

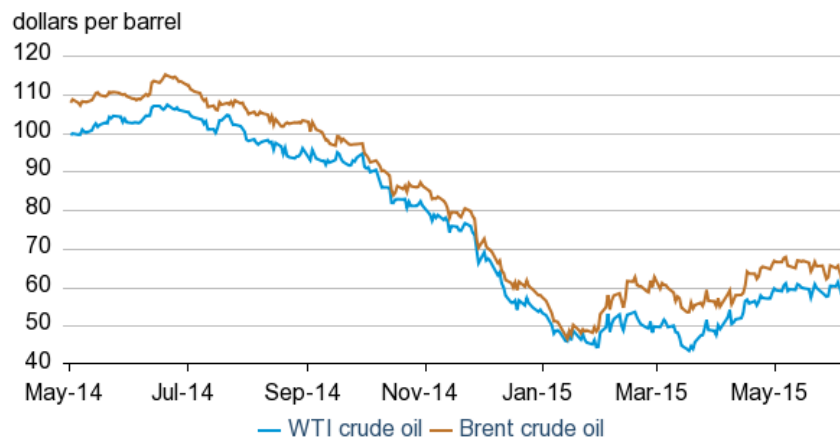


Short-Term Energy Outlook Market Prices and Uncertainty Report

Crude Oil

Prices: International crude oil prices declined in May and in the first week of June while domestic crude oil prices stayed relatively stable. The North Sea Brent front month futures declined \$4.43 per barrel (b) since May 1 to settle at \$62.03/b on June 4 (**Figure 1**). The West Texas Intermediate (WTI) front month futures price decreased \$1.15/b over the same period to settle at \$58/b on June 4.

Figure 1. Historical crude oil front month futures prices



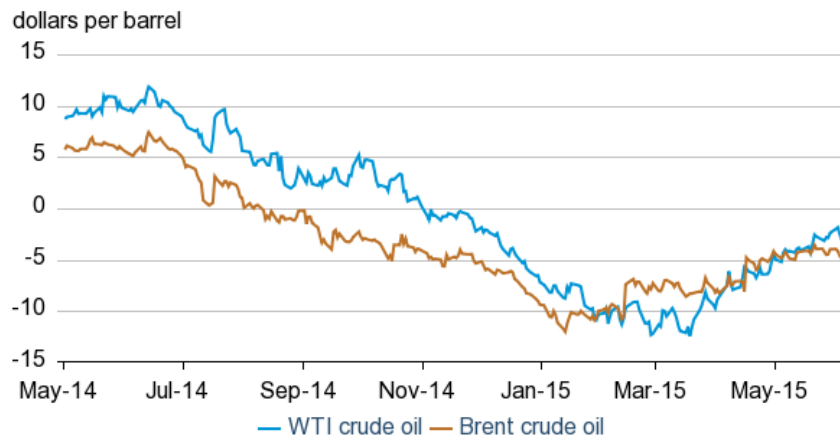
Bloomberg L.P.

Elevated crude oil production from members of The Organization of the Petroleum Exporting Countries (OPEC) continues to weigh on global oil prices. The Ministry of Oil in Iraq reported that Iraq's crude oil exports in May exceeded recent record highs for the third consecutive month. Global crude oil production continues to exceed consumption by a wide margin, and there was no indication from the latest OPEC meeting of any curtailment of production. Strong petroleum product consumption in the United States, combined with a reduction in U.S. crude oil inventories, may be providing support for WTI oil prices in the short term.

This is a regular monthly companion to the EIA *Short-Term Energy Outlook*
(<http://www.eia.gov/forecasts/steo/>)
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The contango in the Brent futures curve increased slightly while the contango in the WTI futures curve decreased. The 1st-13th month futures spread for Brent settled at $-\$4.87/\text{b}$ on June 4, a decrease of $40\text{¢}/\text{b}$ since May 1 (**Figure 2**). Reports of unsold cargoes from West Africa and the North Sea illustrate the extent of the growing crude oil surplus in the international market. [Global petroleum inventories](#) in May rose an estimated 3.0 million barrels per day (b/d), the most since April 2012. In contrast, [total commercial petroleum inventories](#) in the United States increased just 61,400 b/d in May, the lowest stock build since October 2014, as refineries increased runs and crude oil imports declined. U.S. [refinery gross inputs](#) rose to a 2015 high of 16.6 million b/d in May, while [crude oil imports](#) fell to 7 million b/d. The WTI 1st-13th month futures spread flattened by $\$1.88/\text{b}$ over the same period to $-\$3.09/\text{b}$.

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

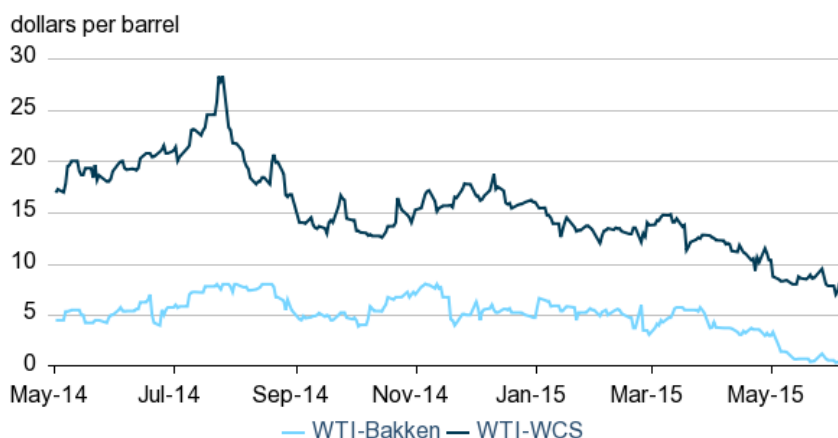


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Higher refinery runs in the United States and expanded infrastructure supported a narrow WTI-Bakken spot price spread. The differential declined $\$2.85/\text{b}$ since May 1 to $50\text{¢}/\text{b}$ on June 4 (**Figure 3**). The average spread in May was $\$1.07/\text{b}$, the lowest since April 2013. Bakken prices increased as [gross inputs to refineries](#) in PADD 2 reached 3.7 million b/d in May, the second highest volume on record.

The WTI-Western Canadian Select (WCS) spot price spread declined $60\text{¢}/\text{b}$ since May 1 to $\$8.15/\text{b}$ on June 4. May's average differential was the smallest since April 2009. The WTI-WCS spread has generally been declining since December 2014 because of the opening of the Flanagan South pipeline, which connects to the Seaway Twin pipeline and allows for Canadian crude oil already shipped to PADD 2 to reach the U.S. Gulf Coast market. More recently, however, WCS prices have increased because of supply disruptions of oil sands producers in Alberta, Canada, where wildfires in the region have forced some oil sands production to temporarily go offline.

Figure 3. WTI Crude Oil Price Differentials

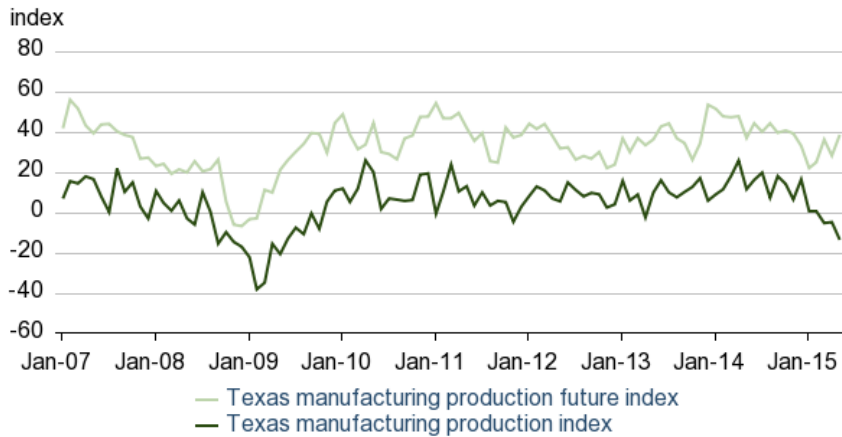


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Texas manufacturing outlook: The Federal Reserve Bank of Dallas (Dallas Fed) [surveys Texas manufacturers](#) every month to gauge business conditions in the state. Companies chosen are asked to report whether they experienced any changes in a variety of business indicators, including production. They are also asked to predict how those same business indicators will change, if at all, in the next six months. Because more than 30% of the companies surveyed fall within sectors directly affected by the oil industry, including petroleum and coal, fabricated metal, and machinery manufacturing, low oil prices and low capital expenditures from oil companies can affect the outlook of these manufacturers.

In May, the production index was -13.5, the third straight month of negative readings and the lowest value recorded since 2009 (**Figure 4**). On the other hand, the future production index for May was 38.6, a considerable turnaround from January when it matched a six-year low. Further, unlike during the last significant oil price decline in 2008, the future production index has not dipped below zero. The lack of a general economic slowdown in the United States and more access to credit for manufacturers and oil companies is allowing operations, unlike the situation in late 2008 and early 2009.

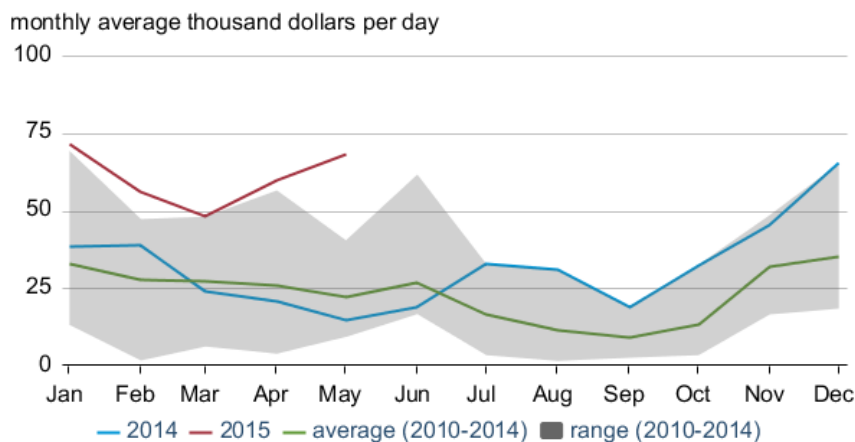
Figure 4. Texas Manufacturing Survey Outlook



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Crude oil tanker rates: The cost of shipping crude oil on very large crude carriers (VLCCs) from the Persian Gulf to Asia reached an average of \$68,300/d in May (Figure 5), the highest for that month since 2008. VLCC rates have stayed well above the five-year average or set the five-year high every month since July 2014. High costs of shipping are an indicator of the volume of crude oil being produced and sent to the world market. Instead of cutting production during this low oil price environment, many crude oil producers in the Middle East, like Iraq and Saudi Arabia, have maintained or increased production to protect their market share. Higher tanker rates may also reflect an increase in floating storage. If more crude oil is being stored on VLCCs, vessel availability could be limited, which would push up charter rates.

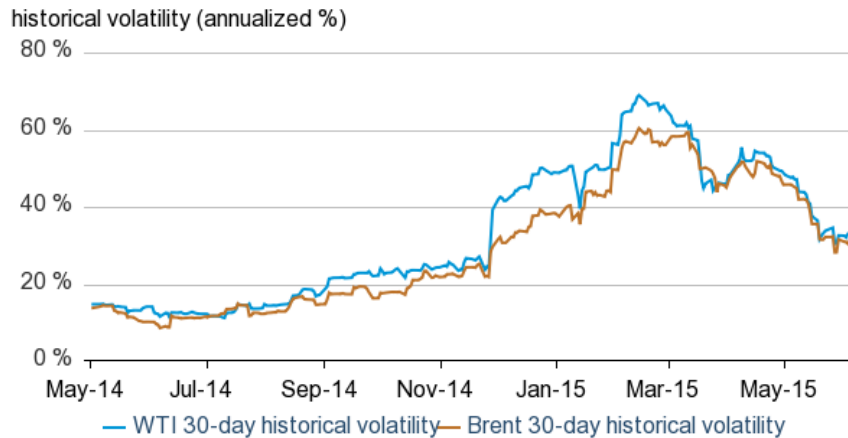
Figure 5. VLCC Rates from Persian Gulf to Asia



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Volatility: Brent and WTI traded in relatively narrow ranges of \$5.71/b and \$3.67/b, respectively, in May, resulting in a marked decline in price volatility to the lowest levels in six months. The 30-day historical volatility of Brent declined 14 percentage points since May 1 to settle at 31.4% on June 4. The WTI 30-day historical volatility declined 15 percentage points to settle at 33.2% over the same period (Figure 6).

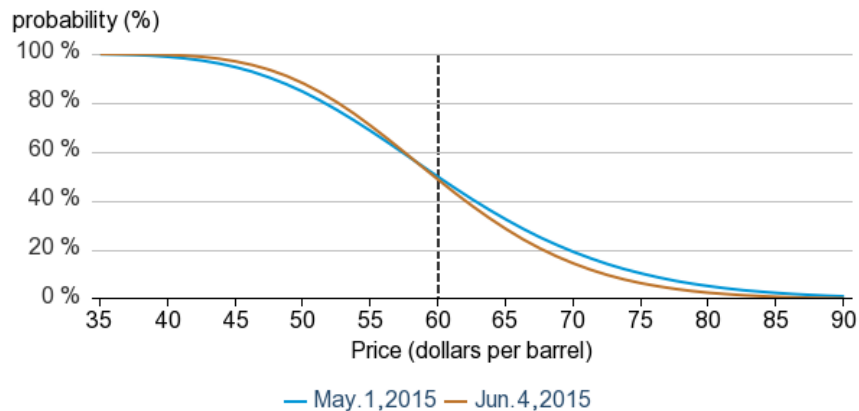
Figure 6. Crude oil historical volatility



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Market-Derived Probabilities: The September 2015 WTI futures contract averaged \$60.37/b for the five trading days ending June 4 and has a probability of exceeding \$60/b at expiration of 49%. The same contract for the five trading days ending May 1 had a probability of exceeding \$60/b of 50% (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 September 2015 WTI contract expiring above price levels



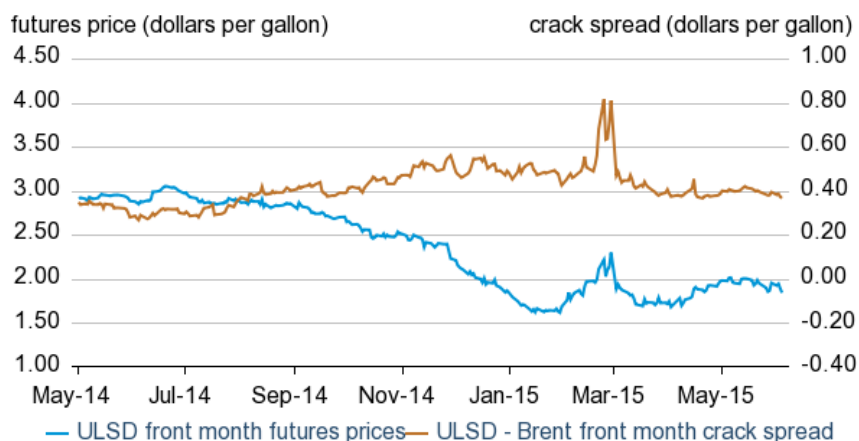
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Petroleum Products

Ultra-Low Sulfur Diesel prices: The front month futures price for the New York Harbor Ultra-Low Sulfur Diesel (ULSD) contract decreased 14¢ per gallon (gal) from May 1 to reach \$1.84/gal on June 4 (**Figure 8**). The ULSD-Brent crack spread decreased slightly by 3¢/gal since May 1 to settle at 37¢/gal on June 4.

Distillate prices were relatively stable as the price of crude oil continues to be the main driver. Although total U.S. distillate inventories showed only a slight increase for the second straight month, regional storage patterns in the United States varied. Higher refinery runs in both PADD 1 (Northeast) and PADD 3 (Gulf Coast) compared to last month and May 2014 resulted in higher distillate production. In PADD 1, Northeast distillate inventories increased by 5.4 million barrels over the past month as a result. However, on the Gulf Coast, distillate inventories declined by 1.2 million barrels, likely due to an increase in PADD 3 distillate exports, which typically increase this time of year, or there is higher U.S. demand for distillate.

Figure 8. Historical ULSD futures price and crack spread



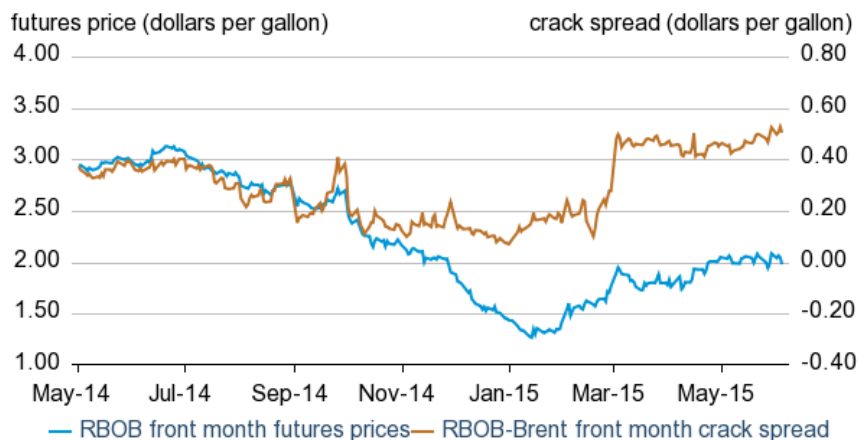
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Gasoline prices: The reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline) front month futures price decreased 6¢/gal from May 1 to June 4, settling at \$1.98/gal (**Figure 9**). The RBOB-Brent crack spread increased by 4¢/gal over the same period and settled at 50¢/gal.

Total U.S. gasoline product supplied for March was 9.1 million b/d and weekly product supplied estimates for May suggest the trend of higher year-over-year gasoline consumption is continuing into the start of the summer driving season. Although stocks remain above their five-year average, U.S. gasoline inventories declined by 7.5 million barrels over the past month, more than the average decline from April to May.

Continued strong demand may result in larger inventory declines compared to previous summers and these expectations are likely supporting prices. A gasoline crack spread of more than 50¢/gal, the highest in several years, provides incentive for higher refinery runs to produce additional gasoline in order to meet robust demand.

Figure 9. Historical RBOB futures prices and crack spread

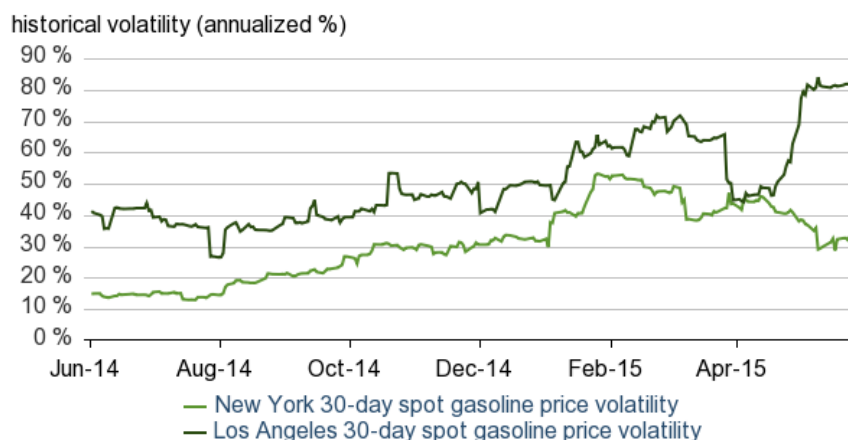


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Gasoline volatility: Price volatility for spot New York Harbor gasoline continues to decline along with crude oil volatility. Historical volatility for spot gasoline in the New York Harbor area for the previous 30 trading days decreased to 33% on June 4, hitting its lowest point in the previous 6 months at the end of May (**Figure 10**).

However, unplanned refinery outages in other parts of the United States led to increases in gasoline price volatility. Historical 30 day volatility reached 80% for spot Los Angeles California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB), well above volatility levels for gasoline in other parts of the United States, as the combination of the unplanned outage at the Torrance refinery, several other smaller outages, and planned maintenance at the Cherry Point refinery reduced refinery runs and tightened gasoline supply in PADD 5 (West Coast). West Coast refinery utilization dropped to 79% for the three consecutive weeks ending May 8, the lowest rate for that time of year since 2012, reflecting the effects of both planned maintenance and unplanned outages. With lower-than-expected gasoline production from local refiners, imported supplies of both finished gasoline and gasoline blending components have increased, including cargoes from Asia, eastern Canada, and Europe. May imports of gasoline into PADD 5 were the highest since 2007 and, along with refineries returning to more normal production, should be reflected in lower and less volatile prices.

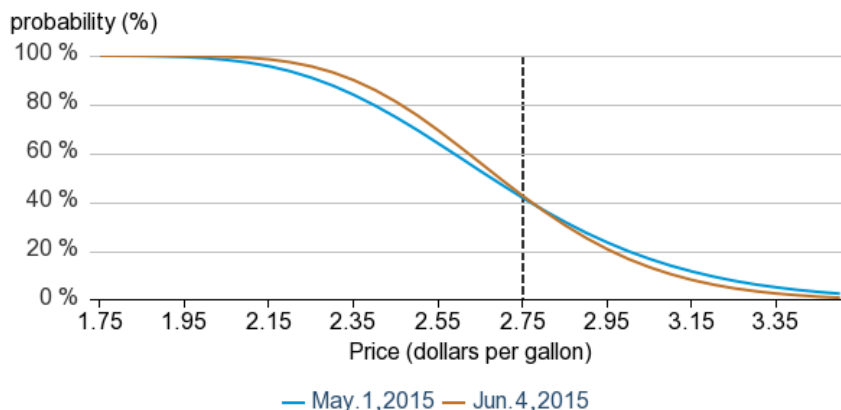
Figure 10. Gasoline historical volatility



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Market-Derived Probabilities: The September 2015 RBOB futures contract averaged \$1.97/gal for the five trading days ending June 4 and has a 43% 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 May 1 had a 42% probability of exceeding \$2.10/gal (Figure 11).

Figure 11. Probability of September 2015 retail gasoline exceeding different price levels at expiration



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Natural Gas

Prices: U.S. natural gas futures prices declined 15¢/MMBtu since May 1, settling at \$2.63/MMBtu on June 4 (Figure 12). Prices rose 9% over the first two weeks in May as cooling degree days (CDDs) in the Southeast were 91% higher than the 30-year normal, suggesting increased demand from the electric power sector to meet air conditioning

needs. Average weekly storage injections were the same compared to May 2014, however, which exerted downward pressure on prices toward the end of the month.

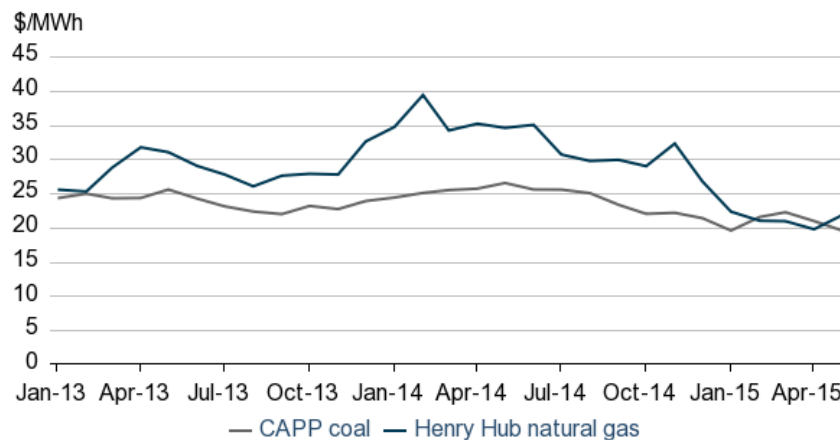
Figure 12. Historical front month U.S. natural gas prices



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Using standard heat rates for coal and natural gas to convert prices to an electricity generation basis, the estimated monthly average price for natural gas rose above the corresponding coal price in May after remaining below it for three consecutive months (**Figure 13**). Central Appalachian (CAPP) coal and natural gas are competing fuel sources for electricity generation in the Southeast United States. CAPP coal prices averaged \$19.57/MWh in May, a 7% decrease from April, whereas Henry Hub natural gas prices increased 10%, averaging \$20.18/MWh in May.

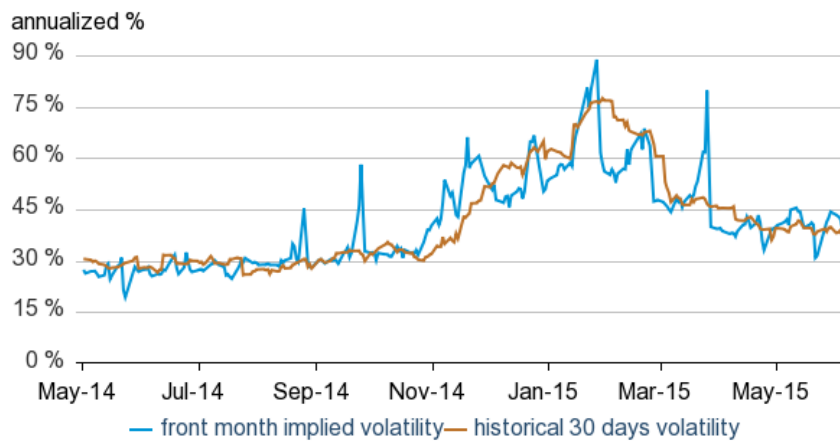
Figure 13. Estimated monthly average price for electricity generation



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Volatility: Implied volatility decreased less than 1 percentage point since May 1, settling at 40.2% on June 4. Historical volatility decreased 2 percentage points to settle at 37.8% (Figure 14). Although natural gas volatility declined from the recent highs during the winter heating season, implied volatility remains about 15 percentage points above May 2014 levels. This suggests there is additional uncertainty and sensitivity of natural gas prices to consumption this summer, a change from this time last year when low inventories supported prices and storage injections. Another source of additional uncertainty lies in the response of natural gas producers to lower associated liquids prices.

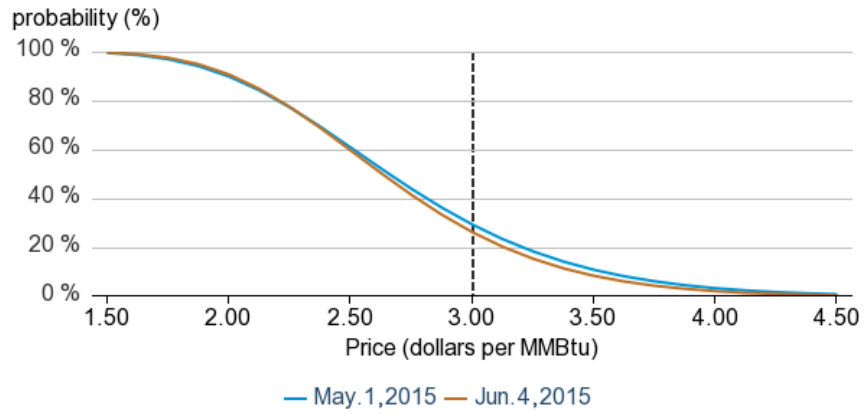
Figure 14. Natural gas historical and implied volatility



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Market-Derived Probabilities: The September 2015 Henry Hub futures contract averaged \$2.69/MMBtu for the five trading days ending June 4 and has a 26% probability of exceeding \$3.00/MMBtu at expiration. The same contract for the five trading days ending May 1 had a 29% probability of exceeding \$3.00/MMBtu (Figure 15).

Figure 15. Probability of the September 2015 Henry Hub contract expiring above price levels



 U.S. Energy Information Administration, CME Group