be processed, contributing to demand for crude oil and LLS price strength.

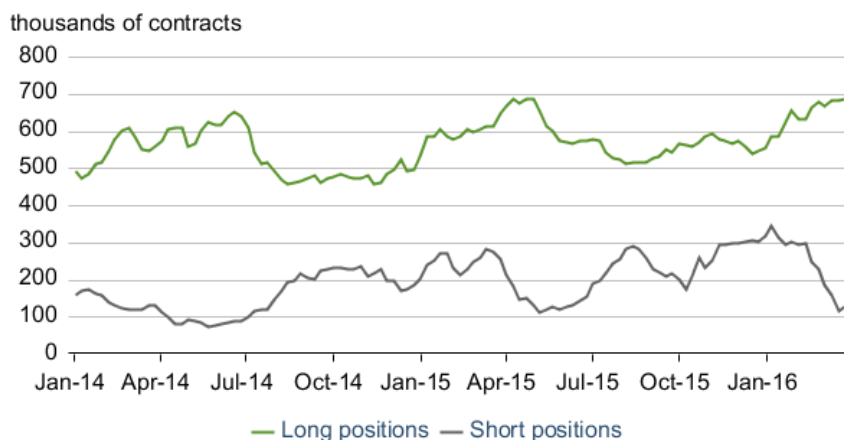
**Figure 3. Historical crude oil differentials**



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**Money manager short and long positions:** With the trading volume and open interest for Brent futures contracts approaching or even surpassing the trading volume and open interest for WTI contracts, examining the combined long and short positions of money managers in both futures markets provides broad insight into money manager participation in the crude oil market. Since oil prices started increasing in mid-February, there was a sharp decline in short futures positions. The combined total of short positions held by money managers in the Brent and WTI futures markets fell from nearly 300,000 contracts on February 16 to 127,000 contracts on March 29. Over the same time, long positions increased by 52,000 contracts, raising the money manager net position by about 222,000 contracts (**Figure 4**).

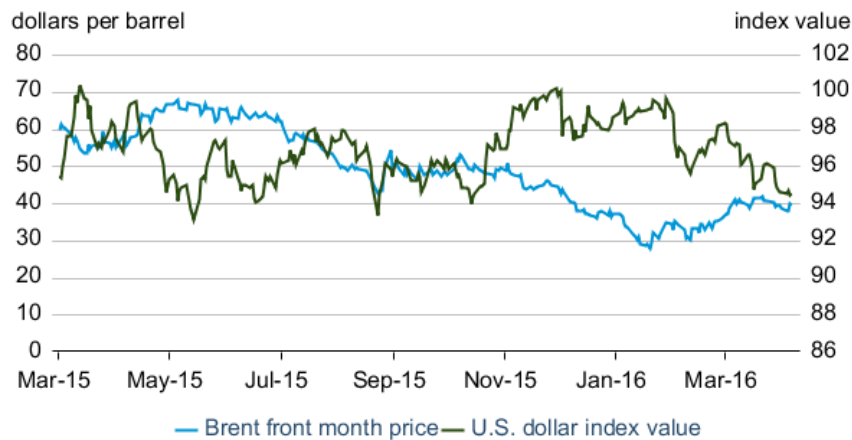
**Figure 4. Combined WTI and Brent money manager open interest**



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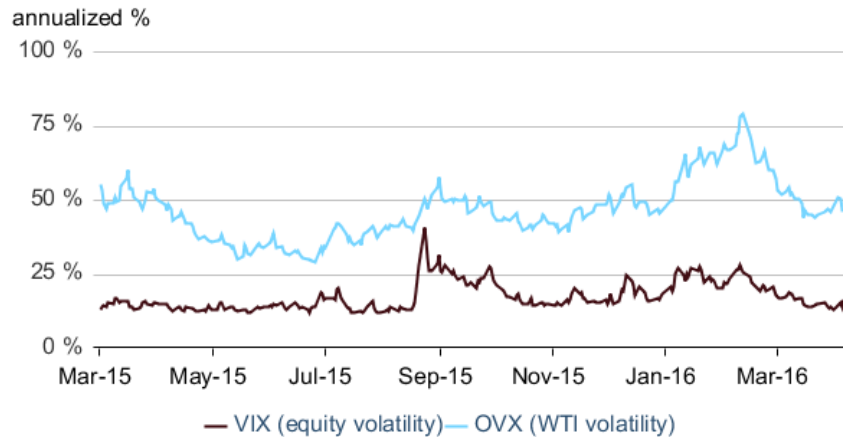
**Crude oil and the U.S. dollar:** The declining value of the U.S. dollar is also consistent with crude oil prices responding to improving global economic conditions and reduced risk of slowing economic growth. From February 1 to April 7, Brent crude oil prices increased by 15.2% and the U.S. dollar index (a weighted value of the U.S. dollar exchange rate against currencies of several developed countries) declined by 4.6% (Figure 5). As worries over global growth intensified earlier this year, the value of the dollar increased as investors bought lower-risk assets that are more typically denominated in U.S. dollars. With the dollar now at its lowest levels of the year, the market seems to be more comfortable with current expectations for global economic growth, which are also likely boosting oil prices. Currencies for emerging market economies strengthened against the dollar as well, with the Brazilian real and Indian rupee rising by 6.9% and 2%, respectively, since February 1.

**Figure 5. Brent crude oil price vs. the value of the U.S. dollar**



**Volatility:** Both the OVX (an index that measures implied volatility for WTI crude oil futures) and the VIX (an index that measures implied volatility for the S&P 500) fell over the past five weeks. The OVX dropped by 10.3 percentage points from March 1 to April 7 and the VIX fell by 1.5 percentage points over the same time (Figure 6). The co-movement to lower levels suggests both crude oil and equities were responding to improving economic outlooks and overall improvements in market sentiment.

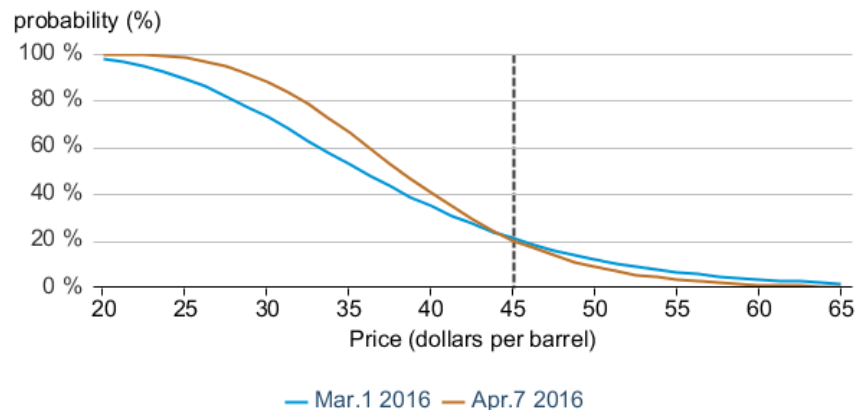
**Figure 6. Equity and Crude oil volatility indices**



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**Market-Derived Probabilities:** The July 2016 WTI futures contract averaged \$38.87/b for the five trading days ending April 7 and has a 20% probability of exceeding \$45/b at expiration. The same contract for the five trading days ending March 1 had a 21% probability of exceeding \$45/b (**Figure 7**).

**Figure 7. Probability of the July 2016 WTI contract expiring above price levels**



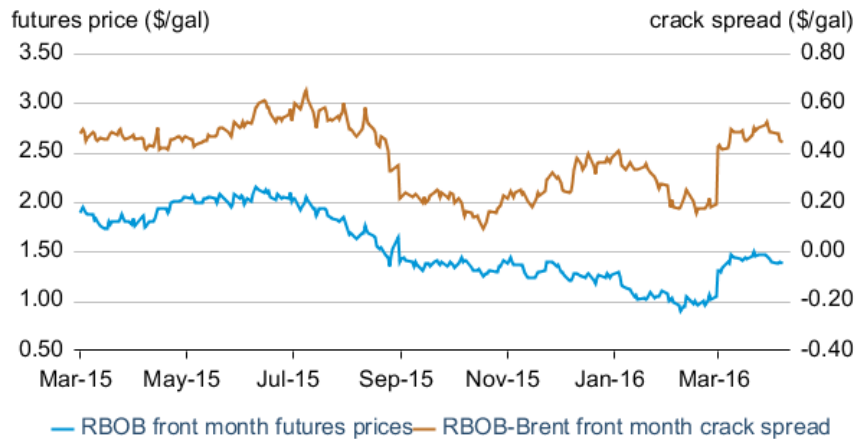
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## Petroleum Products

**Gasoline prices:** The reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline) front month futures price increased 8 cents per gallon (gal) from March 1 to April 7, settling at \$1.38/gal (**Figure 8**). The RBOB-Brent crack spread rose by 2 cents/gal over the same period, settling at 44 cents/gal.

Gasoline consumption and exports in March together totalled 9.75 million b/d, a record high for that month. Total U.S. inventories of gasoline declined 11 million barrels from February to March, compared to an average decline of 9 million barrels over the past five years. Although gasoline stocks stayed above the five-year range, robust domestic gasoline consumption appears to have helped to sustain gasoline crack spreads at similar levels to this time last year.

**Figure 8. Historical RBOB futures prices and crack spread**

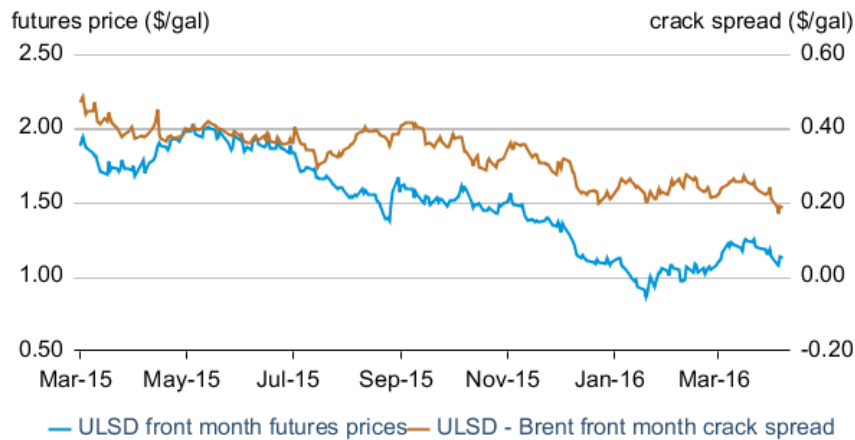


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**Ultra-low Sulfur Diesel Prices:** The front month futures price for the New York Harbor Ultra-low Sulfur Diesel (ULSD) contract increased 3 cents/gal from March 1 to settle at \$1.13/gal on April 7 (**Figure 9**). However, the ULSD-Brent crack spread declined 4 cents/gal over the same period to settle at 19 cents/gal.

In March, distillate consumption plus exports rose 260,000 b/d from February but still remained within the five-year range. Despite the increase in distillate consumption and exports, distillate inventories were virtually unchanged from February to March, keeping stock levels 14 million barrels above the five-year high for March. High distillate inventories combined with near five-year highs in distillate production depressed the average ULSD crack spread in March to 25 cents/gal, the lowest for that month since 2010.

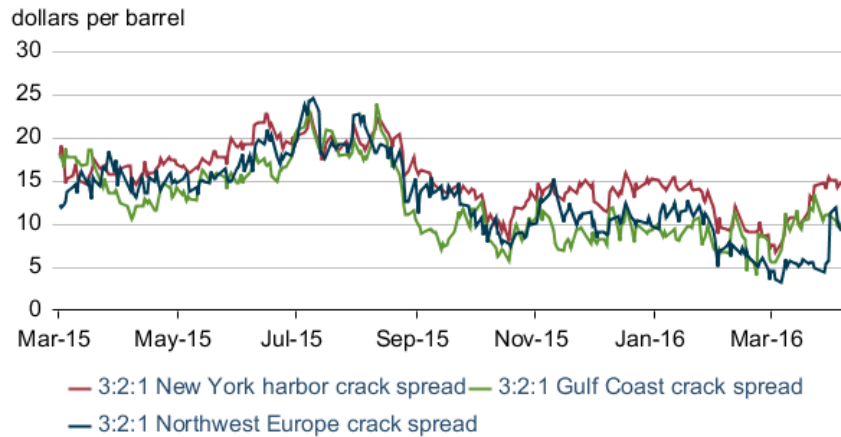
**Figure 9. Historical ULSD futures price and crack spread**



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**Regional crack spreads:** Growth in U.S. gasoline consumption year-over-year in March helped to lift U.S. refinery margins well above those in Northwest Europe, despite low ULSD prices in both regions. From March 1 to March 31, the [3:2:1 crack spread](#) in New York Harbor and in the U.S. Gulf Coast rose \$8.42/b and \$5.19/b (**Figure 10**), respectively. In contrast, the 3:2:1 spread in Northwest Europe rose only \$2/b. A specification change to a more expensive summer-grade gasoline in Europe and some recent increases in European gasoline exports to Nigeria, where there have been some gasoline shortages, likely contributed to the latest uptick in Northwest Europe refining margins. However, low European gasoline prices in March may indicate fewer gasoline export markets were available to European refineries. Unlike in March 2015 when global gasoline consumption was robust and refinery margins at European refineries were on average \$10/b higher, rising gasoline inventories in European and Asian markets may indicate lower demand internationally for European gasoline exports. Total U.S. gasoline imports were down slightly year-over-year by 12,000 b/d in March, likely a result of strong U.S. gasoline production.

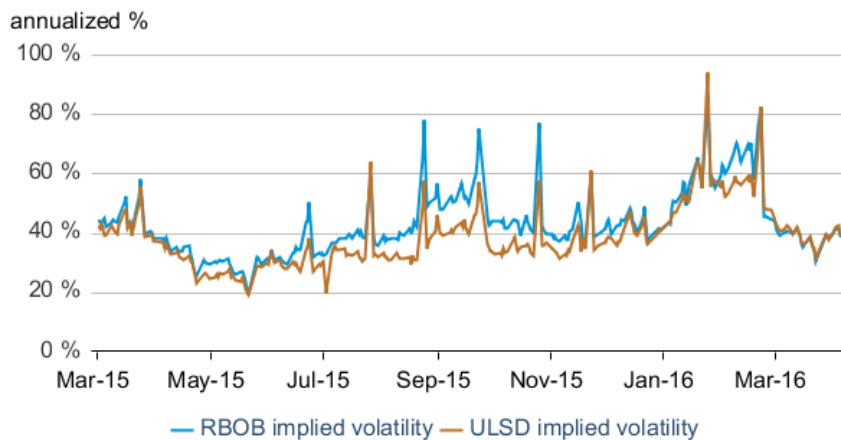
**Figure 10. 3:2:1 regional crack spreads**



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**Volatility:** The implied volatility for the front month RBOB and ULSD futures contracts each declined by 5 percentage points since March 1 to settle at 39% and 40%, respectively, on April 7 (**Figure 11**). For the first time since July 2009, the monthly average ULSD implied volatility in March was higher than the monthly average RBOB implied volatility, reflecting elevated uncertainty in distillate markets. The RBOB implied volatility is generally higher than the ULSD implied volatility, recently averaging 6 percentage points higher in 2015.

**Figure 11. RBOB and ULSD implied volatility**



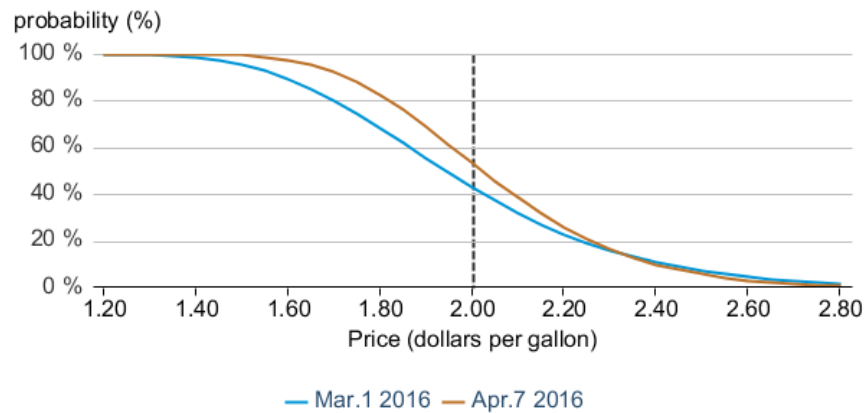
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**Market-Derived Probabilities:** The July 2016 RBOB futures contract averaged \$1.40/gal for the five trading days ending April 7 and has a 53% probability of exceeding \$1.35/gal (typically leading to a retail price of \$2.00/gal) at expiration. The same contract for the



five trading days ending March 1 had a 43% probability of exceeding \$1.35/gal (**Figure 12**).

**Figure 12. Probability of July 2016 retail gasoline exceeding different price levels at expiration**

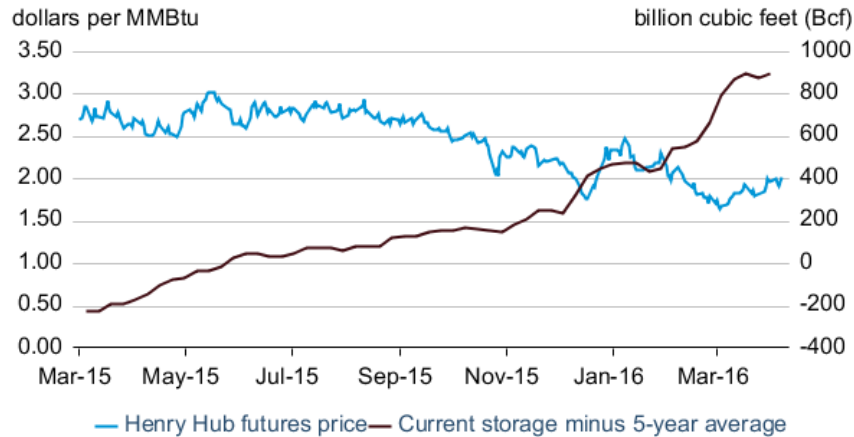


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## Natural Gas

**Prices:** Although front month futures prices for delivery of natural gas at Henry Hub increased by 28 cents per million British thermal units (MMBtu) from March 1 to settle at \$2.02/MMBtu on April 7, futures are still 57 cents/MMBtu lower than the April 2015 average (**Figure 13**). At the end of the traditional storage-withdrawal season, natural gas inventories stand almost 900 billion cubic feet (bcf) above the five-year average, pushing prices lower. At these lower price levels, electric generators will have greater incentive to use natural gas compared to previous years, helping to reduce excess inventories in the spring and summer months. A similar dynamic occurred in 2012, after mild temperatures during the preceding winter pushed natural gas inventories higher and prices lower, with prices then recovering gradually throughout the spring, summer, and fall.

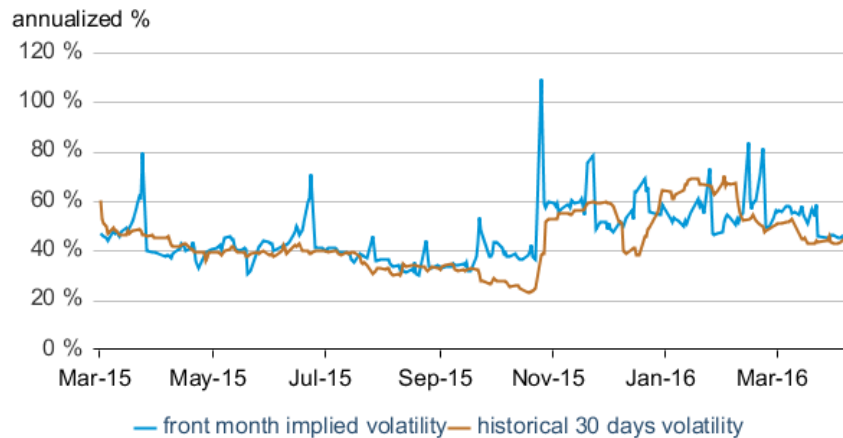
**Figure 13. U.S. natural gas prices and storage**



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**Volatility:** Both natural gas implied and historical volatility fell in March and the first week of April. Implied volatility for front month futures contracts settled at 45% on April 7, the lowest point since the winter heating season started (**Figure 14**). Historical volatility also settled at 45%, near the lowest point of the year. With the winter heating season coming to an end, lower volatility in natural gas markets likely reflects the market’s expectation that prices will stay low in the near future to help reduce high inventory levels.

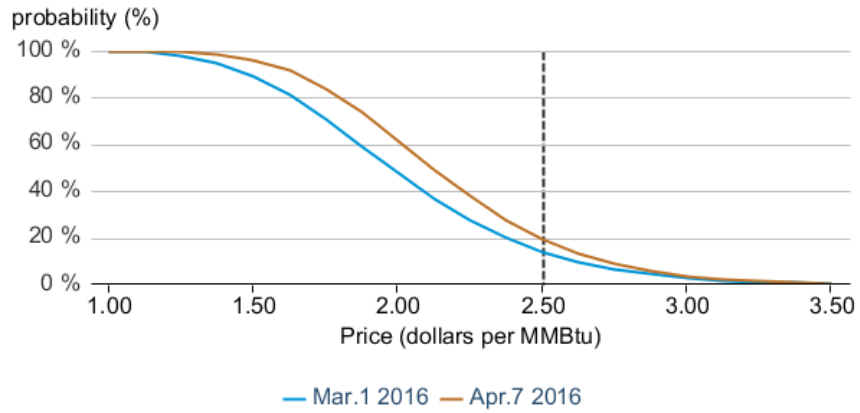
**Figure 14. Natural gas historical and implied volatility**



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**Market-Derived Probabilities:** The July 2016 Henry Hub futures contract averaged \$2.16/MMBtu for the five trading days ending April 7 and has a 20% probability of exceeding \$2.50/MMBtu at expiration. The same contract for the five trading days ending March 1 had a 14% probability of exceeding \$2.50/MMBtu (**Figure 15**).

**Figure 15. Probability of the July 2016 Henry Hub contract expiring above price levels**



 U.S. Energy Information Administration, CME Group