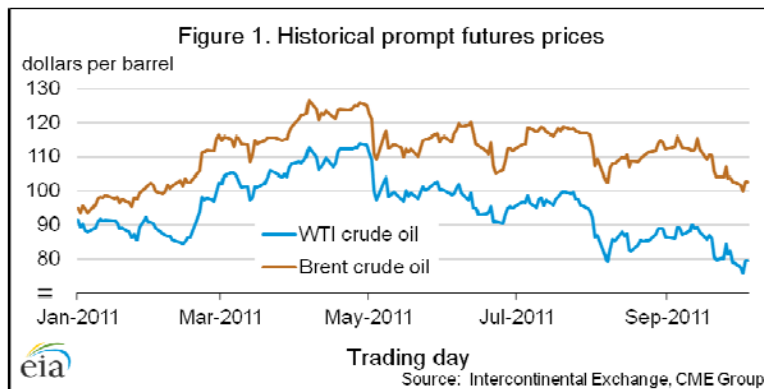




Short-Term Energy Outlook Market Prices and Uncertainty Report¹

October 12, 2011 Release

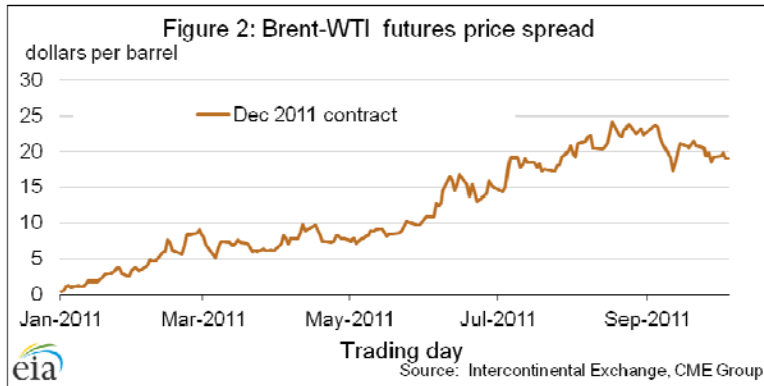
Crude Oil Prices. World crude oil prices generally moved downward during the month of September, with Brent crude oil falling over \$12 during the month and West Texas Intermediate (WTI) a slightly lower \$9 (**Figure 1**). Economic concerns and a continued debt crisis in Europe lowered price levels across multiple asset classes; physical oil prices, in turn, were affected by lower expectations about near and mid-term world oil demand growth. The balance between supply and demand has been the most bearish for the midcontinent crude, WTI, for most of this year; on the final trading day in September, it closed at \$79.20, \$12 lower than it began the year. Brent, however, even with the recent declines, is still around \$8 higher year-to-date. This benchmark price divergence has been one of the major crude oil stories of the year, and it remains elevated, though lower than the August highs (**Figure 2**).



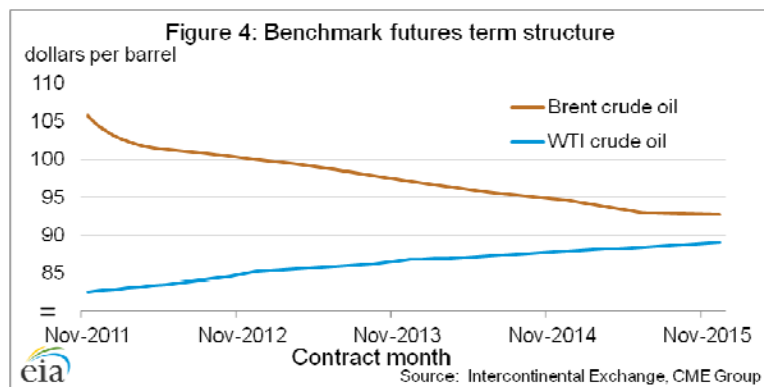
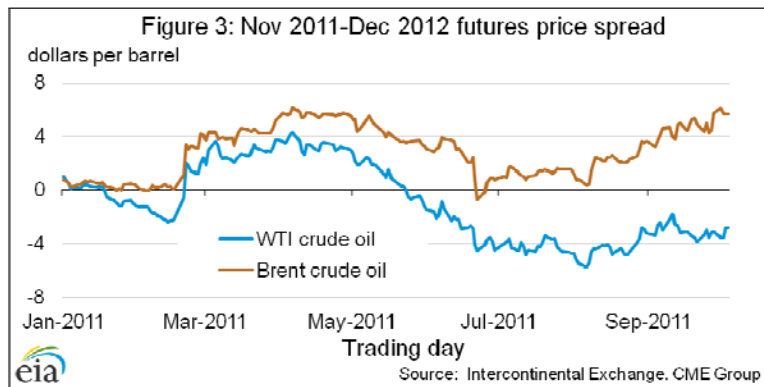
¹ This is a regular monthly companion to the EIA *Short-Term Energy Outlook*.

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

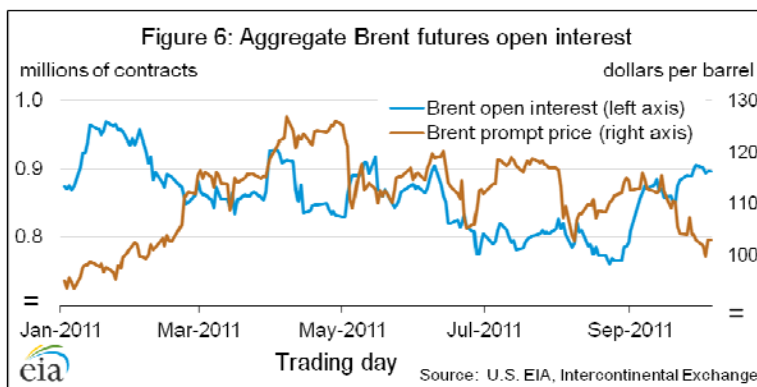
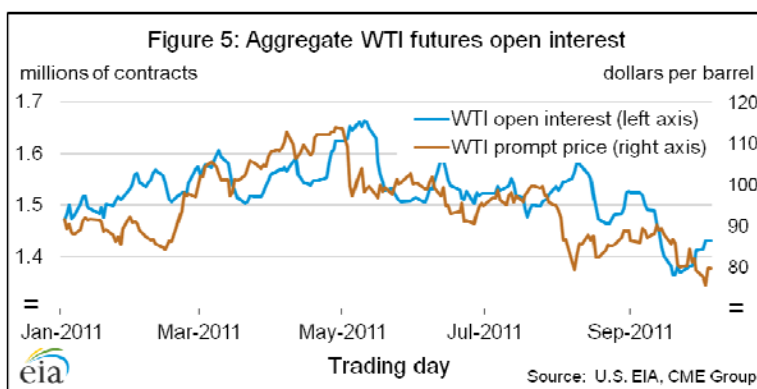
Contact: Richard Haynes (Richard.Haynes@eia.gov)



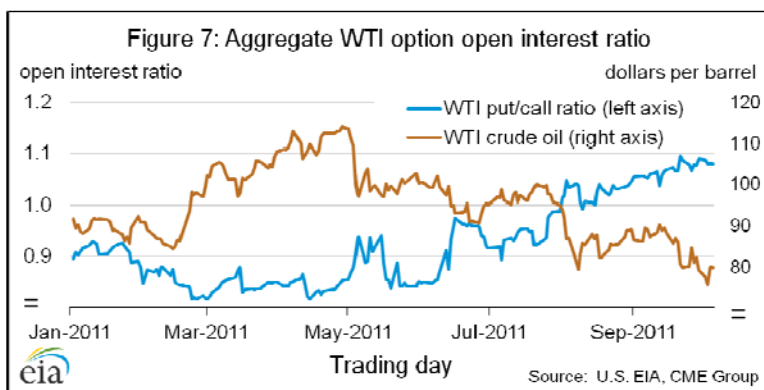
The current relative tightness of the Brent market versus WTI can be seen in the price difference between futures contracts with different expirations (**Figure 3**). As of the end of September, Brent crude to be delivered in November of this year was just over \$6 more expensive than that scheduled to be delivered at the end of 2012. In contrast, near term deliveries of WTI crude oil are somewhat cheaper than that for those more deferred. The futures strip suggests an anticipated decrease in the spread between WTI and Brent prices over the next few years (**Figure 4**). In fact, cheaper deferred Brent and more expensive deferred WTI has held true for much of 2011, but so far this year the market has seen little to no closing of the spread, countering the shape of the futures curve. There is no general consensus in forecasts for the relative price of Brent and WTI; as of this month's Short Term Energy Outlook, EIA does not anticipate a large shift to WTI/Brent convergence over the next 12 months.



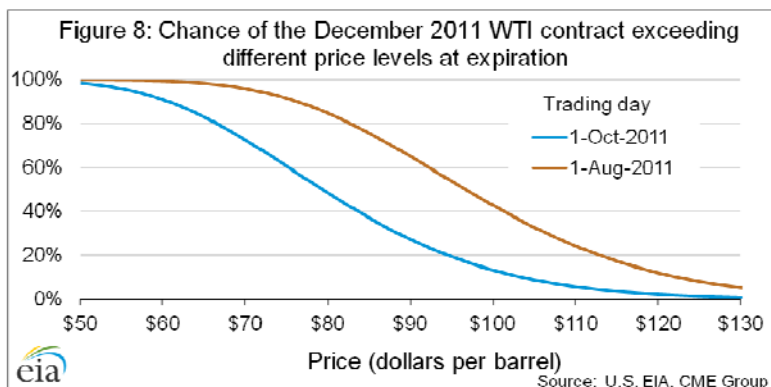
The financial market for WTI is the most widely traded of world crude oil contracts; for much of 2011, there have been over 1.5 million futures contracts outstanding, each representing 1,000 barrels of crude oil. The widening differential between WTI and other crude oil benchmarks has made the WTI contract less representative in markets beyond the U.S. midcontinent. During the most recent two months, the market saw a decrease in trading interest in the WTI contract, with open interest falling from over 1.5 million contracts to under 1.4 million as of the middle of September (**Figure 5**). In contrast, during this same period open interest for Brent futures increased from 800 thousand to 900 thousand contracts (**Figure 6**). It should be noted, however, that the trend of market interest in the two benchmarks during the first half of the year was reversed, so these recent trends may be temporary.



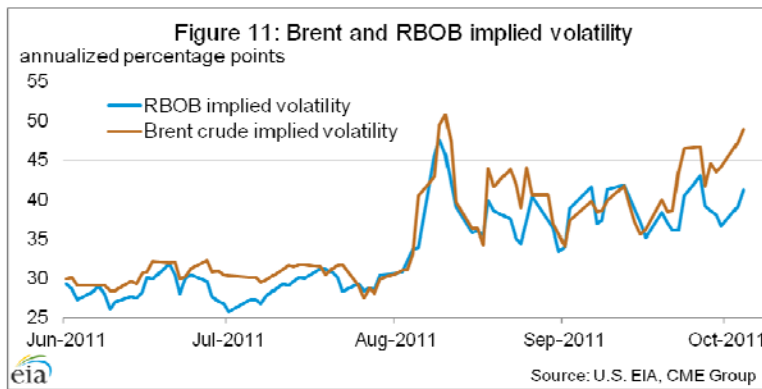
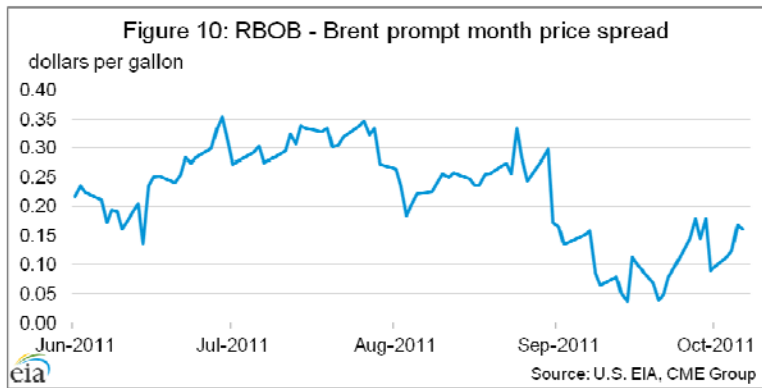
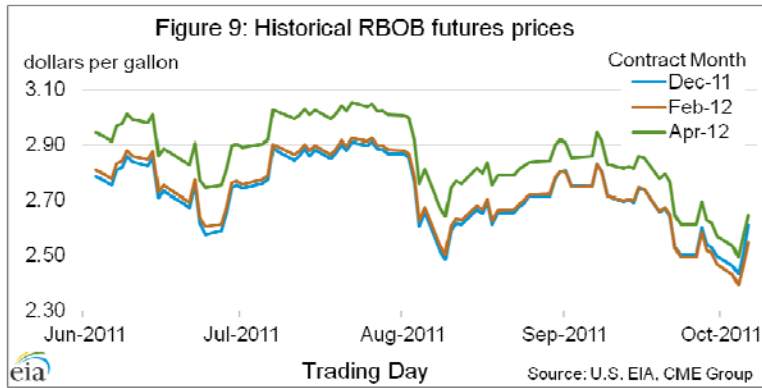
Open interest in the options market is still dominated by the WTI benchmark. The total number of WTI option contracts as of the end of September stood at almost 4 million, almost ten times higher than for Brent. One commonly used indicator for market sentiment is the “put-call ratio,” the ratio of open put contracts, which increase in value as prices fall, to call contracts, which gain value as prices rise. An increase in the relative number of put contracts can often signal interest in protecting against price downside. Since May of this year, the put-call ratio has been on an uptrend, coinciding with a general downtrend in price (**Figure 7**).



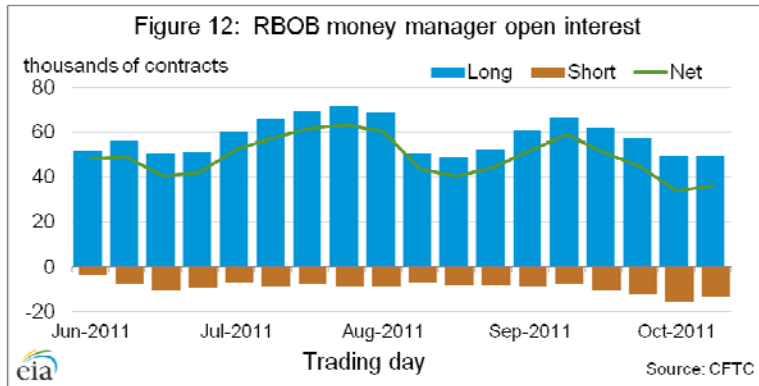
With implied volatility of options at the beginning of October significantly higher than two months ago (47 percentage points versus 31), the chance of a given percentage change in price has increased. However, with WTI prices having fallen almost \$20 per barrel during the same period, the probability that the WTI futures contract for December delivery will be above \$90 per barrel was only 27 percent, far lower than the 65 percent level seen at the beginning of August for the same contract (**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.)



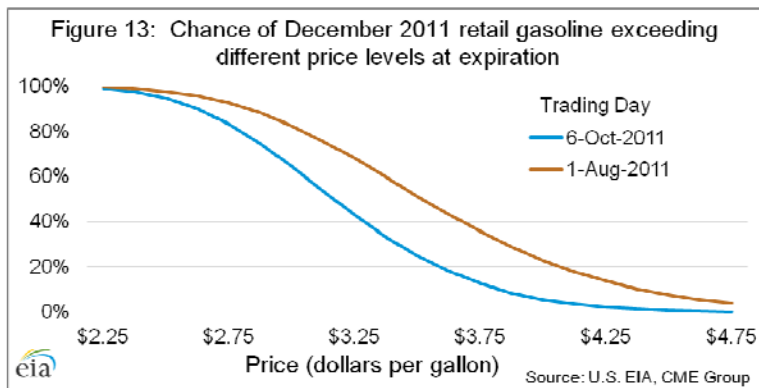
Gasoline. New York Harbor Reformulated Blendstock for Oxygenate Blending (RBOB) prices decreased steadily through the month of September as the summer driving season came to an end (**Figure 9**). Prompt month gasoline prices for the month of September were down \$0.14 per gallon from August to an average of \$2.73; Brent crude, which has been mirroring product prices, averaged just under \$109 per barrel for September, down approximately \$1 per barrel from the August average. The crack spread (the gasoline prompt month price minus the crude benchmark prompt month price) fell substantially from summer levels, averaging \$0.11 per gallon in September compared to \$0.25 per gallon in August and \$0.31 per gallon in July (**Figure 10**). The implied volatilities of Brent and RBOB tracked each other closely for most of September but have begun to diverge in the first days of October (**Figure 11**).



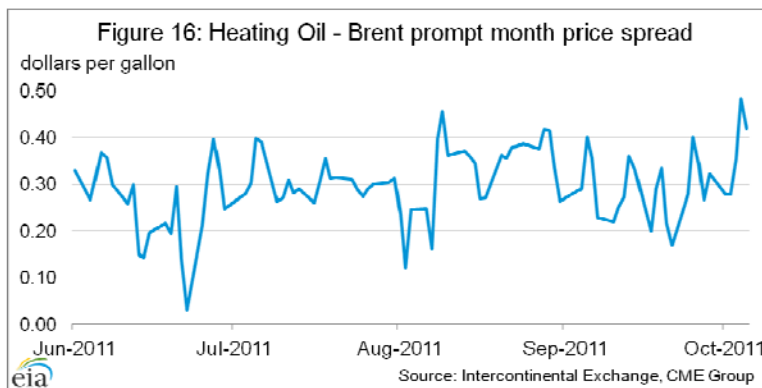
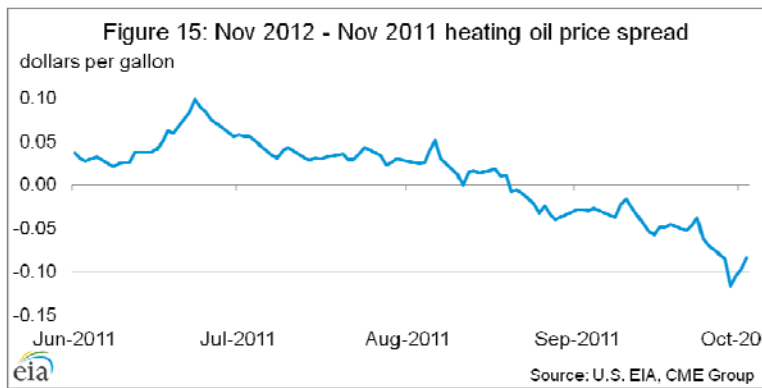
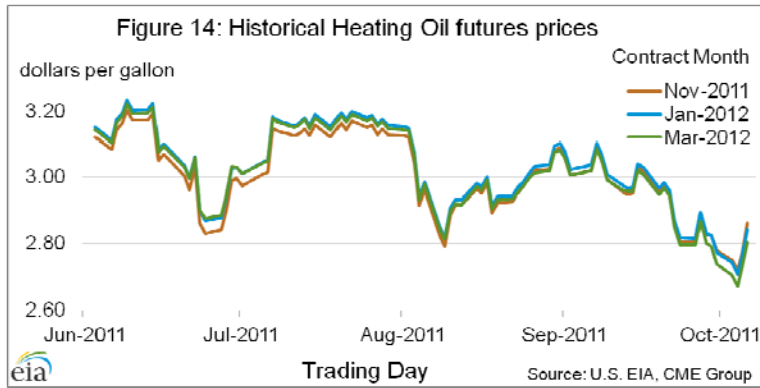
Along with decreasing spot and futures gasoline prices in September, long positions held by money managers in gasoline futures contracts fell 25 percent from just under 67,000 contracts for the September 6 report date to under 49,700 for October 4 (**Figure 12**). Over the same time period net positions fell from 59,000 contracts to just over 36,000 contracts. This reduction of long interest by money managers over the month of September may indicate lowered expectations for increasing prices as gasoline demand falls going into the winter, although the trend did reverse in the last week as prices increased slightly.



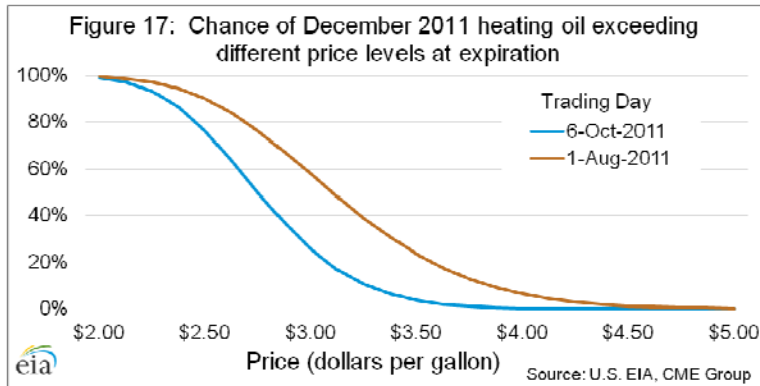
RBOB futures contracts for December 2011 delivery settled on October 6 at \$2.61 per gallon. The probability the RBOB futures price will exceed \$2.80 per gallon (consistent with a U.S. average regular gasoline retail price above \$3.50 per gallon) at expiration is approximately 20 percent, down from approximately 53 percent on August 1 (**Figure 13**). Moving further out on the curve, the RBOB futures contract price on October 6 for February 2012 came in at \$2.54 and has a probability of exceeding \$2.80 per gallon (\$3.50 retail) at expiration of approximately 24 percent due to increased time to expiration.



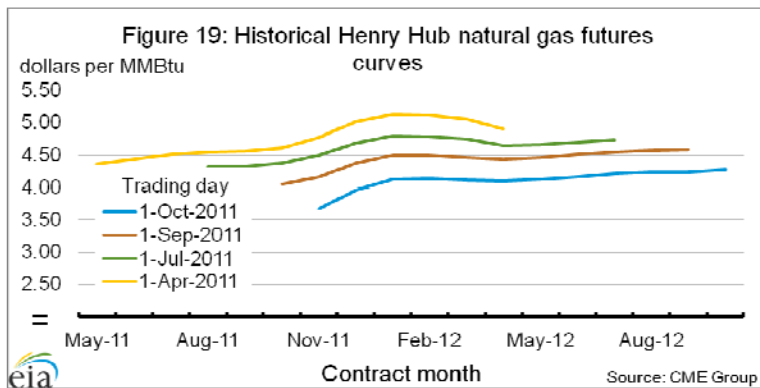
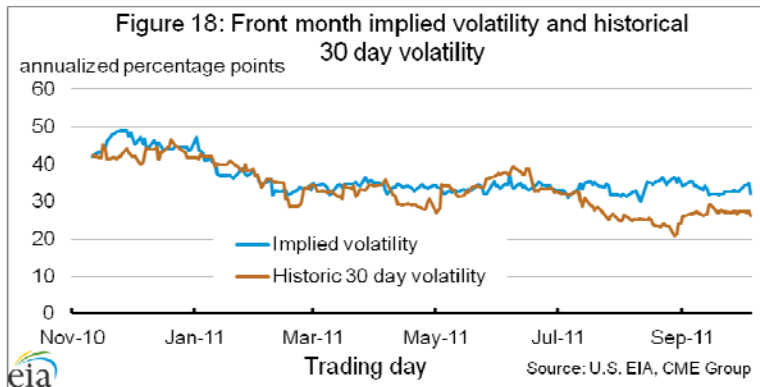
Heating Oil. Heating oil prices followed a similar trajectory as crude, decreasing for the month of September (**Figure 14**). Prompt month heating oil futures contracts averaged \$2.94 for the month of September, down from averages of \$2.97 for August and \$3.12 for July. Continued price decreases are currently incorporated in longer term expectations of the heating oil contract price, as seen by the fact that heating oil for delivery in November of next year is cheaper than that for next month (**Figure 15**). Uncertainty regarding economic conditions appears to be weighing down heating oil futures prices further out the curve. Unlike gasoline, heating oil crack spreads (prompt heating oil minus prompt Brent) remained at nearly the same level as the past few months, averaging \$0.32 per gallon in September (**Figure 16**).



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 futures contracts for December 2011 delivery settled on October 6 at \$2.86 per gallon. The probability the futures price will exceed \$3.00 per gallon at expiration is approximately 26 percent, down sharply from 59% on August 1 (**Figure 17**). Looking further out on the curve to the end of heating oil season, the heating oil futures contract price on October 6 for February 2012 came in at \$2.74 and has a probability of exceeding \$3.50 per gallon at expiration of approximately 27 percent.



Natural Gas. The volatility for both actual price movements (realized volatility) and anticipated price movements for the front month natural gas futures contract were fairly flat during the month of September, trading in narrow ranges of 4.8 and 3.8 percentage points, respectively (**Figure 18**). This is in sharp contrast to the high volatility we saw during September in the crude oil and equities markets. The U.S. natural gas market continues to be dominated by increased shale production and the market’s expectation of abundant future domestic supplies (**Figure 19**).



The price of the futures contract for March 2012 delivery of natural gas fell by \$0.45 per MMBtu from September 1 to October 6. With implied volatility remaining relatively unchanged at 32.1

percent, this price drop reduced the chance of natural gas rising above certain price points by the end of winter. The probability that the March contract will exceed \$5.00 per MMBtu at contract expiration fell by 18 percentage points from 31 to 13 percent when compared to market conditions in August (**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).

