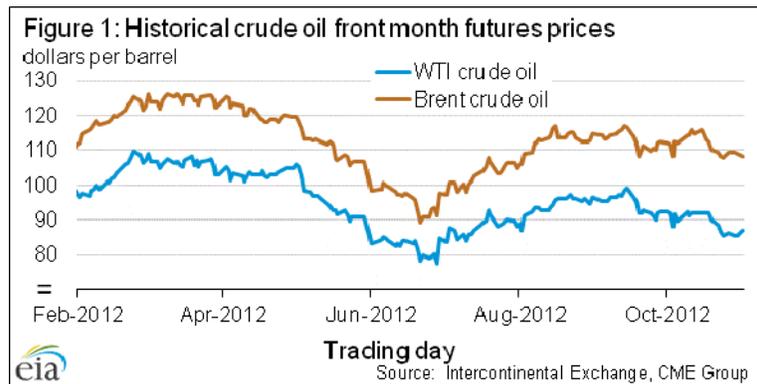


## Short-Term Energy Outlook Market Prices and Uncertainty Report<sup>1</sup>

### Crude Oil

**Prices:** Crude oil prices decreased slightly in October with most of the decline coming at the end of the month. The Brent and West Texas Intermediate (WTI) front month futures contracts decreased by \$4 and \$5 per barrel, respectively, since October 1 and settled at \$108.17 and \$87.09 dollars per barrel on November 1 (**Figure 1**). These are the lowest levels for both crude oil benchmarks since the beginning of August 2012.

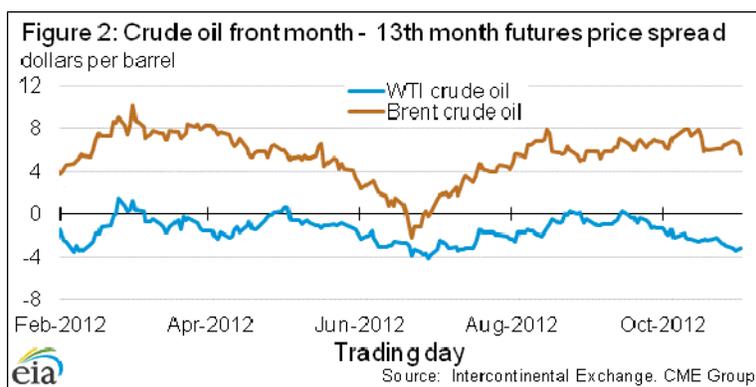


The downward price pressure coincided with third quarter earnings announcements from companies in the S&P 500 that were below market expectations. Many companies also lowered their earnings guidance for the first half of 2013, citing uncertainty over the fiscal cliff in the U.S. (a combination of scheduled tax increases and reduced government spending scheduled to take effect in the first quarter of 2013) as well as concerns over the European economy. Eurozone unemployment reached a 2012 high of 11.6 percent in October and several Purchasing Managers' Indices (a leading economic indicator) are still showing contraction in the manufacturing sectors of European economies.

<sup>1</sup> 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)

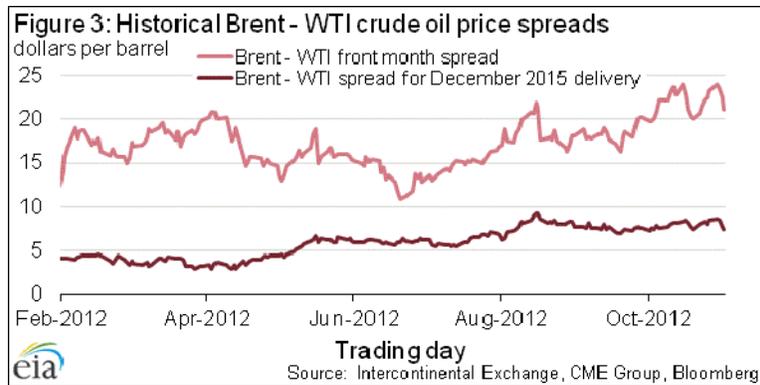
Backwardation in the Brent futures curve (when near term prices are higher than prices for delivery further in the future) decreased slightly over the last month. The 1<sup>st</sup> – 13<sup>th</sup> spread for Brent contracts settled at \$5.59 per barrel on November 1, \$1.00 per barrel lower than levels on October 1 (**Figure 2**). Production issues during September and October in the North Sea contributed to recent increases in backwardation in the Brent futures curve. Recent announcements of several oil fields ending maintenance periods, as well as builds of global crude oil inventories forecasted for the fourth quarter of 2012, have recently eased some of the tightness in the Brent market.

The amount of contango (when near-term prices are less than price farther in the future) in the WTI futures curve increased during October. Inventories at the delivery point for the futures contract in Cushing, OK were 43.4 million barrels for the week ending October 26, about 11 million barrels higher than at this time last year, and have put downward pressure on front month WTI futures prices.



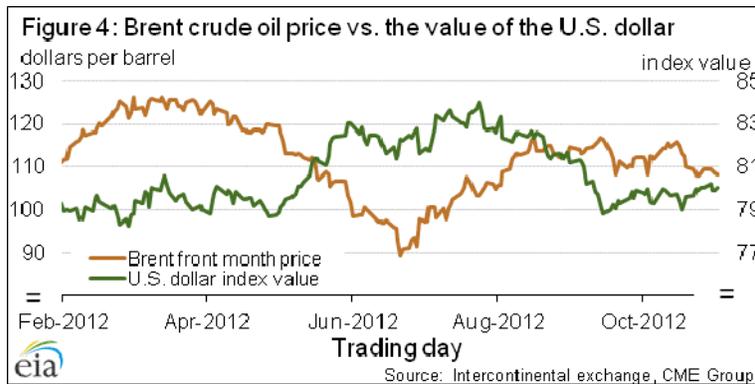
The difference (spread) between the front month Brent and WTI futures contracts climbed to its highest level so far this year – nearly \$24 per barrel on October 29– before settling at about \$21 per barrel on November 1. The spread between Brent and WTI prices is indicative of the significant transportation costs of moving additional barrels of crude oil from Cushing, OK to the U.S. Gulf coast and recent lower supply from Brent crude oil streams (**Figure 3**).

The spread between the two benchmarks for delivery in December 2015 is considerably lower than the current spread, but remains in the \$7.50 to \$9.50 range. The differential between these two long-dated crude oil futures contracts most likely indicates a market expectation that current transportation constraints are likely to ease but not disappear over that period. Insufficient pipeline infrastructure to move oil to the U.S. Gulf Coast from increasing areas of production in PADD II, potential mis-matches between crude oil types and U.S. Gulf Coast refining capacity as well as declining production in the North Sea could all be contributing to the long-term spread.



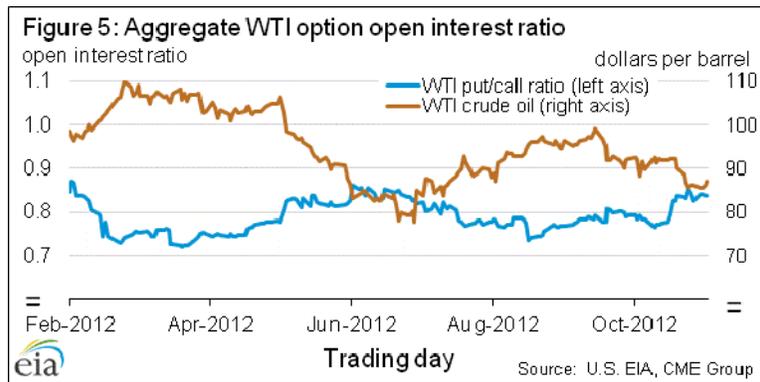
**Crude Oil and the U.S. Dollar:** The typical inverse relationship between the price of crude oil and the value of the U.S. dollar returned in October. The U.S. dollar index (a weighted basket of the exchange rate between the U.S. dollar and six other major currencies) decreased by 1.7 percent in September while Brent crude oil prices dropped by nearly \$2 per barrel (1.6 percent) over the same time period. In October, the value of the dollar increased slightly, coinciding with declines in the price of the front month Brent futures contract (**Figure 4**).

Concerns over economic growth tend to cause investors to take on less risk and purchase more assets denominated in U.S. dollars, thus causing the value of the dollar to increase. At the same time, these concerns over economic growth result in lower crude oil prices. A more detailed explanation of the inverse relationship between the value of the U.S. dollar and crude oil prices can be found on EIA’s [What Drives Crude Oil Prices?](#) website.

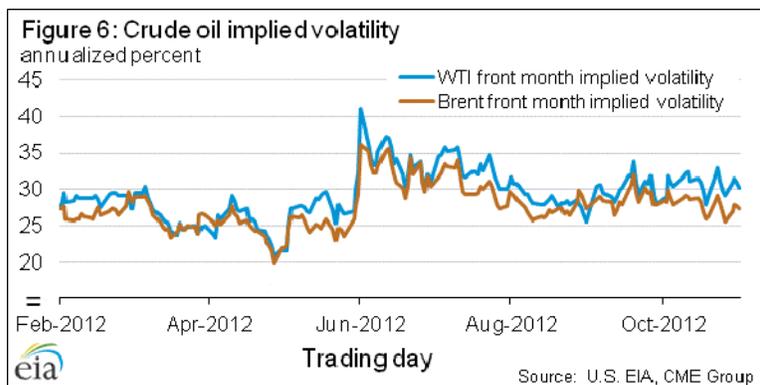


**Crude oil option open interest:** The number of outstanding put options (financial contracts used to profit from or hedge against downward movements in crude oil prices) increased relative to the number of outstanding call options (financial contracts used to profit from or hedge against upward movements in crude oil prices) during October. The ratio settled at 83.9 percent as of November 1, an increase from the 79.2 percent level on October 1 (**Figure 5**). The increased open interest in put options indicates a growing concern among market participants that crude oil prices could

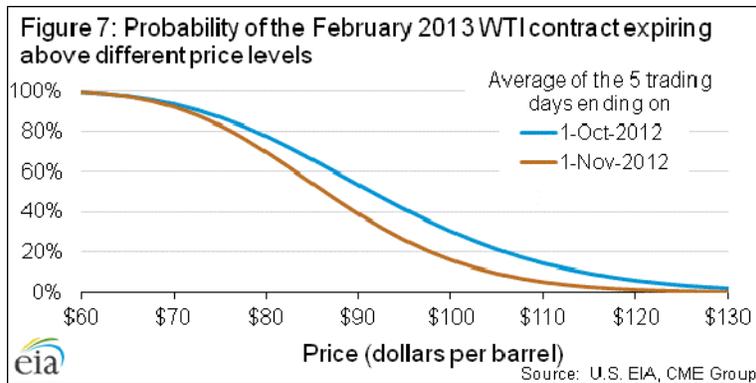
weaken further and they are positioning themselves to hedge against or profit from those potential prices movements.



**Volatility:** Implied volatility for the front month Brent and WTI contracts diverged slightly in October but overall, were relatively unchanged. Implied volatility for the front month Brent contract at 27 percent on November 1 and implied volatility for the front month WTI contract settled at 31 percent (**Figure 6**).

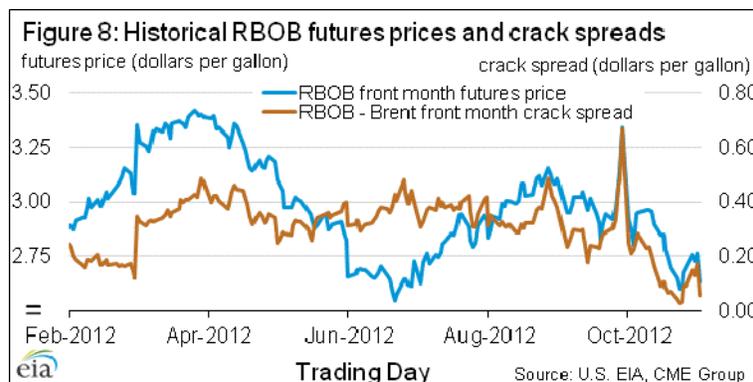


**Market Derived Probabilities:** The probability of the February 2013 WTI futures contract expiring above \$100 per barrel is now 16 percent, a 14 percent decrease from the five-day period ending October 1 (**Figure 7**). Since implied volatility was nearly unchanged, the decrease in price had the largest effect on the decreased probability of exceeding \$100 per barrel at expiration compared to market conditions on October 1. Given the higher level of Brent prices relative to WTI prices, the probabilities that the January Brent contract will exceed specified dollar thresholds are higher.



## Gasoline

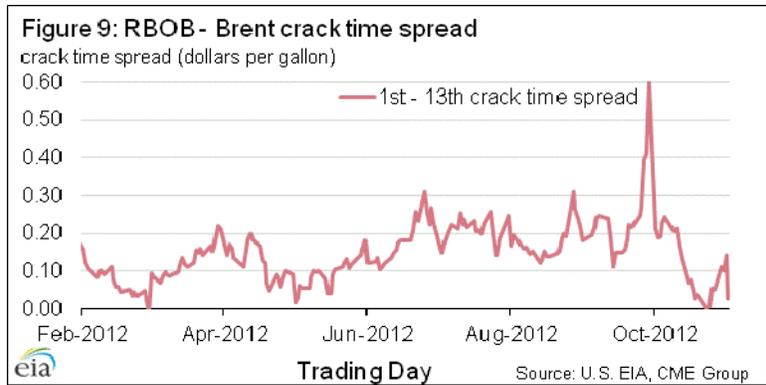
**Prices:** Front month futures prices for Reformulated Blendstock for Oxygenate Blending (RBOB) gasoline for delivery in New York Harbor fell for much of October only to rebound towards the end of the month due to effects from Superstorm Sandy. The sharp decline in the front month price between October 31 and November 1 reflected the transition from November delivery to a December delivery date for the front month contract. Market participants expect that the effects of Sandy on the New York Harbor gasoline market will be largely resolved before December. The contract settled at \$2.63 per gallon on November 1, a drop of \$0.29 per gallon since October 1 (**Figure 8**). The drop in crude oil prices was not solely responsible for the lower gasoline futures prices earlier in the month. The front month RBOB – Brent crack spread settled at \$0.06 per gallon on November 1 after falling to its lowest level since January 2012 of \$0.03 per gallon on October 23.



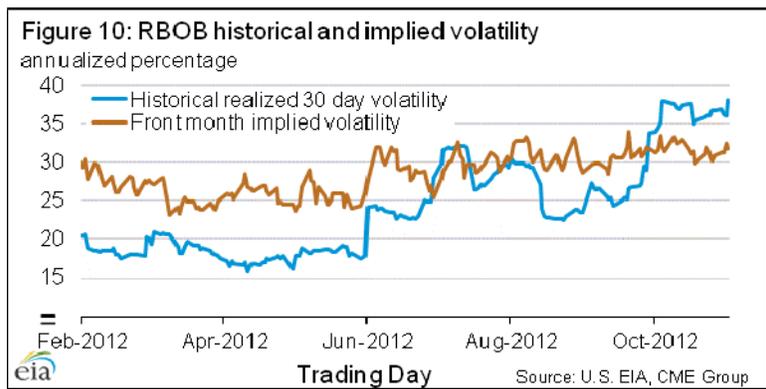
The RBOB-Brent crack time spread is a measure of the amount of backwardation or contango in the gasoline futures curve beyond what exists in the Brent crude oil futures curve. Just prior to Superstorm Sandy's landfall, the 1<sup>st</sup> – 13<sup>th</sup> crack time spread for RBOB was \$0.00 per gallon indicating that RBOB crack spreads were the same for delivery in November 2013 as in November 2012 – that is, the RBOB contract had the same backwardation as the Brent contract (**Figure 9**). In contrast, the RBOB contract was more backwardated than the Brent contract for most of the year (by \$0.21 per gallon on

October 1). This is a sign of easing tightness in the current Atlantic basin gasoline market.

After the storm hit, reports of power outages and delays in restarting some northeast refineries increased the incentives to sell gasoline out of inventories now with the potential to buy gasoline back in the future. As a result, the RBOB contract amount of backwardation over Brent increased somewhat but remained below their levels for most of 2012.

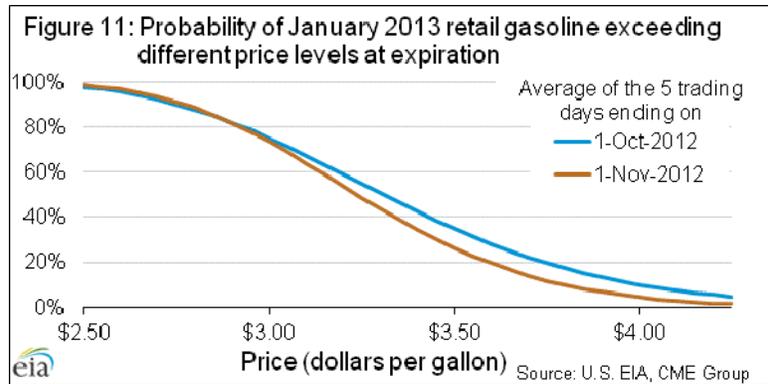


**Volatility:** The increase in historical volatility for gasoline was due to the large price swings seen on the last trading day in September and the first trading day in October. The final day of September was when the October RBOB futures contract expired and an unusually large amount of buying in a relatively thin market caused the price to increase dramatically. The next day, RBOB prices dropped as the November contract became the front month contract. Implied volatility settled at 32 percent on November 1, unchanged from October 1, and historical volatility settled at 38 percent, an increase of 4 percentage points from the beginning of October (**Figure 10**).



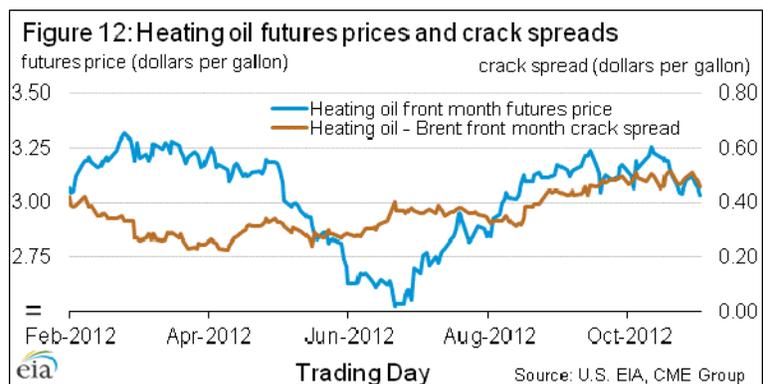
**Market Derived Probabilities:** The February 2013 RBOB futures contract averaged \$2.62 for the five trading days ending November 1 and has a probability of exceeding \$2.85 per gallon (\$3.50 retail) at expiration of approximately 26 percent. The same contract as of the five trading days ending October 1 had a probability of exceeding \$3.50 retail of 35

percent. Lower crude oil prices and a decrease in RBOB crack spreads were the primary contributors to the decrease in the probability of exceeding different price points at contract expiration (**Figure 11**).

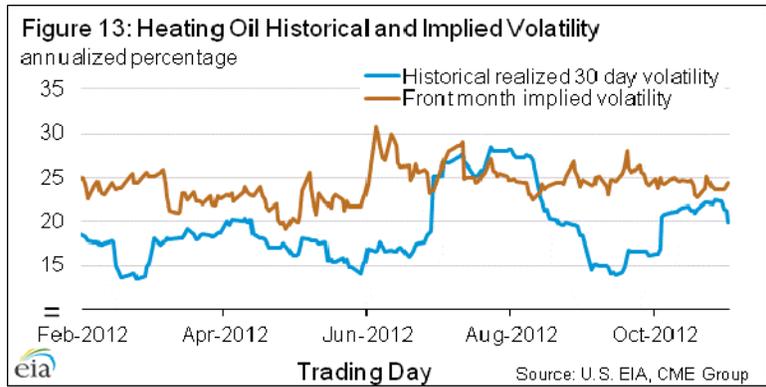


## Heating oil

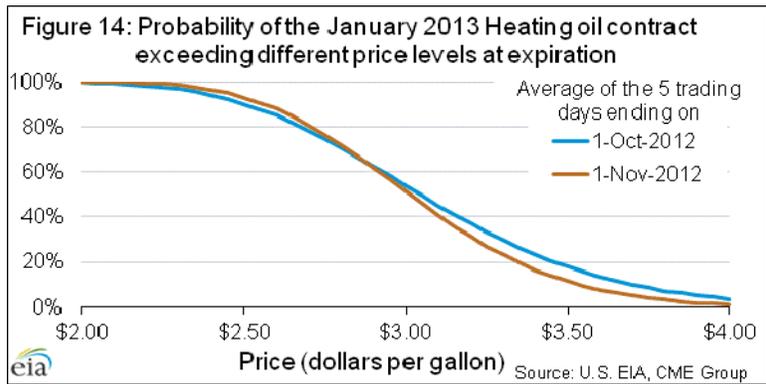
**Prices:** The front month NYMEX futures contract for heating oil continued to track Brent crude oil prices in October. The price for the front month contract settled at \$3.03 per gallon on November 1, a decrease of \$0.10 per gallon since October 1 (**Figure 12**). Over the same time period, the heating oil – Brent crack spread remained unchanged from levels seen one month ago, settling at \$0.46 per gallon on November 1. News of northeast refinery capacity coming back online as well as potential damage to refineries in the northeast as a result of Superstorm Sandy do not appear to have had a large effect on distillate markets as these refineries are configured to produce higher volumes of gasoline. Similarly, heating oil prices and crack spreads were less affected when refineries in the Northeast were idled at the end of last year.



**Volatility:** Heating oil implied volatility settled at 24 percent on November 1, slightly lower than its level on October 1 (**Figure 13**). Historical volatility for the front month heating oil contract increased in the beginning of October but then leveled off in the rest of the month. Historical volatility settled at 20 percent on November 1.



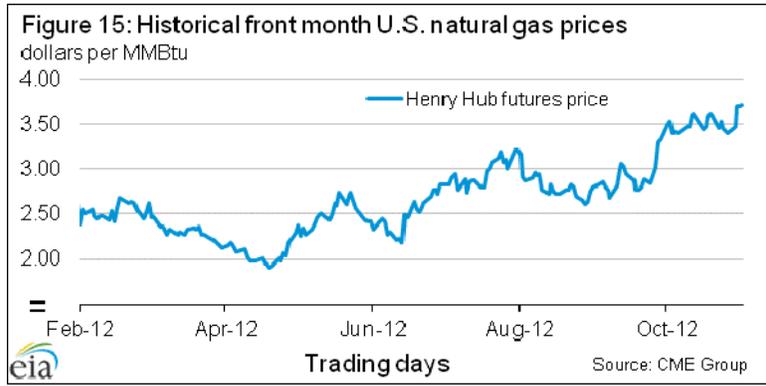
**Market Derived Probabilities:** The heating oil futures contract for February 2013 delivery averaged \$3.03 per gallon for the five days ending November 1, down almost \$0.05 per gallon from October 1, and has a probability of exceeding \$3.50 per gallon at expiration of approximately 11 percent. The same contract as of the five trading days ending October 1 had a probability of exceeding \$3.50 of 18 percent. Lower prices along with shorter time to expiration days were the main contributors to the decrease in probability of the February contract exceeding \$3.50 per gallon (**Figure 14**).



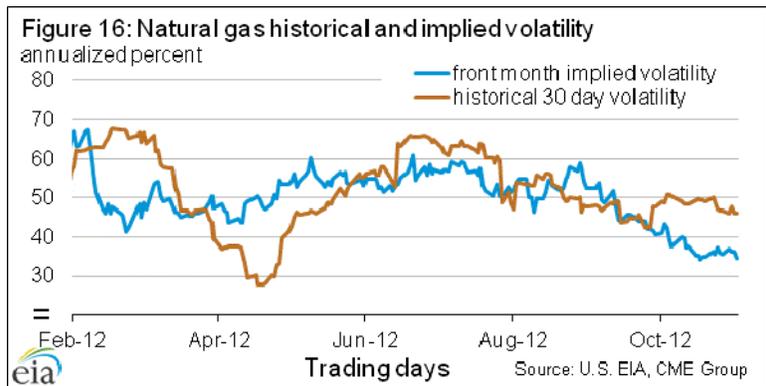
## Natural Gas

**Prices:** The front month NYMEX futures contract price for delivery of natural gas to Henry Hub in Louisiana rose during the month of October, driven primarily by forecasts for cooler seasonal weather. Natural gas prices have responded as forecasters have refined their weather projections with the approach of winter. Natural gas demand in the power sector remains significantly higher than it was a year ago due to unusually high nuclear outages and continued use of gas over coal in many cases. Higher seasonal commercial and residential natural gas demand lent additional upward pressure to natural gas prices at the end of the month. The front month futures contract settled at \$3.70 per MMBtu on November 1, a 6 percent increase from October 1 but still 6 percent lower than this time last year (**Figure 15**). Natural gas storage reached the highest levels

in the EIA’s recorded history, recorded at 7 percent above the five year average on October 25. For more information on natural gas storage, see the EIA [Weekly Natural Gas Storage Report](#).



**Volatility:** Implied volatility for the front month futures contract continued to fall during the month of October, reaching the lowest point so far this year on October 17. Implied volatility settled at 34 percent on November 1, 6 percentage points lower than on October 1. Historical volatility also decreased during the month of October, settling at 46 percent on November 1, 3 percentage points lower than at the beginning of October (Figure 16).



**Market Derived Probabilities:** The probability that the February 2013 contract will settle higher than \$3.50 per MMBtu rose by 9 percentage points from 59 percent to 68 percent when compared to market conditions on the five trading days ending October 1 (Figure 17). The average price over the five trading days ending on November 1 for the February 2013 contract increased by \$0.13 per MMBtu, compared to the five trading days ending October 1.

