

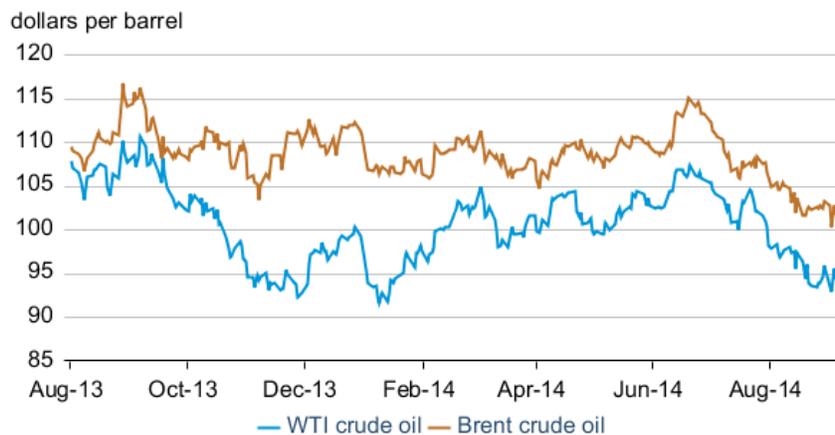


Short-Term Energy Outlook Market Prices and Uncertainty Report

Crude Oil

Prices: International crude oil prices fell in August and remain near their lowest levels of 2014. The North Sea Brent front month futures price settled at \$101.83/barrel on September 4, a decrease of \$3.01/barrel from August 1 (**Figure 1**). The front month West Texas Intermediate (WTI) contract price fell by \$3.43/barrel over the same period, settling at \$94.45/barrel on September 4.

Figure 1. Historical crude oil front month futures prices



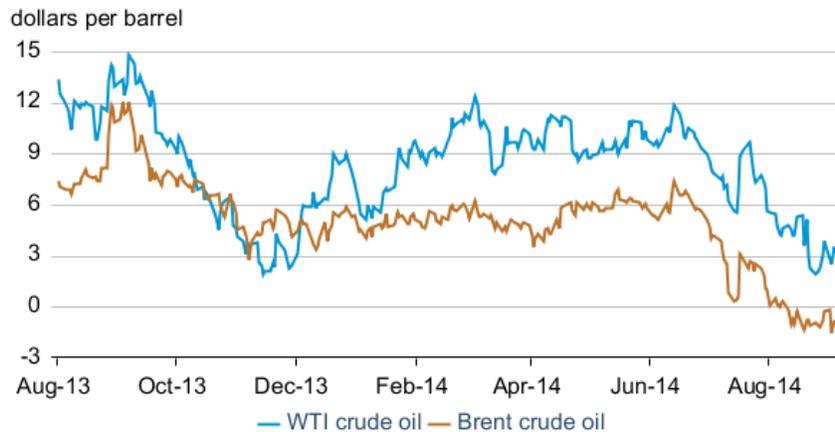
Although the U.S. economy showed robust growth in the second quarter, recording a revised 4.2% growth rate, economic data in Europe and China were disappointing and points to potentially weaker demand for crude oil going forward. Eurozone GDP growth was 0.2% in the second quarter and inflation fell to 0.3% in August, while in July Chinese total imports fell 1.6% year-over-year and industrial growth was below expectations. Combined with the upcoming seasonal decline in refinery runs and the seasonal increase in crude oil exports from Saudi Arabia, the international crude oil market is at one of its loosest points in the past three years.

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)

The 1st-13th spread for Brent settled at -\$0.81 on September 4, marking the first time since June 2012 that the Brent futures market was in contango (when near-term prices are less than longer-dated ones) for delivery one year in the future (**Figure 2**). Initial estimates for August show a build in global crude oil inventories, which is unusual for this time of year.

The domestic U.S. crude oil market also loosened in August amid smaller inventory withdrawals but still remains in backwardation (when near-term prices are greater than longer-dated ones). The WTI 1st-13th spread settled at \$3.16/barrel on September 4, a decrease of \$2.42/barrel compared to August 1. The rate of U.S. commercial crude oil inventory declines slowed in August, averaging a withdrawal of 1.5 million barrels per week for the four-week-period ending August 29. Inventory declines averaged 4.2 million barrels per week for the four-week-period ending August 1.

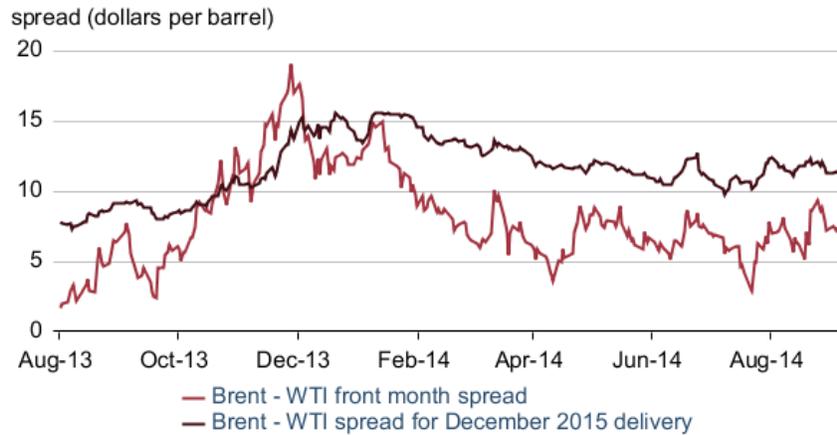
Figure 2. Crude oil front month - 13th month futures price spread



Most of the recent volatility in the front month Brent-WTI spread is attributable to the different contract roll dates for the two futures contracts. The front month spread settled at \$7.38/barrel on September 4, relatively unchanged compared to its level on August 1 (**Figure 3**). However, the spread dropped to \$5.19/barrel on August 18, just before the September WTI contract expired, and then quickly rose to \$9.30/barrel a few days after WTI front month delivery rolled to October.

Meanwhile, longer-term Brent-WTI differentials remain above the front month spread. The Brent-WTI spread for delivery in December 2015 settled at \$11.26/barrel on September 4, within its recent \$10-to-\$13/barrel trading range. The higher spread for delivery at the end of next year suggests that market participants believe that continuing increases in U.S. domestic crude oil production could put downward pressure on WTI prices.

Figure 3. Historical Brent - WTI crude oil price spreads



Brent and the U.S. dollar: The divergence of growth expectations between the United States and the rest of the world is also reflected in currency markets. As economic growth slows in countries other than the United States, it increases the likelihood that their central banks will implement further monetary easing in order to stimulate growth, like the recent announcement of rate cuts and quantitative easing by the European Central Bank. In the United States, stronger economic growth has the Fed reducing its quantitative easing program and raises the possibility of increases in the Federal Funds Rate earlier than anticipated. These opposing shifts in monetary policy had the combined effect of increasing the value of the U.S. dollar against other world currencies by 3.1% August 1 to September 4 (**Figure 4**). The negative correlation between crude oil prices and the value of the U.S. dollar suggests that the decline in economic growth expectations outside the United States is impacting both markets.

Figure 4. Brent crude oil price vs. the value of the U.S. dollar



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Net money manager positions: Money managers decreased their net long positions in the Brent and WTI futures contracts in July and August, coinciding with the decline in prices over the previous two months. Money managers were long by 65,000 Brent futures contracts as of August 26, marking the lowest total since June 2012 and displaying week-over-week declines in net long positions for 7 out of the last 10 weeks (**Figure 5**). Money managers held a net long position of 196,000 WTI contracts as of August 26, the lowest amount since May 2013 and declining week-over-week for 9 out of the previous 10 weeks.

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Figure 5. Brent and WTI Net Money Manager Positions

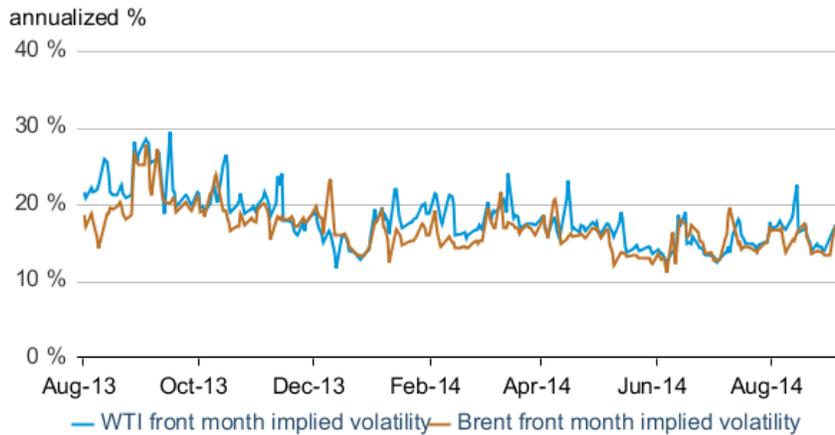


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Volatility: Implied volatility for both the Brent and WTI front month contracts increased slightly in the previous month. Brent implied volatility settled at 17.3% on September 4,

an increase of 0.7 percentage points from August 1 (**Figure 6**). WTI implied volatility rose by 0.3 percentage points over the same period, also settling at 17.3% on September 4. Volatility for both contracts remains near the bottom of their recent range.

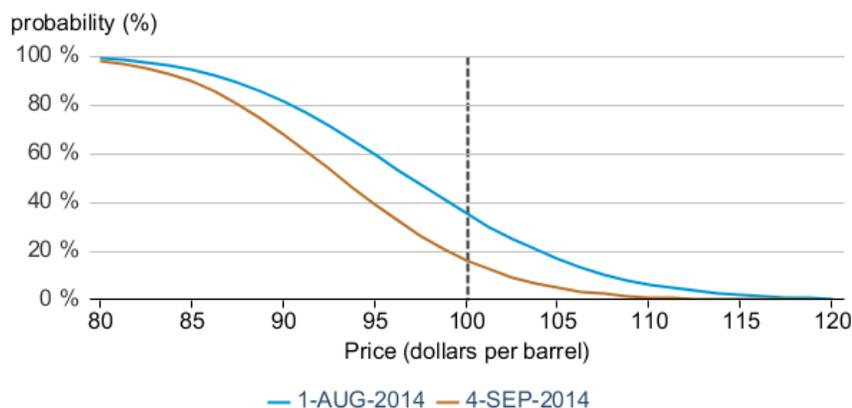
Figure 6. Crude Oil Implied Volatility



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Market-Derived Probabilities: The December 2014 WTI futures contract averaged \$93.38/barrel for the five trading days ending September 4 and has a probability of exceeding \$100/barrel at expiration of 16%. The same contract for the five trading days ending August 1 had a probability of exceeding \$100 of 35% (**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 December 2014 WTI contract expiring above price levels

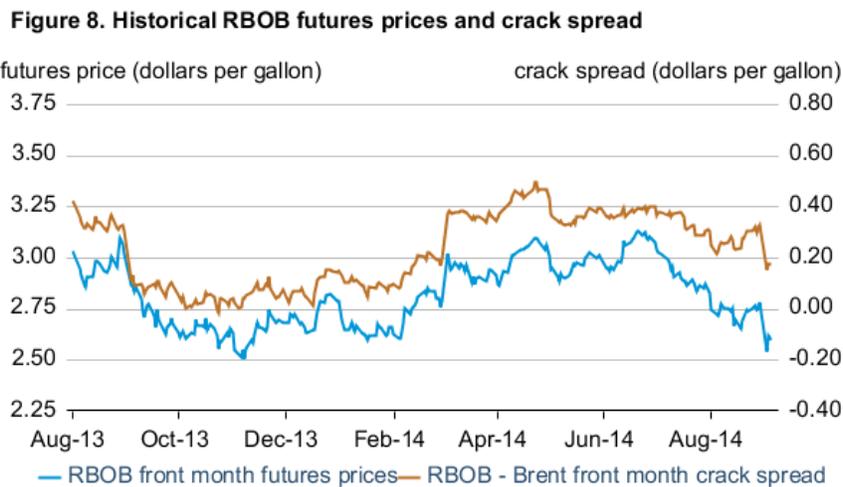


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Petroleum Products

Gasoline prices: The reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline) front month futures price settled at \$2.60 per gallon (gal) on September 4, down 14 cents/gal since August 1 (**Figure 8**). The RBOB-Brent crack spread declined 7 cents/gal from August 1 to settle at 18 cents/gal on September 4.

The declines in gasoline futures price and crack spreads reflect the futures contract rolling from September to October delivery. Each year at this time, the gasoline futures contract switches to the winter grade specification of gasoline, which costs less to produce than the summer grade of gasoline, resulting in lower RBOB prices. From August 1 to August 29, the RBOB front month futures price and RBOB-Brent crack spread increased by 4 cents/gal and 8 cents/gal, respectively, as U.S. gasoline market fundamentals strengthened. Gasoline [consumption plus exports](#) in the four weeks ending August 29 rose 0.01 million bbl/d from July to 9.5 million bbl/d, near the top of the five-year range for August. Total motor gasoline [inventories](#) dropped 4 million barrels from August 1 to August 29.

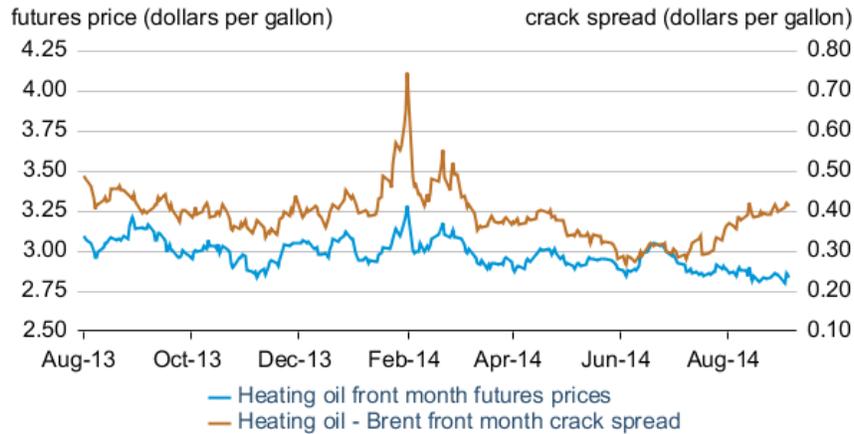


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Heating Oil prices: The front month futures price for heating oil decreased 3 cents/gal from August 1, settling at \$2.84/gal on September 4 (**Figure 9**). The heating oil-Brent crack spread increased 4 cents/gal to settle at 41 cents/gal on September 4.

Although heating oil prices declined, they did not decline as strongly as crude oil prices. Heating oil prices were supported by a drop in distillate production plus imports and subsequent declines in distillate stocks. For the four weeks ending August 29, distillate [production plus imports](#) declined 0.11 million bbl/d from July to 5.0 million bbl/d in August, similar to the level seen in August 2013. Distillate [inventories](#) fell by 1.5 million barrels from July to August and moved below their five-year range for the first time since April of this year.

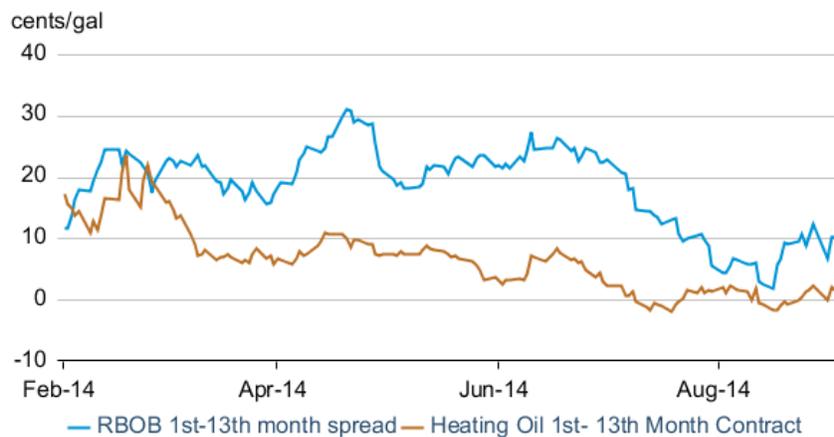
Figure 9. Historical heating oil futures price and crack spread



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The heating oil 1st-13th month futures price spread was relatively flat in August, while the RBOB 1st-13th month futures price spread began to show increased backwardation (**Figure 10**). Several refineries in North America had unplanned maintenance outages and contributed to higher gasoline inventory withdrawals. The Irving refinery in Saint John, New Brunswick, in Canada and the PBF Energy refinery in Delaware City, Delaware, experienced disruptions in the middle of August. Towards the end of the month, there was an explosion and a fire at the BP refinery in Whiting, Indiana. These events put upward pressure on gasoline prices in the near term more so than heating oil prices because gasoline domestic consumption was still in the peak months of the year.

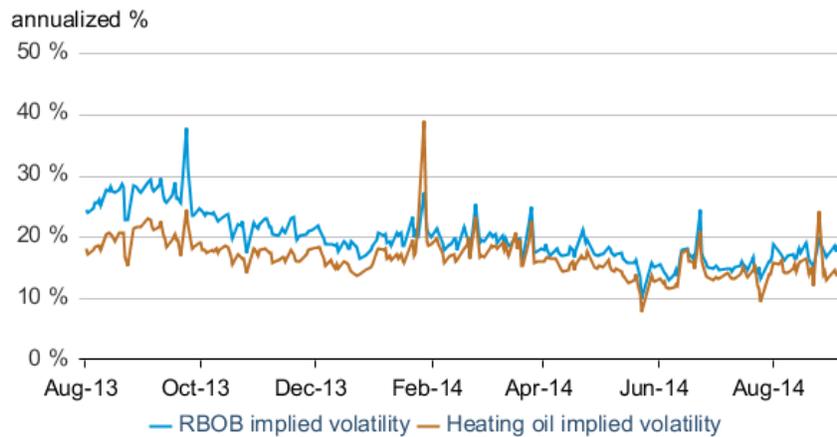
Figure 10. RBOB and heating oil futures price spread



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Volatility: Implied volatility for the front month RBOB contract and front month heating oil contract declined 0.2 percentage points and 1.6 percentage points, respectively, from August 1 to settle at 18.6% and 14.3%, respectively, on September 4 (**Figure 11**). The spread between the implied volatilities of RBOB and heating oil front month contracts at the beginning of September reached its widest point since November 2013, except for temporary spikes near options expiration. The widening spread in late August and early September reflects the greater effects of refinery disruptions on gasoline prices than heating oil prices due to higher seasonal consumption of gasoline.

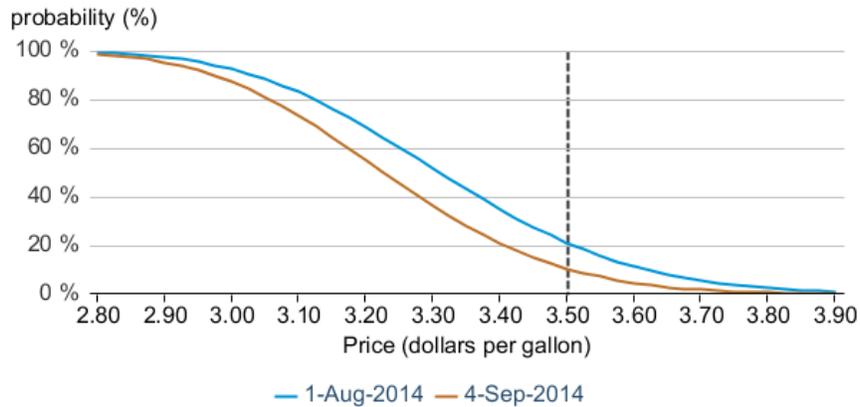
Figure 11. RBOB and Heating oil Implied Volatility



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Market-Derived Probabilities: The December 2014 RBOB futures contract averaged \$2.53/gal for the five trading days ending September 4 and has a 11% probability of exceeding \$2.80/gal (typically leading to a retail price of \$3.50/gal) at expiration. The same contract for the five trading days ending August 1 had a 21% probability of exceeding \$2.80/gal (**Figure 12**).

Figure 12. Probability of December 2014 retail gasoline exceeding different price levels at expiration

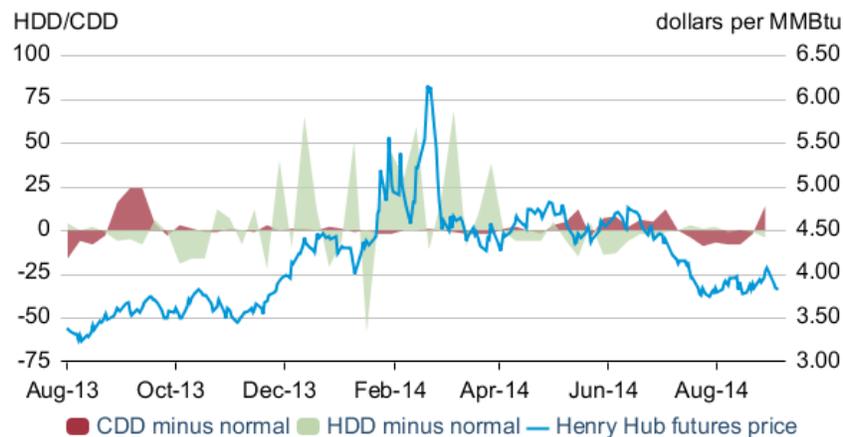


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Natural Gas

Prices: Natural gas futures prices in August traded in the narrowest range for any month since April of 2000. The front month contract settled at \$3.82/MMBtu on September 4, 2 cents/MMBtu higher than the price on August 1. The U.S. market experienced another month of above average storage injections and modest demand. Cooling degree days (CDDs) averaged more than 6 CDDs below normal since the middle of July through August 21, but increased in the last week of August (**Figure 13**). The more recent increase in CDD likely led to a short-term increase in demand for natural gas for power generation and slightly higher prices.

Figure 13. HDD minus normal and CDD minus normal



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The natural gas futures curve exhibits price [seasonality](#), with winter month prices higher than other months of the year. The January futures-front month contract spread

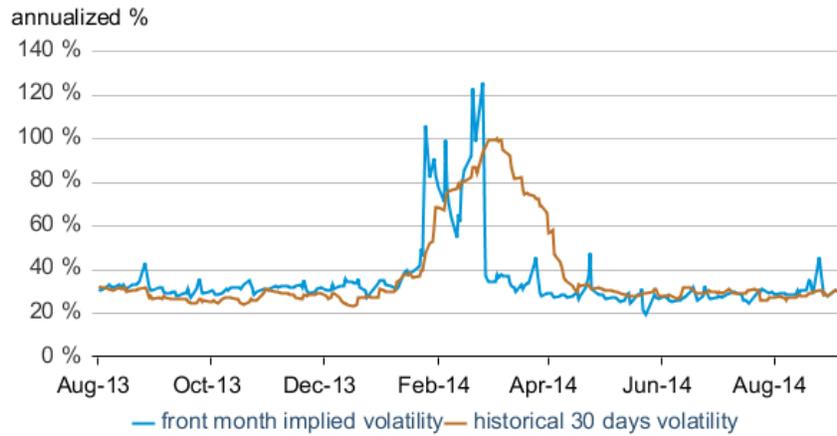
averaged 21 cents/MMBtu so far in 2014, 18 cents/MMBtu lower compared to the same period last year and the second straight year of lowered seasonality in the natural gas futures curve (**Figure 14**). Shifts in consumption patterns along with increases in supply are the primary drivers. On the consumption side, markets such as electricity generation and industry, that do not have the winter peaking characteristic of space heating, are accounting for a growing share of demand. At the same time, the market expects more consumption in the upcoming winter months to come from increases in supply, which would put less strain on inventories, and a narrower winter-summer price spread providing decreased financial incentive to store natural gas.

Figure 14. January futures minus front month contract



Volatility: Historical volatility stayed fairly flat throughout the first three weeks of August, but increased in the last week of the month and early part of September as temperatures increased. Implied volatility increased 1 percentage point since August 1, settling at 29.8% on September 4, while historical volatility increased 2.4 percentage points to also settle at 29.8% (**Figure 15**).

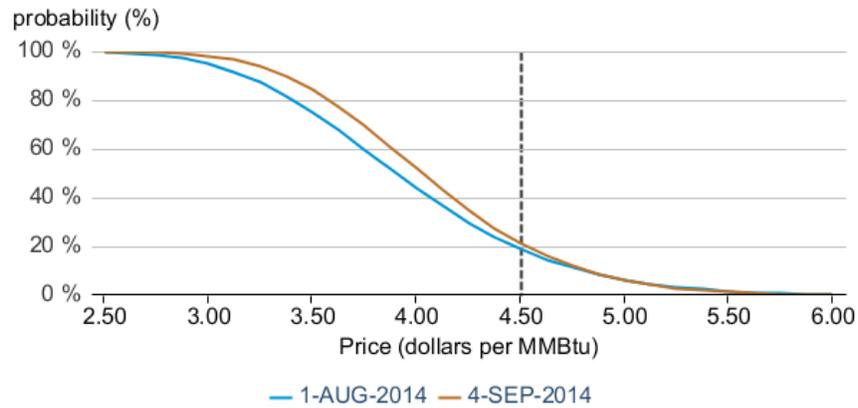
Figure 15. Natural gas historical and implied volatility



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Market-Derived Probabilities: The December 2014 Henry Hub futures contract averaged \$4.07/MMBtu for the five trading days ending September 4 and has a 21% probability of exceeding \$4.50/MMBtu at expiration. The same contract for the five trading days ending August 1 had a 19% probability of exceeding \$4.50/MMBtu (**Figure 16**).

Figure 16. Probability of the December 2014 Henry Hub contract expiring above price levels



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