

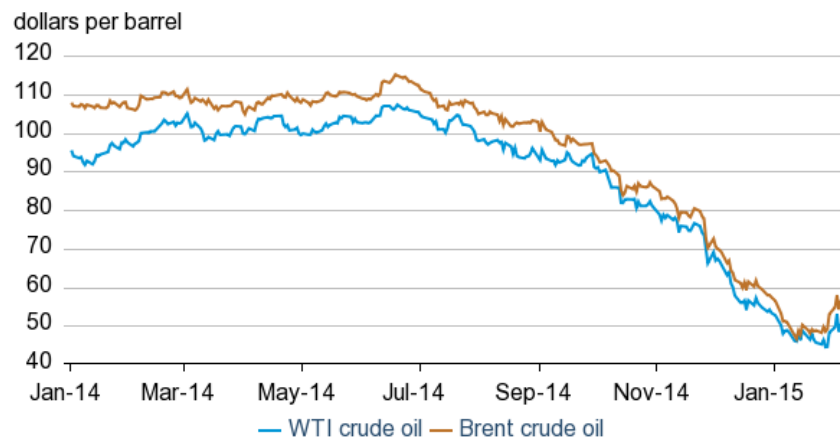


Short-Term Energy Outlook Market Prices and Uncertainty Report

Crude Oil

Prices: Crude oil prices moved higher toward the end of January and into the first week of February. The North Sea Brent front month futures price settled at \$56.57/bbl on February 5, an increase of \$0.15/bbl from January 2 (**Figure 1**). The front month West Texas Intermediate (WTI) contract price settled at \$50.48/bbl on February 5, \$2.21/bbl lower than at the start of January. These changes were relatively small compared to an average month-over-month decline of \$9/bbl from July 2014 to January 2015.

Figure 1. Historical crude oil front month futures prices



Recent oil market volatility reflects changes in news and data for crude oil supply and inventories. U.S. weekly oil rig counts declined sharply in January, and announced reductions in planned 2015 capital expenditures by major international oil companies signal a supply-side response to lower oil prices. However, global oil production is still outpacing consumption in the first half of 2015, resulting in robust crude oil inventory builds that could extend well into 2015.

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

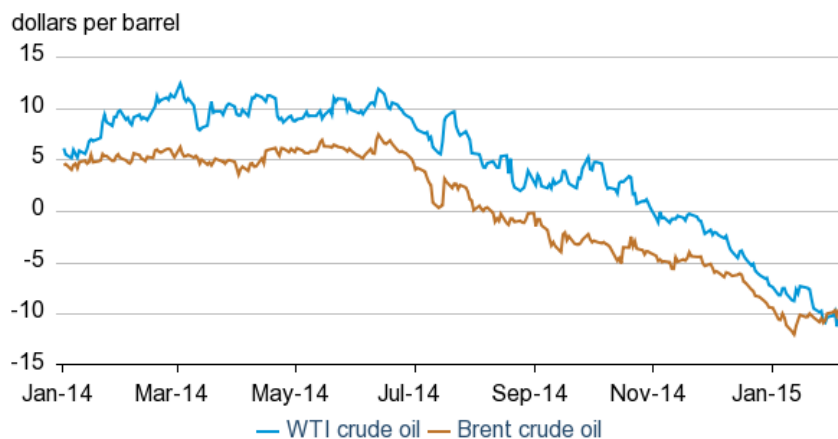
(<http://www.eia.gov/forecasts/steo/>)

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Large builds in U.S. crude oil inventories for three consecutive weeks pushed U.S. commercial inventories to the highest level in 80 years. The WTI futures curve responded with increased contango, as the front month contract moved to a deeper discount relative to contracts for delivery further in the future. The 1st-13th spread for WTI settled at -\$10.48/bbl on February 5, a decrease of \$3.07/bbl from January 2 (**Figure 2**). The market perception of abundant domestic crude oil storage capacity relative to international markets eroded quickly over the past three weeks, as rising inventory levels increased uncertainty over U.S. crude oil storage costs.

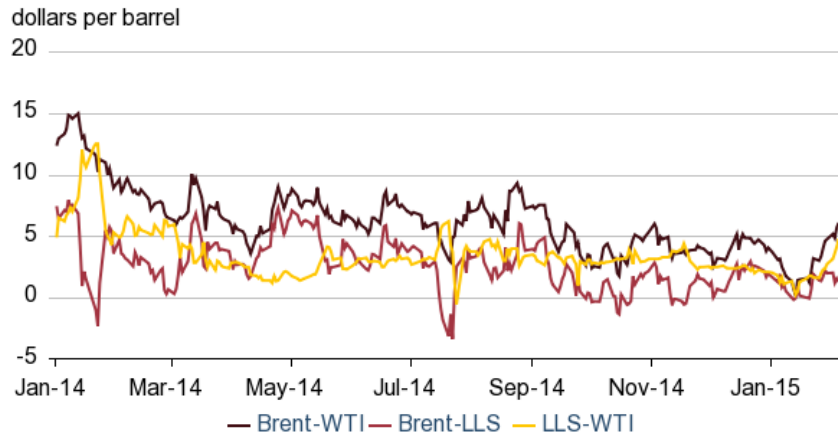
The shape of the Brent futures remained relatively stable from early January to early February, with the 1st-13th month spread settling at -\$9.55/bbl on February 5. According to recent reports, some market participants began storing international crude in floating tankers, a relatively expensive form of storage that requires a large spread between current crude oil prices and prices for future delivery.

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



With robust inventory builds in the United States and contango in the WTI futures curve increasing, the price of U.S. domestic crude oil fell relative to international benchmarks. The Brent-Light Louisiana Sweet (LLS) spread decreased by \$0.39/bbl from January 2 to settle at \$1.29/bbl on February 5. The Brent-WTI spread increased by \$2.36/bbl to settle at \$6.09/bbl (**Figure 3**). A drop in U.S. refinery runs is putting some additional downward pressure on U.S. domestic crude oil prices, as both Gulf Coast and Midwest refinery utilization rates dropped from December to January. Several refineries in the United States have planned maintenance scheduled for February, which could increase discounts of U.S. crude oil prices to international benchmarks.

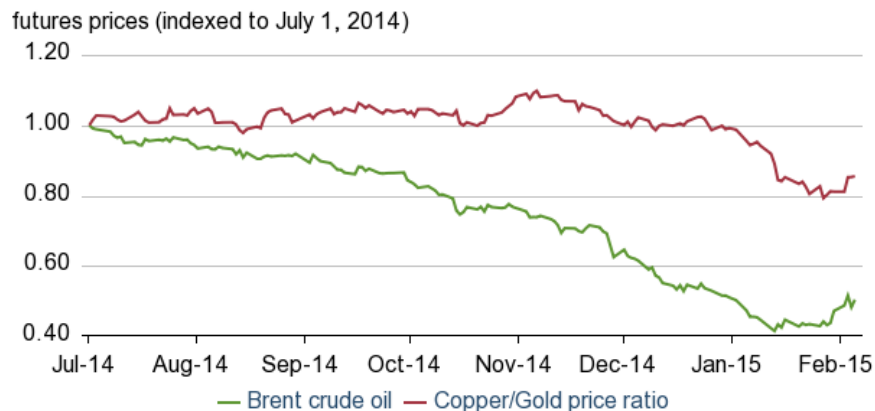
Figure 3. Historical crude oil differentials



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Brent and metals futures prices: Copper has uses in infrastructure and manufacturing and its price is closely tied to expectations of future economic growth. Gold, on the other hand, tends to increase during times of market volatility and uncertainty. When the copper-to-gold ratio rises (falls), it indicates that expectations for economic growth are increasing (decreasing). From July 1 to February 5, the copper-to-gold ratio fell by 15%, while the price of Brent crude oil fell by 50% in that time (**Figure 4**). The lower copper-to-gold ratio implies that demand-side concerns were partially responsible for the recent decline in oil prices. The larger decline in crude oil prices relative to the copper-to-gold ratio indicates that excess supply in crude oil markets has also contributed to lower oil prices.

Figure 4. Brent front month prices and Copper to Gold front month price ratio



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Money manager net positions: During the drop in crude oil prices in the second half of 2014, money manager net open interest in WTI futures contracts remained relatively stable while money manager net open interest in Brent futures contracts rose. As of market close on February 2, money managers had a net open interest of 193,000 WTI contracts, a decline of 7,000 contracts compared to the first week of October (**Figure 5**). Over the same time, net money manager open interest in Brent futures increased by 94,000 contracts. The lack of major declines in net money manager futures positions is a departure from the last major crude oil price drop in 2008 and 2009, when positions declined with prices.

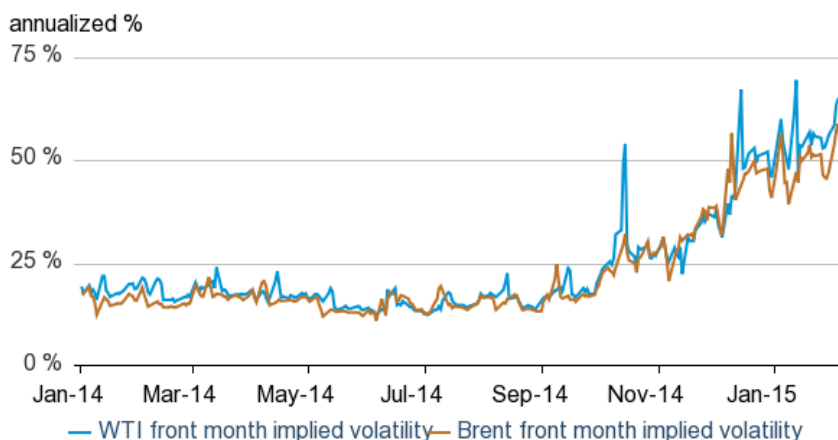
Figure 5. Brent and WTI Net Money Manager Positions



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Volatility: Front month futures contract implied volatility continued to rise for both WTI and Brent in the first five weeks of 2015. Brent implied volatility settled at 56.1% on February 5, 10 percentage points higher than on January 2 (**Figure 6**). WTI implied volatility settled at 65.2% on February 5, an increase of 14 percentage points compared to January 2. The average monthly implied volatility, which removes market extremes due to liquidity issues near expiration, in January for both Brent and WTI was the highest since the second quarter of 2009 and reflects elevated uncertainty in crude oil markets.

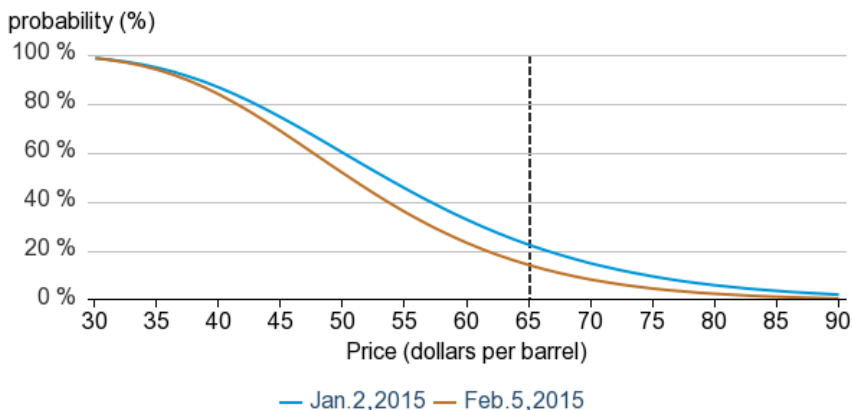
Figure 6. Crude Oil Implied Volatility



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Market-Derived Probabilities: The May 2015 WTI futures contract averaged \$51.94/bbl for the five trading days ending February 5 and has a probability of exceeding \$65/bbl at expiration of 14%. The same contract for the five trading days ending January 2 had a probability of exceeding \$65/bbl of 23% (**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 May 2015 WTI contract expiring above price levels



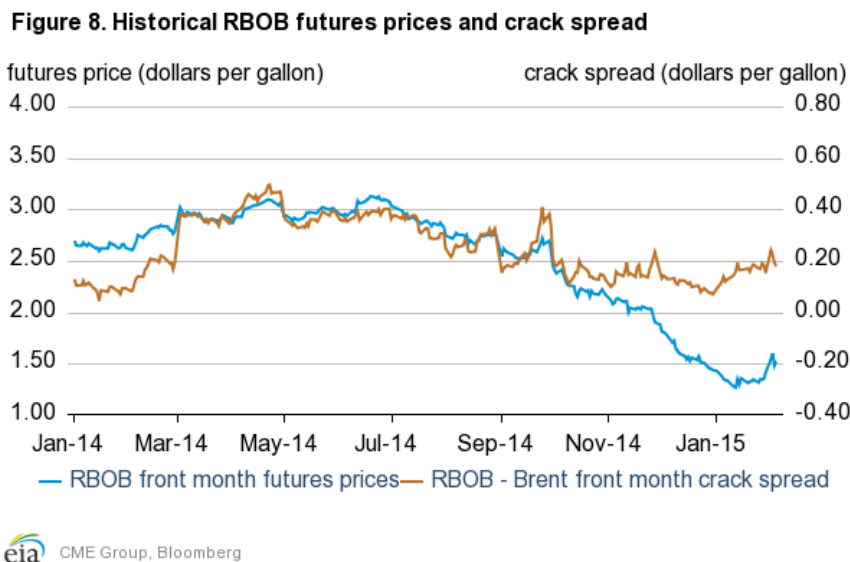
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Petroleum Products

Gasoline prices: The reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline) front month futures price increased by \$0.09 per

gallon (gal) from January 2 to settle at \$1.52/gal on February 5 (**Figure 8**). The RBOB-Brent crack spread increased to \$0.18/gal on February 5, up \$0.09/gal from January 2.

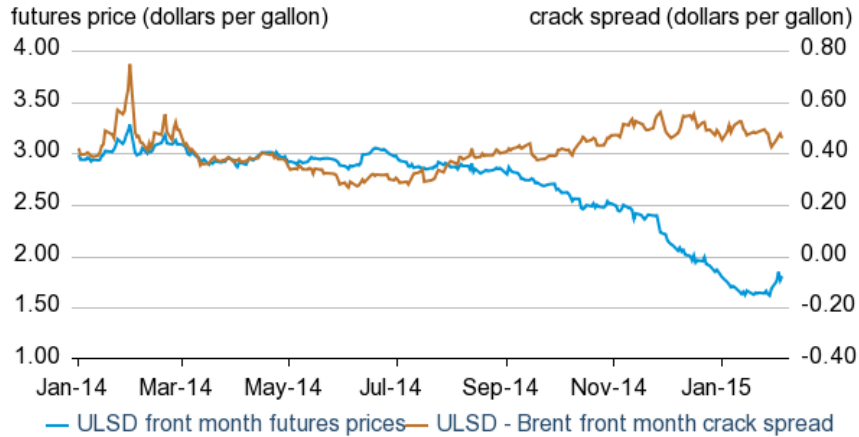
Gasoline prices recovered to a greater extent than crude oil prices at the end of January and into the first week of February. Apparent increases in U.S. demand for the gasoline as well as a contract rollover helped to push prices higher. As of January 30, the four-week average of [consumption plus exports](#) of finished motor gasoline reached 9.2 million bbl/d, the highest on record for January. Because of the seasonal rise in gasoline futures prices that starts early in the year, gasoline futures on February 1 rose as the futures contract rolled over to the higher-priced contract for March delivery.



Ultra-Low Sulfur Diesel prices: The front month futures price for the New York Harbor Ultra-Low Sulfur Diesel (ULSD) contract increased by just \$0.01/gal from January 2, settling at \$1.81/gal on February 5 (**Figure 9**). The ULSD-Brent crack spread remained nearly stable since January 2 to settle at \$0.46/gal on February 5.

ULSD prices generally followed crude oil prices over the past five weeks. In contrast to January 2014, when much of the United States experienced extreme cold weather that pushed consumption of products like heating oil to several-year highs, this January's total [consumption plus exports](#) of distillate declined by 0.14 million bbl/d. On the other hand, as ULSD crack spreads continue to stay at the top of the five-year range, refiners have had an incentive to produce more distillate. The four-week average distillate [production](#) as of January 30 was 4.8 million bbl/d, a record high for January.

Figure 9. Historical ULSD futures price and crack spread



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Higher production and lower consumption in January led to a 20 million barrel year-over-year increase in [total U.S. distillate stocks](#). [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 January 30 were 7 million barrels higher than this time last year. As a result, the ULSD 1st-13th futures curve spread declined to -\$0.12/gal as of February 5 (**Figure 10**), which was its average level in January. The last time this occurred was in January 2011, when distillate inventories reached a five-year high for that month. The average 1st-3rd ULSD futures spread in January was \$0.04/gal, \$0.06/gal lower than last January, indicating expectations of less tightness in the distillate market in the next few months compared to the same period in 2014.

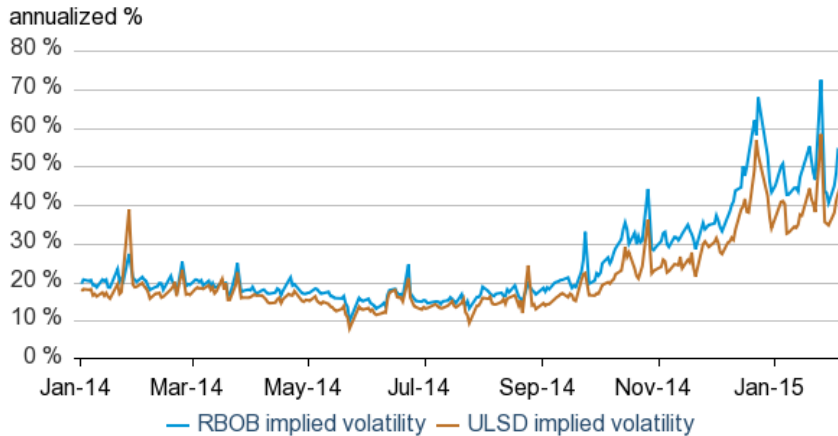
Figure 10. ULSD 1st-13th futures price spread



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Volatility: Implied volatility for the front month RBOB contract and for the front month ULSD contract increased 9.1 and 7.5 percentage points, respectively, from January 2 to settle at 54.1% and 44.2%, respectively, on February 5 (**Figure 11**). The average implied volatility for both RBOB and ULSD in January showed the sixth straight month-over-month increase.

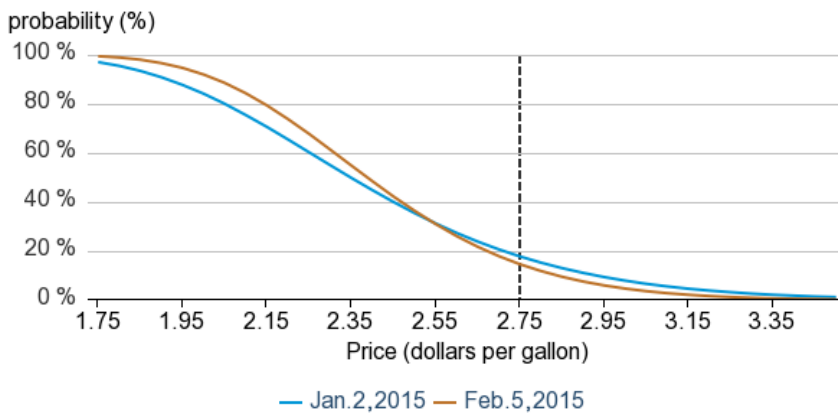
Figure 11. RBOB and ULSD Implied Volatility



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Market-Derived Probabilities: The May 2015 RBOB futures contract averaged \$1.77/gal for the five trading days ending February 5 and has an 15% 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 January 2 had an 18% probability of exceeding \$2.10/gal (**Figure 12**).

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

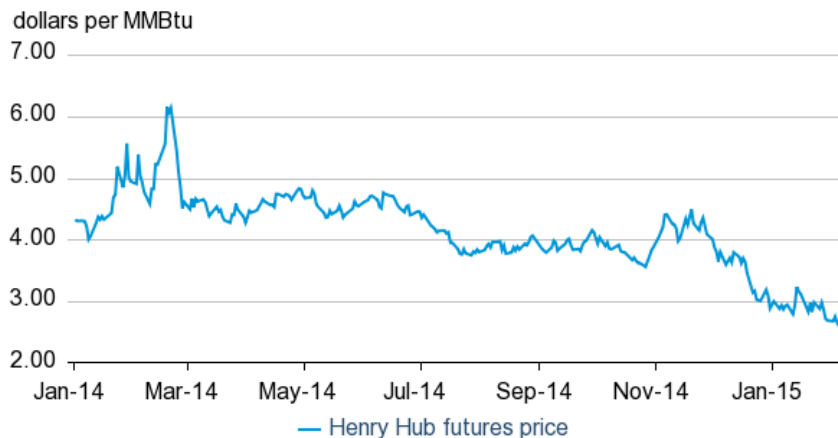


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Natural Gas

Prices: Front month natural gas prices declined for the second consecutive month in January, settling at \$2.60/MMBtu on February 5, \$0.40/MMBtu less than the close on January 2 (**Figure 13**). Front month prices in January averaged \$2.93/MMBtu, making it the first month since September 2012 in which prices averaged less than \$3.00/MMBtu. For the final two weeks in January, the weekly tallies of heating degree days (HDDs) were 41 and 30, respectively, below the 30-year normal, implying less residential heating demand for natural gas.

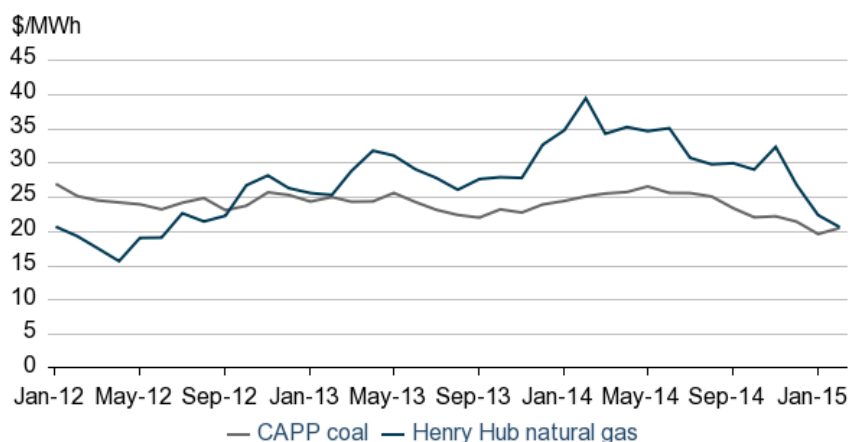
Figure 13. Historical front month U.S. natural gas prices



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Lower natural gas prices could contribute to an increase in the use of natural gas for [electric power generation](#) (power burn) in some parts of the United States, such as Texas and southeastern states. Converting the price of Central Appalachian (CAPP) coal, the benchmark for coal prices in the eastern United States, and Henry Hub natural gas to dollars per megawatt hour (MWh)—by estimating the conversion of a unit of energy to a unit of power—the price of natural gas averaged \$22.32/MWh in January and CAPP coal averaged \$19.56/MWh (**Figure 14**). While this calculation excludes other factors such as transportation or emission abatement costs, some natural gas-fired plants might be able to provide more competitive power than coal-fired ones at these prices.

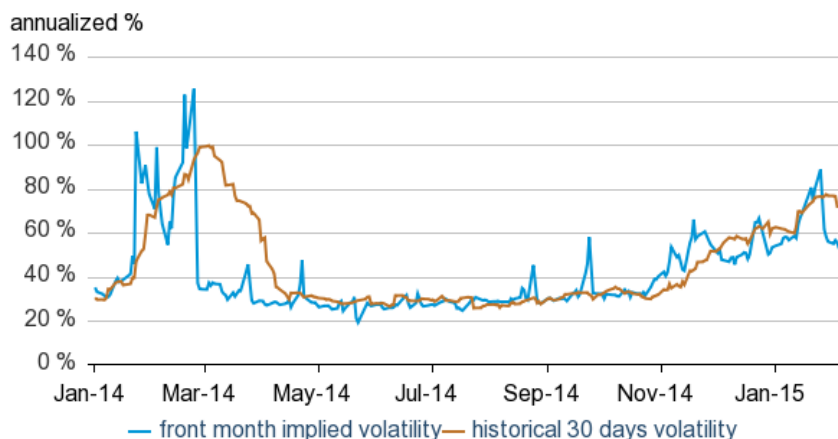
Figure 14. Estimated monthly average price for electricity generation



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Volatility: Implied volatility increased for the third consecutive month, averaging the highest for January since 2009 at 65%. The absolute value of daily percent price changes averaged 4% in January, pushing the 30-day historical volatility to 77% on an annualized basis. Implied volatility settled at 52.9% on February 5, 1.3 percentage points lower than the close on January 2 (**Figure 15**).

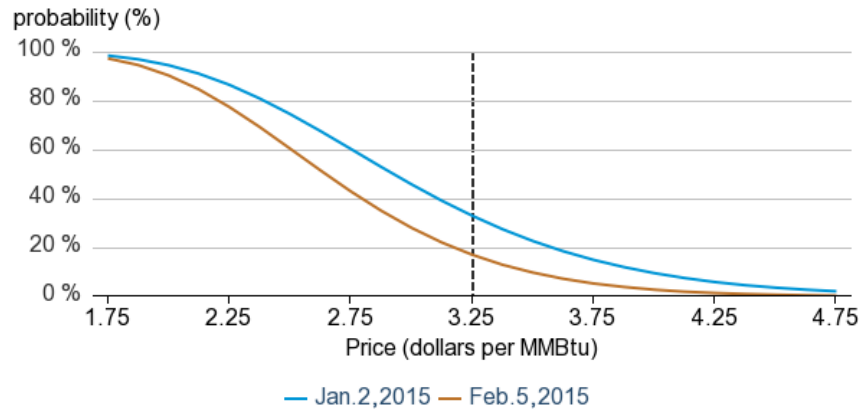
Figure 15. Natural gas historical and implied volatility



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Market-Derived Probabilities: The May 2015 Henry Hub futures contract averaged \$2.71/MMBtu for the five trading days ending February 5 and has a 17% probability of exceeding \$3.25/MMBtu at expiration. The same contract for the five trading days ending January 2 had a 33% probability of exceeding \$3.25/MMBtu (**Figure 16**).

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



 U.S. EIA, Bloomberg