

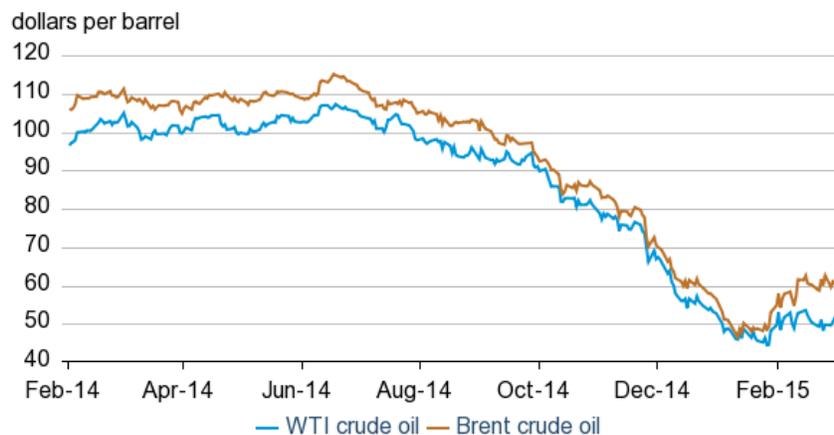


## Short-Term Energy Outlook Market Prices and Uncertainty Report

### Crude Oil

**Prices:** Over the past month, international crude oil prices recorded the first month-over-month increase since June 2014. The North Sea Brent front month futures price settled at \$60.48/bbl on March 5, an increase of \$5.73/bbl from February 2 (**Figure 1**). In the U.S. market, domestic crude oil prices continued to lag behind international benchmarks. The front month West Texas Intermediate (WTI) contract price settled at \$50.76/bbl on March 5, \$1.19/bbl higher than at the start of February.

**Figure 1. Historical crude oil front month futures prices**



After several downward revisions since last summer, projections for 2015 global gross domestic product (GDP) growth remained relatively stable compared to last month, at 2.8%, as quantitative easing programs in Europe and Japan and strong economic growth in India supported expectations for global economic activity. As a result, projections for global crude oil and petroleum production consumption growth were nearly unchanged. With slower non-OPEC crude oil production growth in the face of lower oil prices, continued increases in global oil consumption could bring oil markets closer into balance in the second half of 2015. However, significant uncertainty remains on both the demand and supply side of the oil market and price volatility is likely to persist.

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

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

Contact: James Preciado ([james.preciado@eia.gov](mailto:james.preciado@eia.gov))

For the week ending on February 27, U.S. commercial crude oil inventories rose for the eighth consecutive week. The average build over that time was 7.7 million barrels per week (1.1 million bbl/d), the largest build by for any 8-week period going back to at least 1982. Recent planned and unplanned refinery outages in the United States have lowered runs in February. The unprecedented recent builds in U.S. commercial crude oil inventories may be increasing crude oil storage costs and putting downward pressure on near-term prices compared with further dated ones (increasing contango). The 1<sup>st</sup>-13<sup>th</sup> spread for the WTI futures contract settled at -\$10.01/bbl on March 5, \$0.19/bbl higher than on February 2 (**Figure 2**).

In international markets, the 1<sup>st</sup>-13<sup>th</sup> month spread for Brent settled at -\$7.01/bbl on March 5, \$2.84/bbl higher than on February 2. Although estimates show OECD crude oil inventories are also currently rising, strong international refinery runs compared with the United States are providing support to near-term Brent prices.

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



The spread between U.S. domestic crude oil prices and international benchmarks widened in February after a long period of relative stability. The Brent-WTI spread settled at \$9.72/bbl on March 5, an increase of \$4.54/bbl since February 2, and reached its highest point since January 2014 (**Figure 3**). Increases in both the Brent-Louisiana Light Sweet (LLS) and LLS-WTI contributed to the wider Brent-WTI differential. These spread movements should encourage incremental movements of crude oil from the WTI delivery point at Cushing, Oklahoma, to the U.S. Gulf Coast and, at the same time, reduce imports of international crude oil into PADD 3.

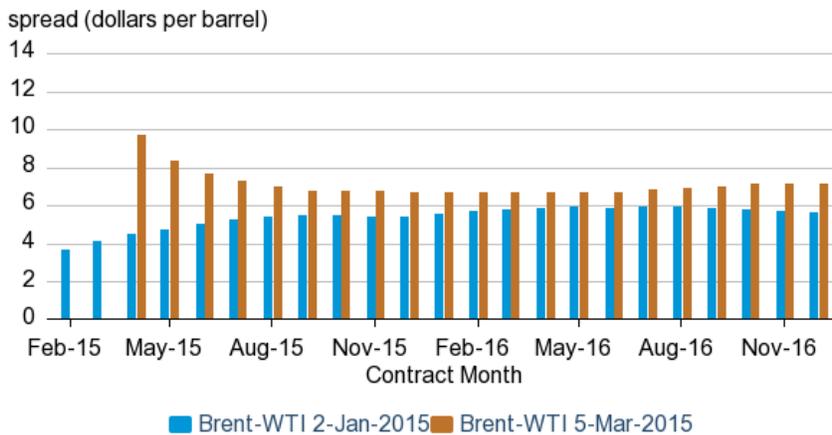
**Figure 3. Historical crude oil differentials**



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Price spreads for delivery of Brent and WTI crude oil further in the future also widened compared to the start of the year. The Brent-WTI spread for delivery in December 2016 settled at \$7.15/bbl on March 5, an increase of \$1.47/bbl compared to January 2 (**Figure 4**). Even with reductions in the projected growth of U.S. crude oil production due to lower absolute prices, EIA projects that U.S. crude oil production will still increase by 730,000 bbl/d from the end of 2014 to the end of 2016. The higher Brent-WTI spread for December 2016 futures contracts reflects market uncertainty over the ability of U.S. transportation and refining infrastructure to efficiently absorb future production growth.

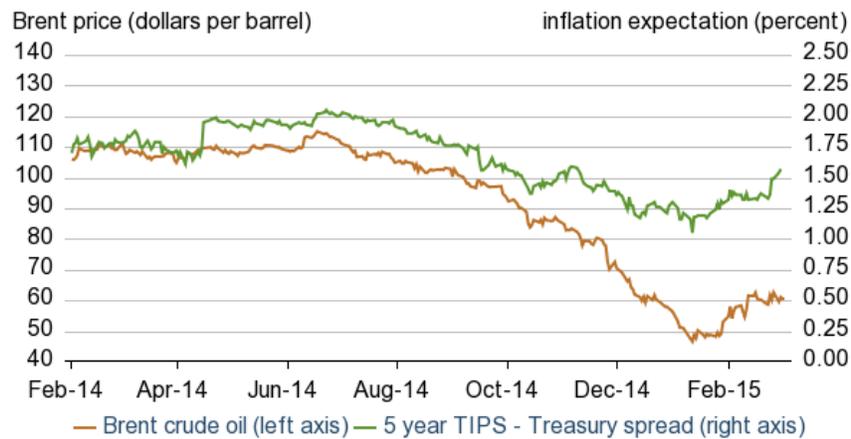
**Figure 4. Brent-WTI difference along the futures curve**



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**Crude oil and inflation expectations:** Oil prices continue to influence the market’s expectation for inflation in the United States over the next five years. As Brent oil prices increased from the end of January to the start of March, so did inflation expectations. The five-year TIPS (treasury inflation protected securities) – Treasury spread (a measure of the market’s expectation for U.S. inflation over the next five years) settled at 1.53% on March 5, an increase of 0.21 percentage points (21 basis points) since February 2 (**Figure 5**). Both Brent front month futures prices and the TIPS-Treasury spread hit their lowest points in the middle of January.

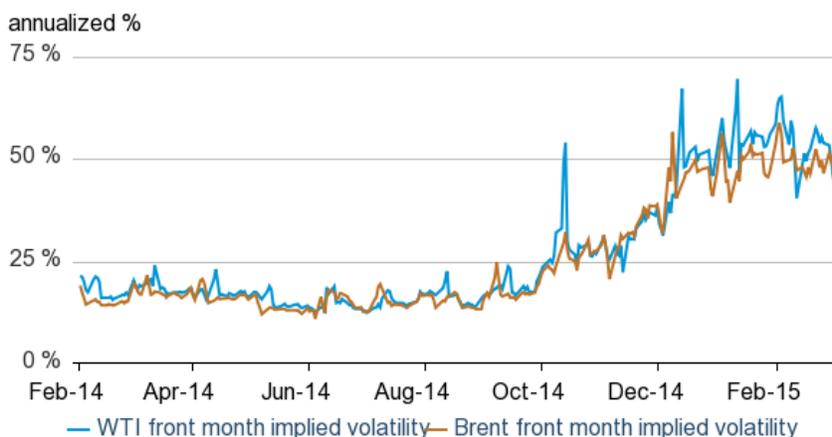
**Figure 5. Crude oil and inflation expectations**



eia Bloomberg, Federal Reserve Bank of St. Louis

**Volatility:** Implied volatility for both Brent and WTI front month futures contracts decreased slightly over the past month but remain at elevated levels. Brent implied volatility settled at 44.31% on March 5, a decrease of 9.6 percentage points since February 2, and WTI implied volatility settled at 43.04% on March 5, a decrease of 15.5 percentage points compared to February 2 (**Figure 6**). WTI implied volatility averaged about five percentage points higher than Brent implied volatility in February. Increasing U.S. crude oil inventory levels creates uncertainty related to the U.S. domestic crude oil market and can lead to higher WTI price volatility relative to other crude oil benchmarks.

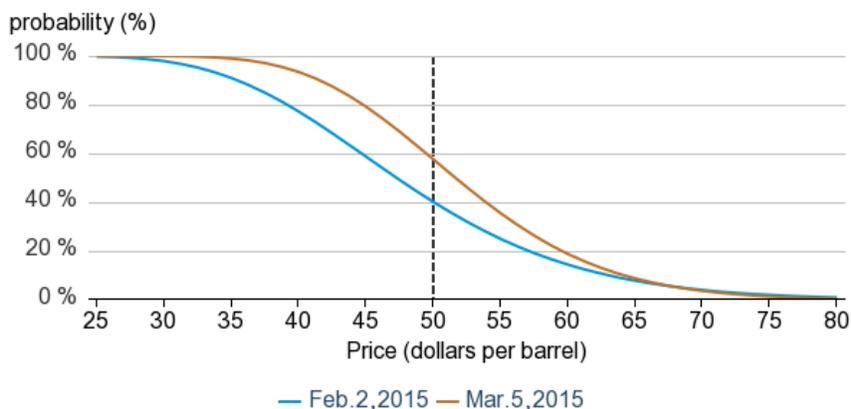
**Figure 6. Crude Oil Implied Volatility**



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**Market-Derived Probabilities:** The June 2015 WTI futures contract averaged \$53.89/bbl for the five trading days ending March 5 and has a probability of exceeding \$50/bbl at expiration of 58%. The same contract for the five trading days ending February 2 had a probability of exceeding \$50/bbl of 40% (**Figure 7**). Because Brent prices are higher than WTI prices, the probability of Brent futures contracts expiring above the same dollar thresholds is higher.

**Figure 7. Probability of the June 2015 WTI contract expiring above price levels**



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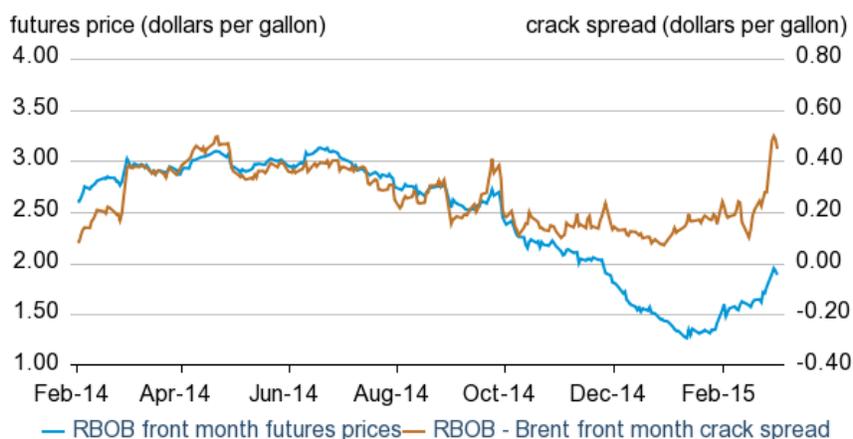
## Petroleum Products

**Gasoline prices:** The reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline) front month futures price rose \$0.34 per gallon (gal) from February 2 to settle at \$1.89/gal on March 5 (**Figure 8**). The RBOB-Brent crack

spread increased to \$0.45/gal on March 5, up \$0.21/gal from February 2. On March 3, the gasoline crack spread reached \$0.50/gal, the highest since July 2013.

Much of the rise in gasoline prices can be attributed to the rollover on March 1 to the April RBOB futures contract, which marks the switch to the more-expensive summer grade gasoline. However, robust gasoline demand and some unplanned refinery outages in the Northeast applied upward price pressure. Gasoline consumption and exports continued the recent trend of reaching or exceeding five-year highs. For the four weeks ending February 27, gasoline [consumption plus exports](#) were 9.2 million bbl/d, the highest for the month of February on record. At the same time, the Delta Air Lines’s refinery in Trainer, Pennsylvania, had operational problems because of the cold weather and the Phillips 66’s Bayway refinery in Linden, New Jersey, experienced delays coming online after completing planned maintenance.

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



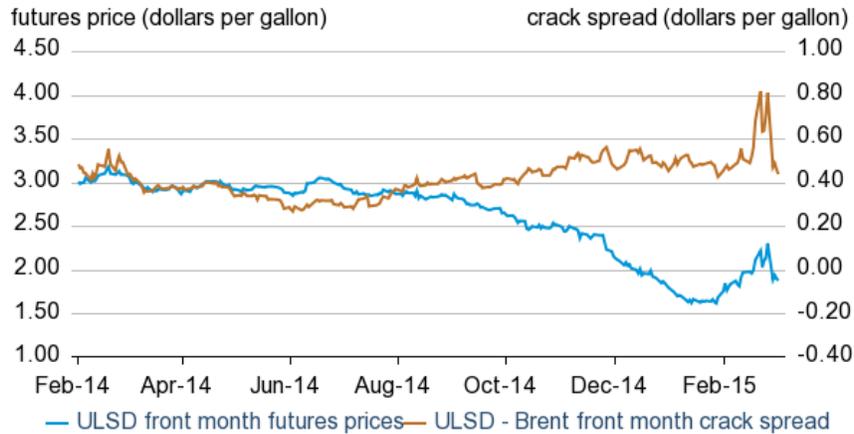
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**Ultra-low sulfur diesel prices:** The front month futures price for the New York Harbor Ultra-low sulfur diesel (ULSD) contract rose \$0.54/gal from February 2 to reach \$2.30/gal on February 27, reflecting short-term tightness in the Northeast distillate market. On March 2, the front month futures price fell \$0.41/gal as the March ULSD futures contract expired to give way to a less-expensive April futures contract. On March 5, the front month futures price settled at \$1.88/gal, \$0.12/gal higher than prices at the beginning of February (**Figure 9**). The ULSD-Brent crack spread decreased slightly by \$0.02/gal since February 2 to settle at \$0.44/gal on March 5.

In February, ULSD prices showed the first average month-over-month increase in eight months. Cold weather and lower refinery runs in the Northeast led to lower inventories and a relatively tight distillate market. As of February 27, the four-week average distillate [consumption plus exports](#) for the entire United States was 5.4 million barrels per day, the highest on record for the month of February and likely supported by strong

consumption in the Northeast. Distillate [production](#) in PADD 1 decreased 0.06 million bbl/d from January to February, in contrast to virtually no change on average in the last five years. Distillate [stocks](#) in the Mid-Atlantic states (PADD 1B) (one of the primary U.S. heating oil markets and the delivery point of the ULSD futures contract) as of February 27 were 7.5 million barrels lower than January, more than triple the average decrease in the past five years.

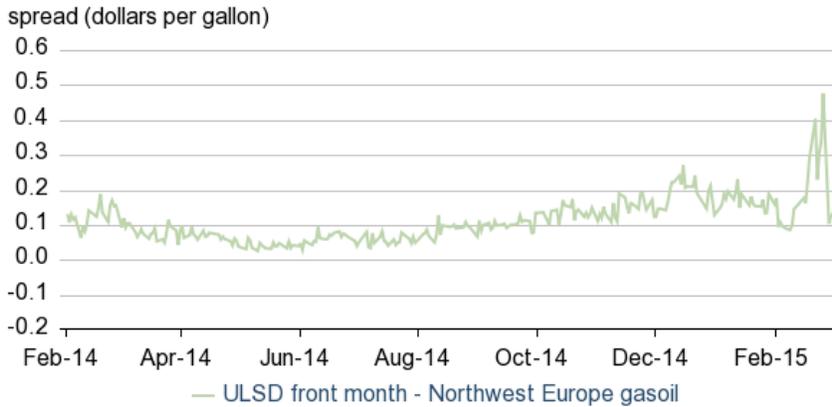
**Figure 9. Historical ULSD futures price and crack spread**



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High ULSD prices in February opened an arbitrage opportunity between the U.S. East Coast and Northwest Europe distillate markets. The differential between the ULSD front month futures price and the Northwest Europe gasoil spot price rapidly increased during the second half of February, with the ULSD front month price reaching its highest premium to Northwest Europe gasoil on record of \$0.48/gal on February 27 (**Figure 10**). Recent news reports indicate several tankers from Northwest Europe and Russia will be delivering distillate to the U.S. East Coast in the coming weeks. Typically, [most](#) of PADD 1 distillate imports come from Canada, but during times of especially cold weather in the Northeast, European or Russian distillate imports are booked to alleviate East Coast market tightness. Compared to last winter, when much of the United States also experienced extreme cold weather, the largest differential between the ULSD front month price and Northwest Europe gasoil spot price was \$0.36/gal at the end of January 2014.

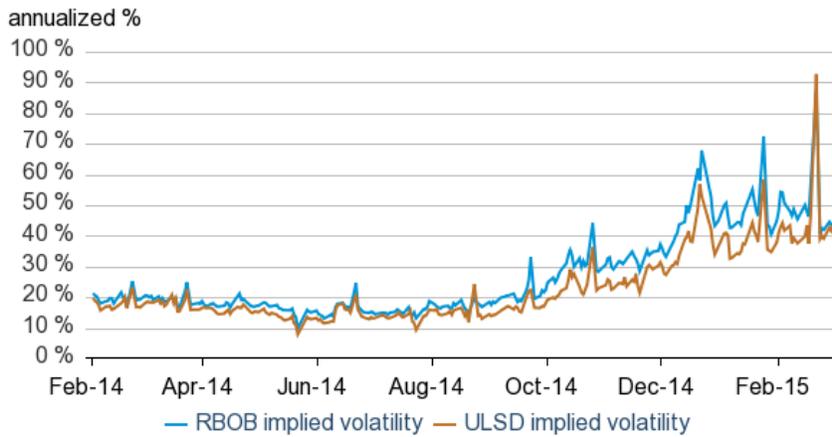
**Figure 10. ULSD front month - Northwest Europe gasoil spot price differential**



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**Volatility:** The implied volatility for the front month RBOB contract increased by 0.2 percentage points from February 2 to settle at 45.1% on March 5 (**Figure 11**). The implied volatility for the front month ULSD contract increased one percentage point over the same period to settle at 39%. As both options contracts neared expiration, the implied volatility of both RBOB and heating oil spiked on February 23 to the highest levels since early 2009.

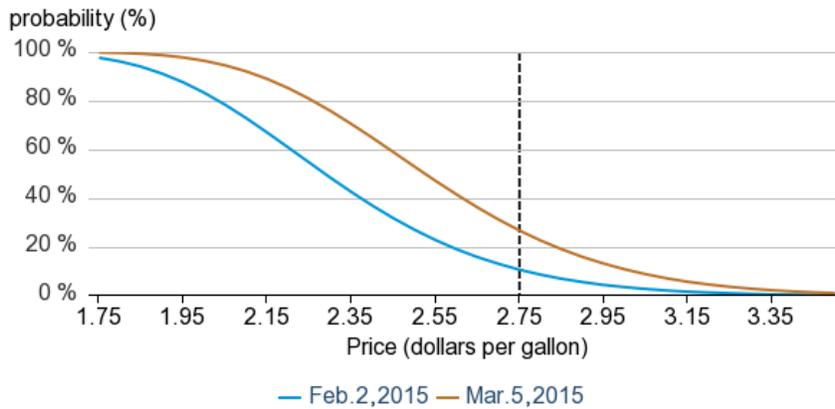
**Figure 11. RBOB and ULSD Implied Volatility**



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**Market-Derived Probabilities:** The June 2015 RBOB futures contract averaged \$1.91/gal for the five trading days ending March 5 and has a 27% probability of exceeding \$2.10/gal (typically leading to a retail price of \$2.75/gal) at expiration. The same contract for the five trading days ending February 2 had an 11% probability of exceeding \$2.10/gal (**Figure 12**).

**Figure 12. Probability of June 2015 retail gasoline exceeding different price levels at expiration**



eia U.S. EIA, CME Group

## Natural Gas

**Prices:** Natural gas futures prices for delivery at Henry Hub, Louisiana, recovered slightly in February following two consecutive months of declines. The front month futures price increased \$0.16/MMBtu since February 2, settling at \$2.84/MMBtu on March 5 (**Figure 13**). U.S. heating degree days (HDDs) in the last two weeks of February totaled 66 and 75 HDDs, respectively, above the 30-year normal. Despite colder temperatures supporting higher demand, total inventories as of February 27 remained 40% above levels at this time last year and are likely limiting any upward price response.

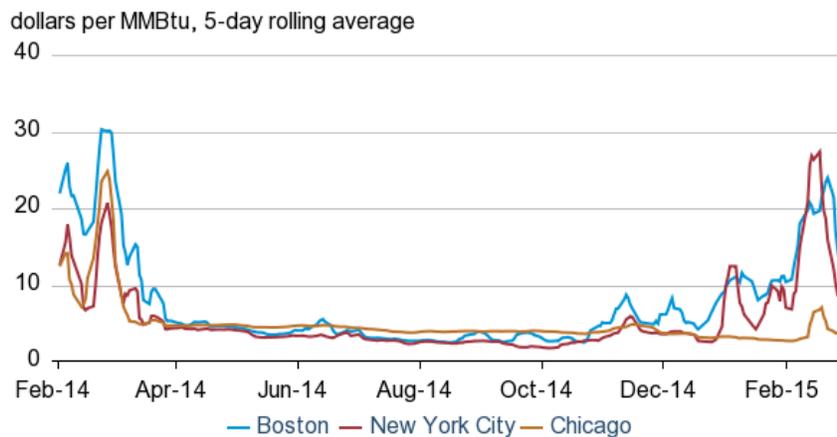
**Figure 13. Historical front month U.S. natural gas prices**



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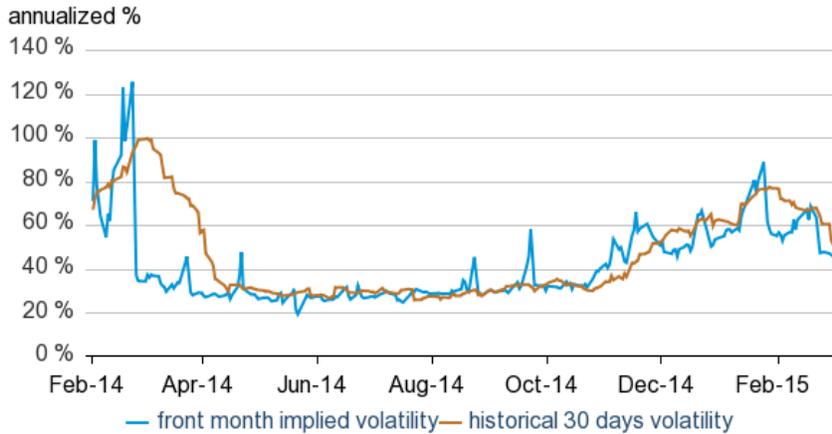
Although average national temperatures were colder on average in February, much of the cold weather was concentrated in the Midwest and Northeast, providing considerable volatility to spot prices for delivery in these parts of the United States. Prices averaged above \$27/MMBtu, \$23/MMBtu, and \$7.00/MMBtu over five-day periods in New York, Boston, and Chicago, respectively (**Figure 14**). In the Northeast, natural gas price spikes contributed to increased distillate consumption for electricity generation, as distillate prices were less than half the price of natural gas on an energy equivalent basis during certain days in February.

**Figure 14. U.S. natural gas regional spot prices**



**Volatility:** Implied volatility for the front month natural gas futures contract decreased 10 percentage points from the close on February 2, settling at 45% on March 5 (**Figure 15**). Implied volatility remained below the historical 30-day volatility for most of February, suggesting market participants expect less price volatility in the upcoming shoulder season beginning in April. Implied volatility typically decreases near the end of the winter season, this year falling 16 percentage points when the front month contract rolled from March to April.

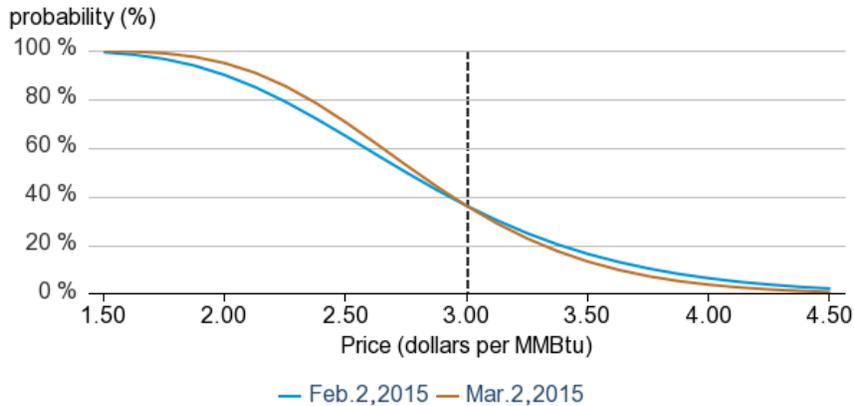
**Figure 15. Natural gas historical and implied volatility**



eia U.S. EIA, Bloomberg

**Market-Derived Probabilities:** The June 2015 Henry Hub futures contract averaged \$2.83/MMBtu for the five trading days ending March 5 and has a 36% probability of exceeding \$3.00/MMBtu at expiration. The same contract for the five trading days ending February 2 also had a 36% probability of exceeding \$3.00/MMBtu (**Figure 16**).

**Figure 16. Probability of the June 2015 Henry Hub contract expiring above price levels**



eia U.S. EIA, Bloomberg