

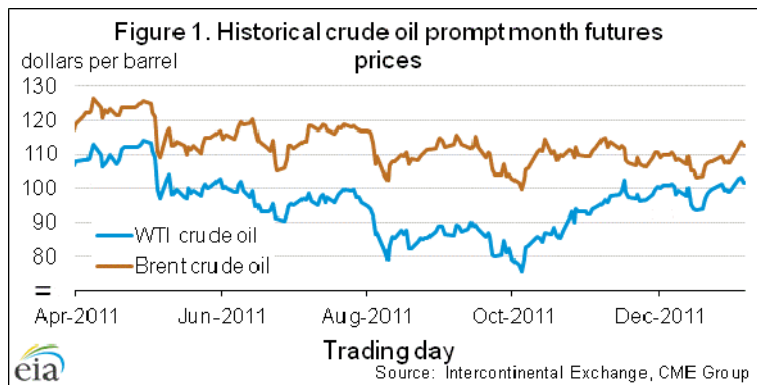


## Short-Term Energy Outlook Market Prices and Uncertainty Report<sup>1</sup>

January 10, 2012 Release

### Crude Oil

**Prices:** Crude oil prices in early January are slightly higher than levels seen one month ago. The front month futures contracts for Brent and West Texas Intermediate (WTI) are \$3.75 and \$1.61 per barrel above their respective closing prices on December 1, 2011 as of January 5, 2012. Both benchmarks continue to trade in the same band that they have been in since coming off their lows in early October. The low and high settlement prices for Brent were \$103.35 and \$113.70 dollars per barrel while WTI traded in a range of \$93.53 to \$103.22 dollars per barrel (**Figure 1**). The brief drop in prices in the middle of December occurred following the decision by OPEC to increase its official production target for the first time since a reduction in the first quarter of 2009 in the wake of the financial crisis.



The the past month saw a variety of news stories and events that one might have expected to both raise and lower prices. On the supply side, Iran's nuclear ambitions have sparked increased sanctions and promises of further action in the future. Iran has responded with military exercises in the Strait of Hormuz, a critical shipping channel for exporting roughly 17 million barrels per day out of the Persian Gulf (see related [Today in Energy](#) article for more information). Nonetheless, increased production in Libya and projections for higher 2012 non-OPEC production could alleviate some upward price pressure on oil prices in 2012. On the

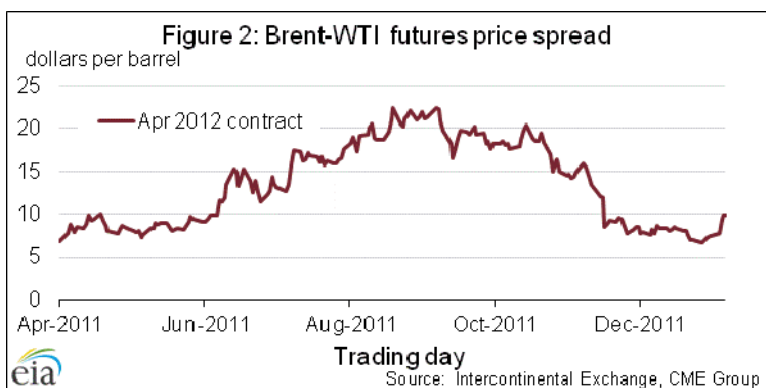
<sup>1</sup> This is a regular monthly companion to the EIA *Short-Term Energy Outlook*.

(<http://www.eia.doe.gov/emeu/steo/pub/contents.html>)

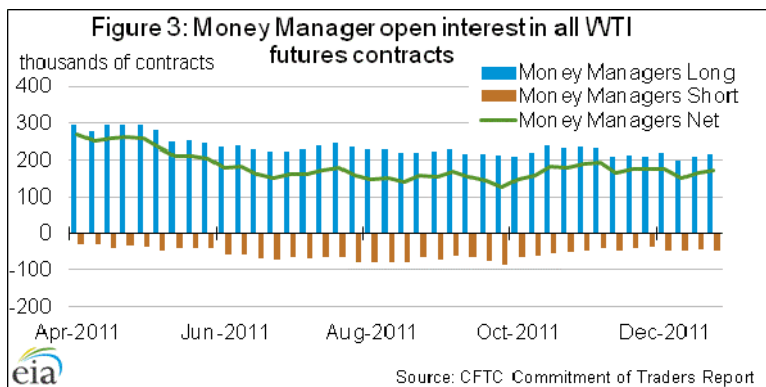
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demand side, weak manufacturing and export data for China, as well as an increased likelihood of a mild recession in Eurozone countries, have put downward pressure on prices. Meanwhile, a potential bullish demand force has come from strong economic reports in the U.S. with 200,000 non-farm jobs added in the month of December and an expanding manufacturing sector.

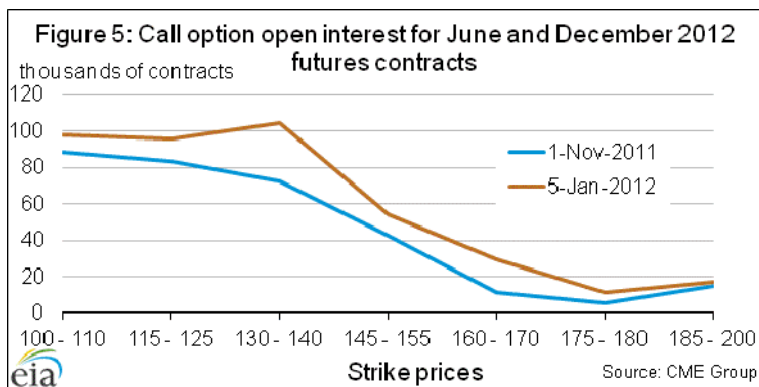
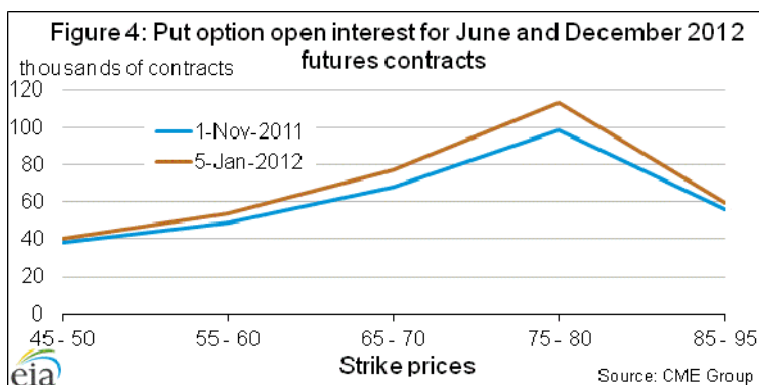
The Brent – WTI spread has held steady from December into January at about \$7 - \$10 per barrel (**Figure 2**). The market perceives this as roughly the cost to transport a barrel of crude oil via rail from Cushing OK to connect with the world waterborne crude oil market on the Gulf Coast. Based on EIA’s semi-annual Working and Net Storage Capacity report, 47 percent of total shell storage capacity for crude oil in Cushing OK is currently vacant. The unused crude oil storage capabilities in the U.S. mid-continent tend to reduce pressure for deeper WTI discounts to world waterborne crude prices in the near future.



**Open Interest:** As reported in the Commodity Futures Trading Commission’s weekly Commitment of Traders report, money managers held a net position of 170,031 crude oil contracts on January 3 (**Figure 3**). This represents a decrease of 3,364 contracts since the last week in November. Money manager open interest remains relatively unchanged from the levels in the fourth quarter of 2011 and well below the highs seen in March and April of last year.

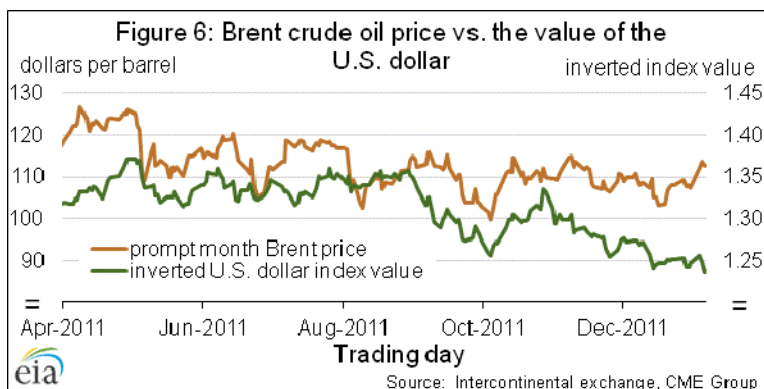


Out-of-the-money option contracts are a way to hedge against or speculate for large price moves. (An out-of-the-money option is a call option with a strike price above the current futures price or a put option with a strike price below the current futures price.) Out-of-the-money put options gain value if the price of crude oil falls while out-of-the-money call options gain value when the price of crude oil increases. Options traded on the June and December futures contracts generally have the highest open interest and are the most liquid compared to options with other expirations further out in time. The liquidity in these options contracts allows for changes in market sentiment to be quickly reflected as opposed to the less liquid contracts that expire in months other than June and December. Below is the open interest on out-of-the-money put options and out-of-the-money call options on the June and December 2012 futures contracts displayed by strike price (**Figures 4 and 5**). Compared to November 1, open interest has increased more on out-of-the-money call options than on out-of-the-money put options. In particular, call options with strike prices from \$130 to \$140 saw the largest increase in open interest since the beginning of November, while those with strike prices from \$160 to \$170 also saw a notably large percent increase in open interest. The rise in open interest could reflect the view by several market participants of prices potentially moving higher in 2012.

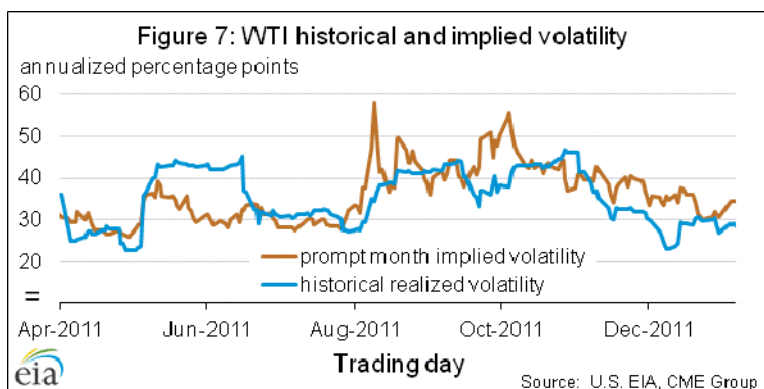


**Crude oil and Currency Markets:** The price of crude oil typically displays a negative correlation with the value of the U.S. dollar and this held true during the fourth quarter of 2011 with the daily price movements of prompt month Brent contract prices and the U.S. Dollar Index (DXY) exhibiting a correlation of -0.53. Even though the overall correlation was unchanged from the

second and third quarters of 2011, a closer look at the relationship shows an apparent slight divergence between the two markets beginning in November. Brent prices and the DXY still exhibited a negative correlation over very short time periods, such as a single day, but both have moved higher together over the longer time horizon of the last two months. Fears surrounding European debt were largely responsible for a 5 percent increase in the value of the U.S. dollar from November 4 to January 5 as investors chose less risky assets denominated in U.S. dollars. Over the same time period, Brent prices stayed relatively flat, increasing by \$0.74 per barrel (Figure 6). This suggests that world financial markets are responding to higher perceived risks in Europe but these same fears are either not translating to potential reductions in future crude oil demand or supply concerns are providing support to the Brent price.

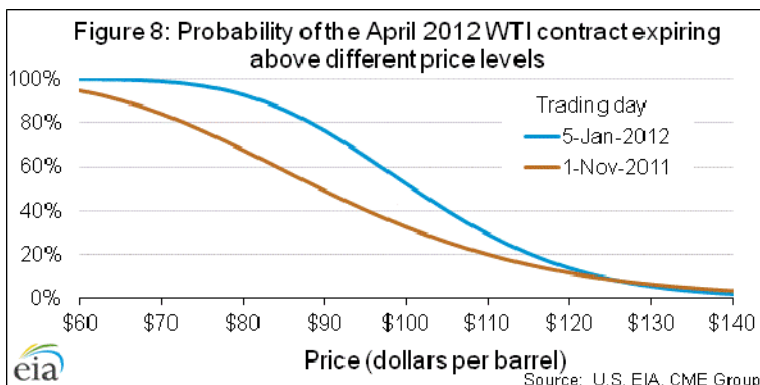


**Volatility:** Historical realized volatility and implied volatility for the front month WTI futures contract have been trending down since the end of October. Implied volatility, calculated from the premiums paid on options contracts, finished 2012 at 30.6 percent, its lowest point since July 27 (Figure 7). Historical realized volatility, which is calculated from daily price movements over the previous 30 trading days, hit its lowest level of 23.8 on December 8, 2011. It then moved higher following the 5 percent single day drop in the price of the front month WTI contract after OPEC announced changes to its production quotas.



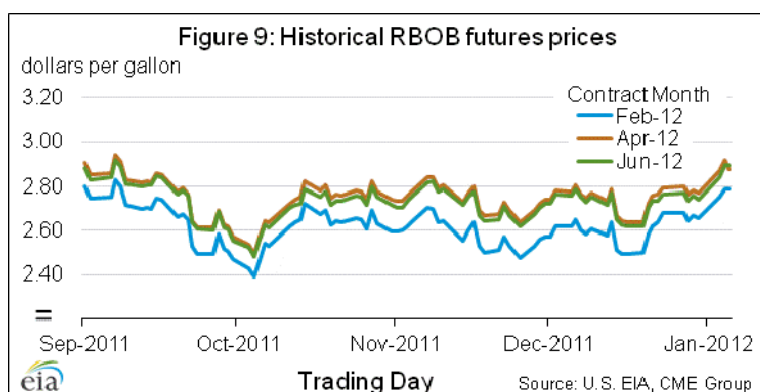
**Market Derived Probabilities:** The price of crude oil for April delivery has increased by \$10 per barrel since November 1 and implied volatility for that futures contract has decreased by 4.7 percentage points. While the chance of exceeding prices below and slightly above current

prices increased, the reduced level of implied volatility and less time to expiration have cancelled out the higher futures contract prices and left the probabilities of the contract expiring at prices above \$120 fairly flat. The probability of the April 2012 futures contract expiring above \$110 per barrel is now 29 percent, a 9 percentage point increase from November 1 (**Figure 8**). These probabilities are based on the cumulative normal densities derived from market expectations using futures and options prices. (See Appendices I and II of EIA’s October 2009 *Energy Price Volatility and Forecast Uncertainty* article for discussion on how these probabilities are derived.)



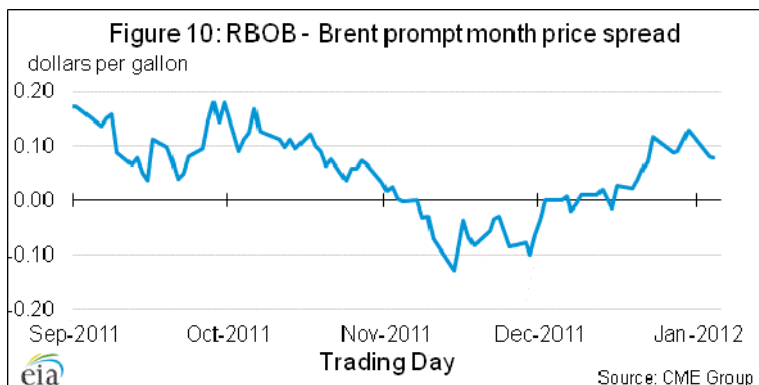
## Gasoline

**Prices:** New York Harbor Reformulated Blendstock for Oxygenate Blending (RBOB) prices increased towards the end of December with the average prompt month price from December 1 through January 5 up \$0.04 per gallon from the November average (**Figure 9**). Gasoline for delivery in April and June are consistently higher than for gasoline for February delivery. This pattern follows the usual trend of prices for summer RBOB contracts being higher than winter contracts due to seasonal differences in fuel formulations and the level of gasoline demand.

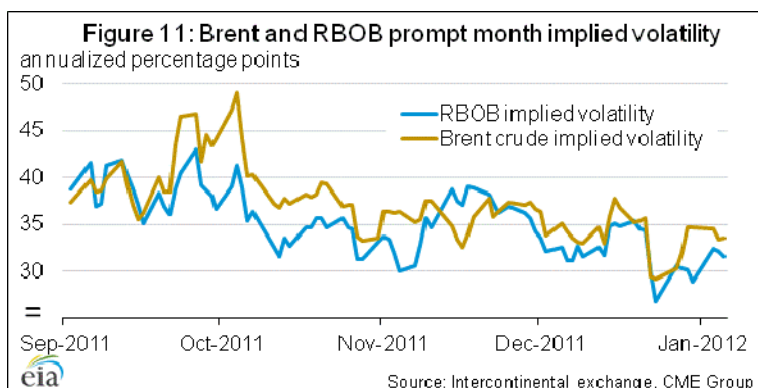


In contrast to RBOB, Brent crude prices decreased over the month of December, averaging \$108.41 from December 1 through January 5, down from \$110.44 in November. The crack spread (the gasoline prompt month price minus the crude benchmark prompt month price) is positive again after being below zero for much of November and December (**Figure 10**). The 4-week average U.S. finished gasoline product supplied (a measure of consumption) is 2 percent

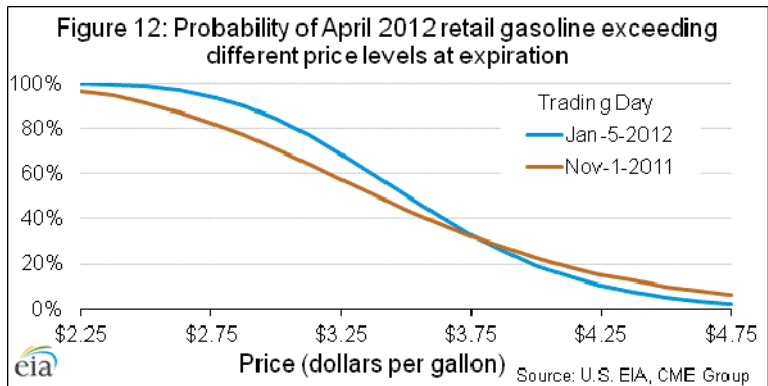
above the November average; the increase in apparent consumption is one factor pushing up the crack spread.



**Volatility:** Market expectations of uncertainty in RBOB prices are reflected in the pricing and related implied volatility of options traded on futures contracts. RBOB implied volatility for the month of November generally tracked Brent implied volatility, although the two diverged slightly towards the end of the month (**Figure 11**). Both RBOB and Brent implied volatility are currently below 35 percent, as compared to levels in the 40 to 50 percent range earlier in the fall.

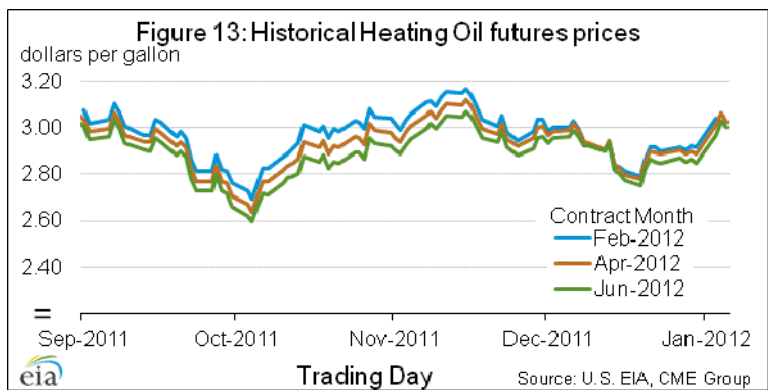


**Market Derived Probabilities:** The April 2012 RBOB futures contract price closed at \$2.88 on January 5 and has a probability of exceeding \$2.80 per gallon (\$3.50 retail) at expiration of approximately 50 percent. The same contract as of November 1 had a probabilities of exceeding \$2.80 (\$3.50 retail) of 44 percent. These probability increases reflect a combination of higher prices, relatively unchanged implied volatility and less time to expiration (**Figure 12**).

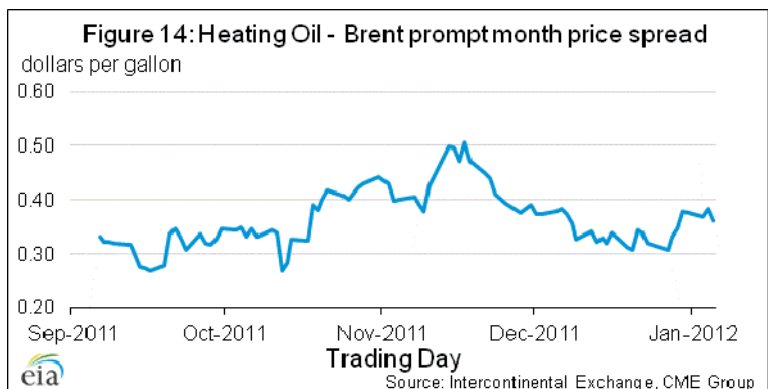


### Heating Oil

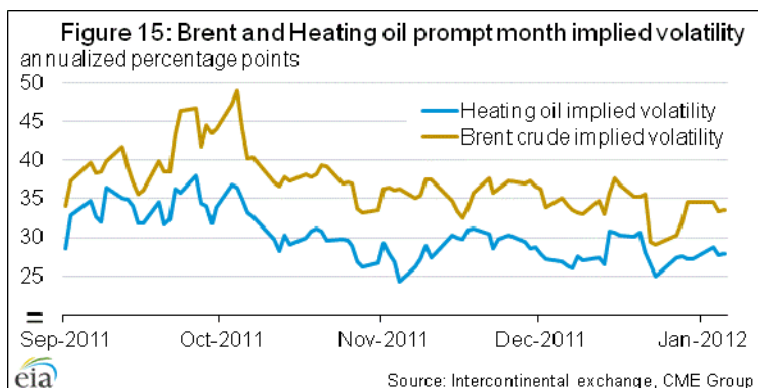
**Prices:** After a brief decrease in the beginning of December, heating oil prices have returned to near-seasonal highs, with prompt month contracts settling higher than contracts further out on the curve. Average prompt month prices for December 1 through January 5 were \$2.93, down from \$3.06 in November (**Figure 13**).



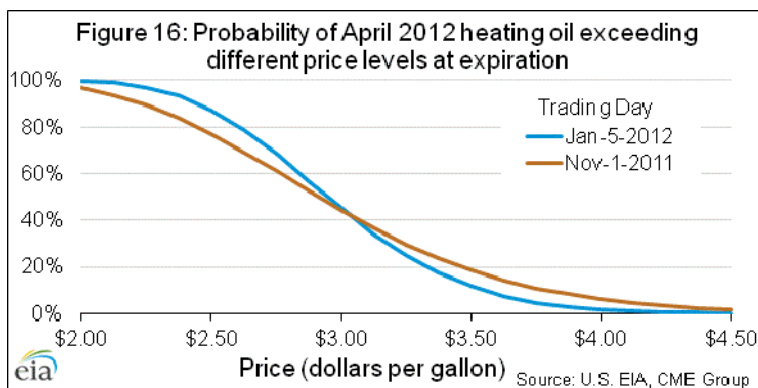
The 4-week average of heating oil and diesel fuel supplied to U.S. markets was down 15 percent at the end of December relative to its seasonal peak at the end of October. The heating oil crack spread (prompt heating oil minus prompt Brent) in December averaged \$0.35, down \$0.08 from November (**Figure 14**).



**Volatility:** Market expectations of uncertainty in monthly average heating oil prices are reflected in the pricing and related implied volatility of futures options contracts. Heating oil implied volatility has begun to stabilize in the second half of December after a dip mid-month, and continues to be below Brent implied volatility (**Figure 15**).



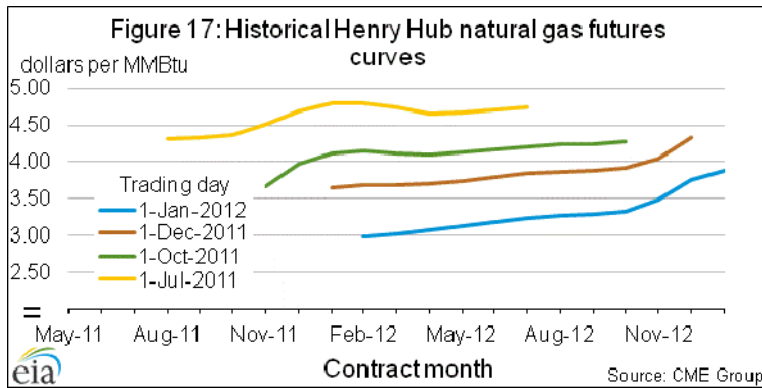
**Market Derived Probabilities:** The April 2012 heating oil futures contract price settled at \$3.02 on January 5 and has a probability of exceeding \$3.50 per gallon at expiration of approximately 12 percent. The same contract as of November 1 had a probability of exceeding \$3.50 per gallon of 18 percent; this decrease reflects lower average heating oil prices, relatively unchanged implied volatility and less time to expiration for the futures contract (**Figure 16**).



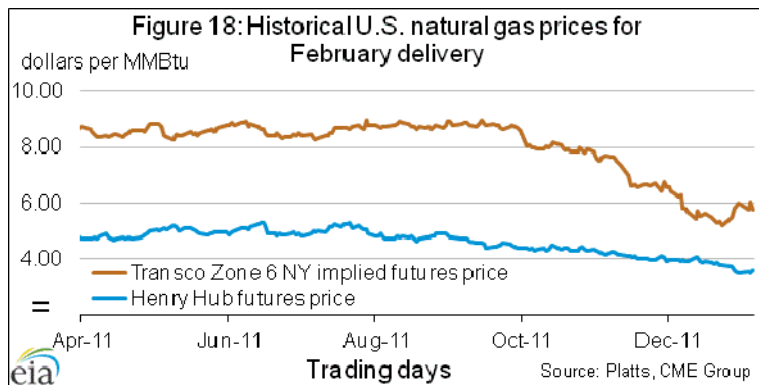
### Natural Gas

**Prices:** Natural gas prices have continued to fall during the month of December as warmer than expected weather across the U.S., especially in the northeast, has lowered demand for natural gas for heating purposes (**Figure 17**). During the month of December, 359 bcf of natural gas was drawn from inventories, which is 149 bcf less than the five year average inventory reduction in December.

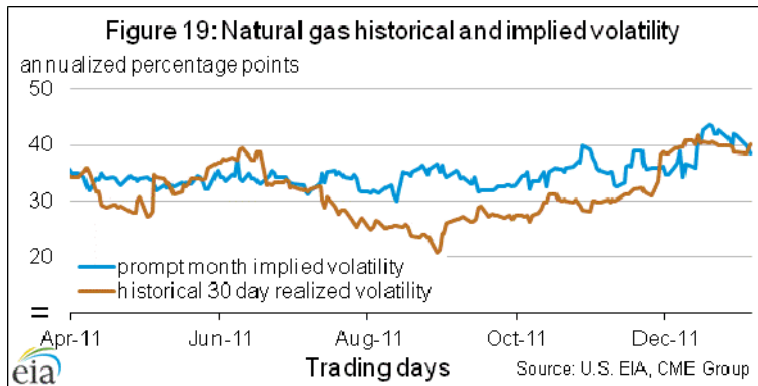




Futures contracts on natural gas are for delivery of the commodity to Henry Hub in Louisiana, the main pricing point for natural gas in the United States. The Transco Zone 6 NY basis swap is another financial instrument that prices future deliveries of natural gas by trading the differential between Henry Hub and Transco Zone 6 NY a pricing point for delivery of gas into New York City. An implied futures price for delivery of natural gas to this east coast point can be constructed by adding the daily closing value of the swap to the closing price of the NYMEX futures price. Since November 1, natural gas in the mid-Atlantic region for delivery in February has decreased by \$1.835 per MMBtu (**Figure 18**).



**Volatility:** Historical volatility for the front month Henry Hub futures contract moved higher at the beginning of December and remained in a narrow range thereafter. On January 5, 30 day realized volatility was 40 percent. Implied volatility for the natural gas contract nearest to expiration moved higher in December reaching its highest point since January 6, 2011 of 43 percent on December 23 (**Figure 19**).



**Market Derived Probabilities:** Since November 1, the price for the April 2012 natural gas futures contract has fallen by \$0.92 per MMBtu. Although implied volatility increased by 7 percentage points during that time, the lower price levels and closer time to expiration had a much larger effect on reducing the chance for higher natural gas prices in the future. The probability that the April contract will settle higher than \$4.00 per MMBtu fell by 37 percentage points from 45 to 8 percent when compared to market conditions on November 1 (**Figure 20**). These natural gas probabilities are cumulative normal densities generated using market-based inputs provided by futures and options markets, i.e., futures prices and implied volatilities. (See Appendices I and II of EIA’s October 2009 *Energy Price Volatility and Forecast Uncertainty* article for additional discussion).

