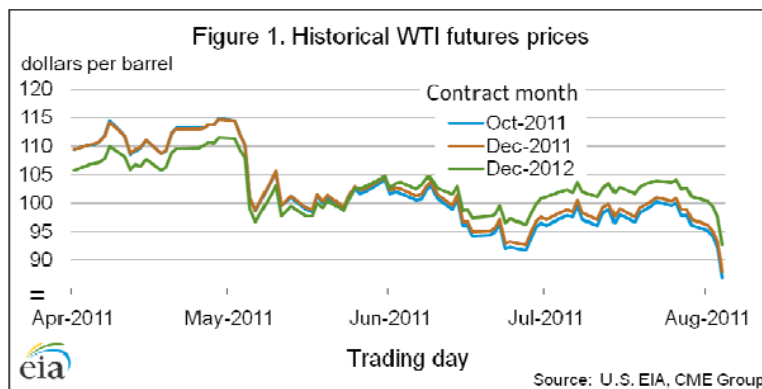




Short-Term Energy Outlook Market Prices and Uncertainty Report¹

August 9, 2011 Release

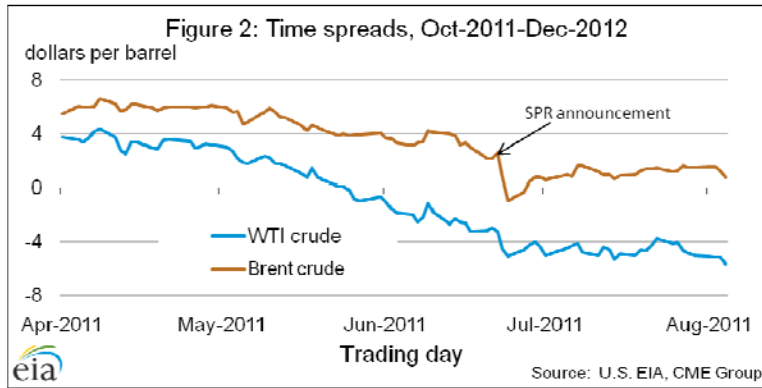
Crude Oil Prices. West Texas Intermediate (WTI) crude oil front month futures prices remained in a tight range for the month of July, rising from a low of \$94.94 at the beginning of the month to just under \$100 on July 22 (**Figure 1**). However, after downward revisions to first half U.S. GDP, released on July 29, WTI prices fell dramatically to settle at \$86.63 on August 4. The first quarter U.S. growth estimate was cut sharply to a level of 0.4 percent by the Department of Commerce, well under both the economist survey expectations and the previous estimate of 1.9 percent. The same report also provided an initial GDP growth estimate of only 1.3 percent in the second quarter. The resulting drop in oil prices was global, with the Brent prompt month price falling almost \$10 from its beginning of the month level to \$107.64. This price drop was not isolated to just the front portion of the futures curve; the spread between the price for October 2011 delivery minus the price for December 2012 delivery remained relatively unchanged during the last month in spite of the large price changes for individual months (**Figure 2**). Market expectations of extended weaker prices, then, continue through at least the end of next year.



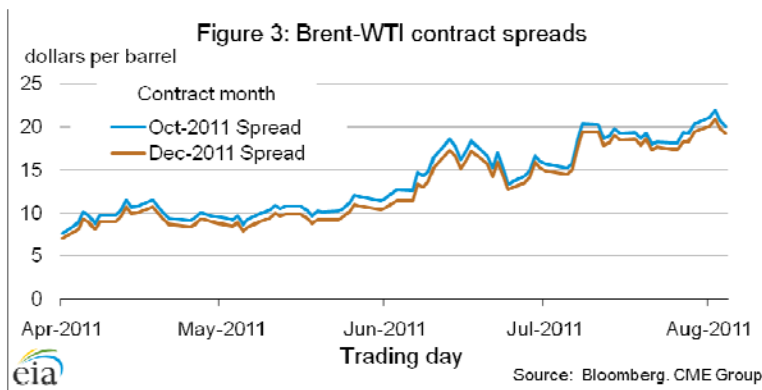
¹ This is a regular monthly companion to the EIA *Short-Term Energy Outlook*.

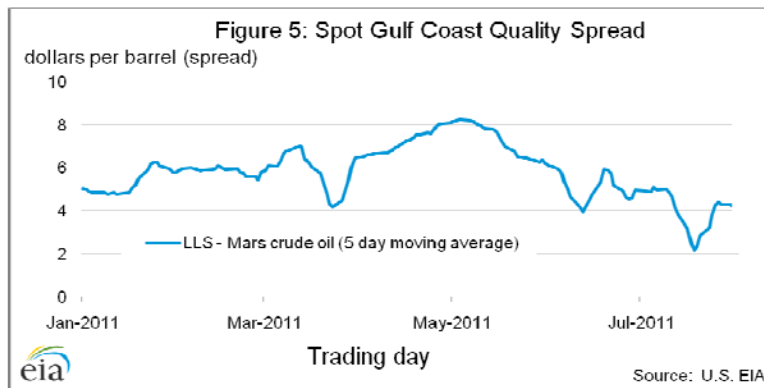
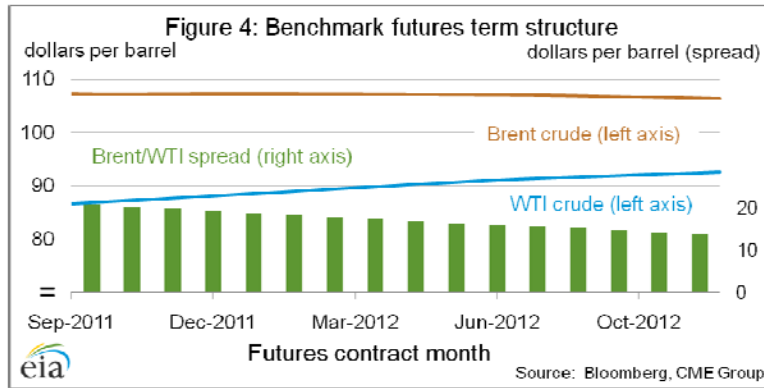
(<http://www.eia.doe.gov/emeu/steo/pub/contents.html>)

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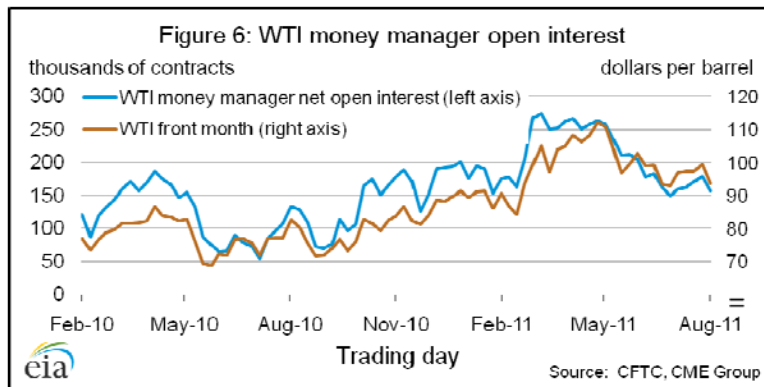


Prices spreads between WTI and other crude benchmarks continued to rise, with the spread between WTI and Brent for the October futures contract increasing from under \$16 at the beginning of July to over \$20 by month's end (**Figure 3**). In contrast to strong supply at the WTI delivery point, Brent has experienced recent supply disruptions, with cargo delays and pipeline maintenance in the last month. Some relief for this divergence between crude benchmark pricing does appear in market prices for deliveries near the end of 2012, but even then the differential continues to remain over \$10 (**Figure 4**). Crude oil quality spreads in the Gulf Coast have weakened from their May highs, after the U.S. Strategic Petroleum Reserve (SPR) release announcement on June 23 and the beginning of deliveries in the last few weeks (**Figure 5**). The SPR release came in the form of light sweet barrels in the domestic market, a potential market substitute for the popular light sweet crude benchmark of Louisiana Light Sweet (LLS). Its value, relative to the heavier Gulf Coast Mars crude oil, has fallen over \$4.00 since May of this year.



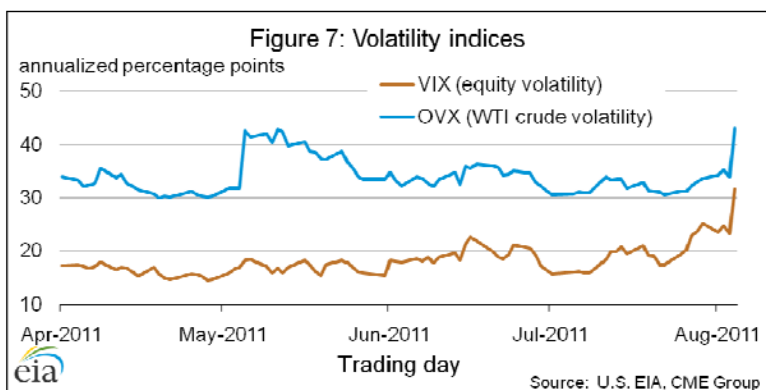


Market participants within the money manager category, which includes entities such as hedge funds, appear in aggregate to have reversed their outlook in recent weeks with increases in net long futures positions in the WTI market after several months of reductions. These net positions, however, fell again in the report on August 2 with the recent rising market uncertainty (**Figure 6**). Levels remain, however, in the range seen at the beginning of the year, before the start of the unrest in the Middle East and North Africa.

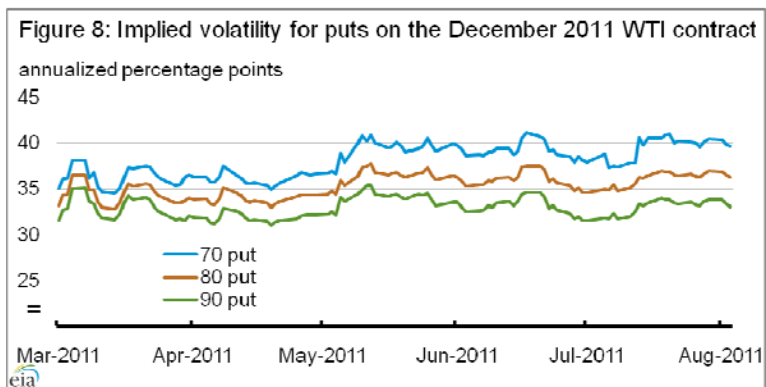


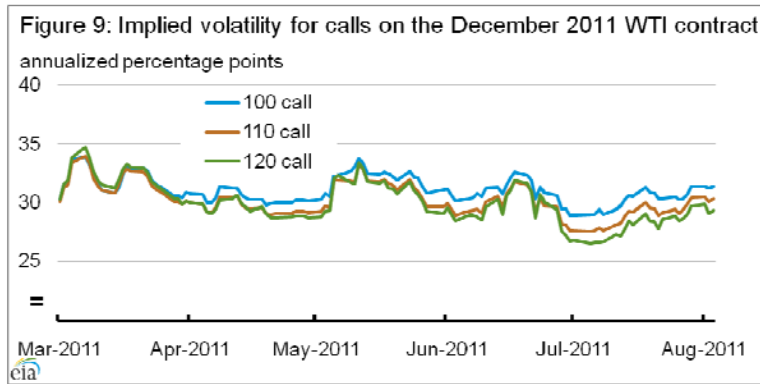
Traditionally, a negative relationship exists between movements of oil futures prices and the implied volatility levels of those futures. During periods of price drops there is a tendency for implied volatility to rise. This trend played out in the first week of August, with oil volatility

levels, measured by CME Group’s volatility index, rising from near post-Libya lows (about 30 percentage points) at the end of July to over 40 percentage points in the first week of August (Figure 7). Volatility levels between crude oil and equities tracked well together with the anticipation of a broad reduction in growth expectations, and prices have seen similar levels of correlation.

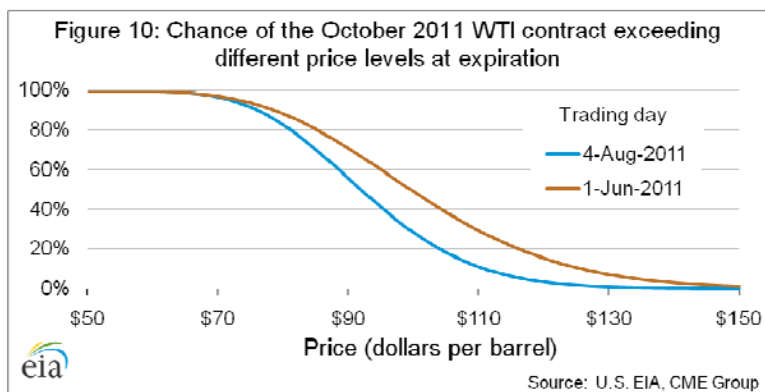


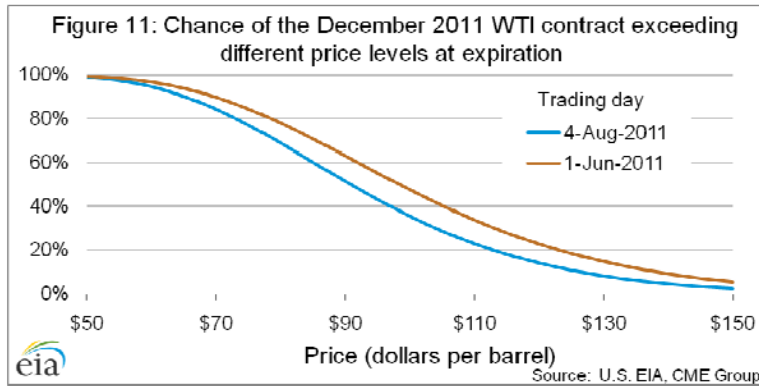
The implied volatility for crude oil that is most frequently quoted is a weighted average of implied volatilities calculated from call and put options on the front month futures contract with near the money strike prices. This is commonly known as the “at the money implied volatility”. Implied volatility, however, can also be calculated individually for options on many futures contracts and at different strike prices (Figures 8 and 9). Generally speaking, out of the money put options often have higher implied volatilities compared to out of the money call options in markets where financial investors are interested in upside exposure. Often this upside exposure will be hedged using puts, derivatives which increase in value with price decreases. The implied volatilities for call options on the December WTI futures contract are lower than the highs set in May, with larger than normal decreases at the end of June; however, this same drop was not experienced by put options which remain close to their May levels. This means that it is cheaper to purchase protection against upward price movements (call options) now compared to May but that premiums for insurance against downward price movements (put options) has not decreased.



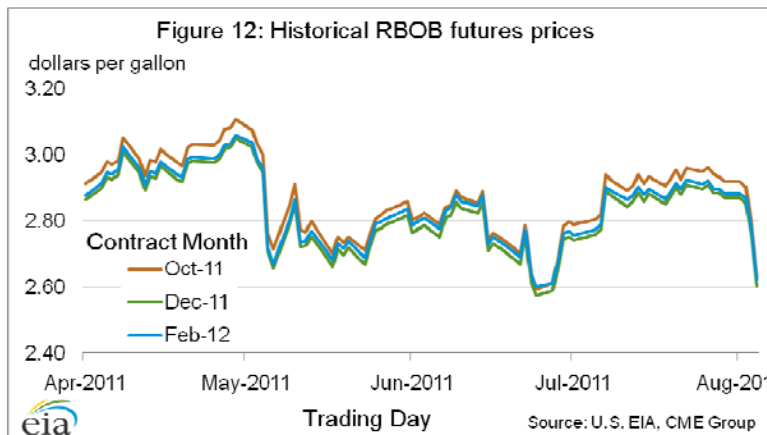


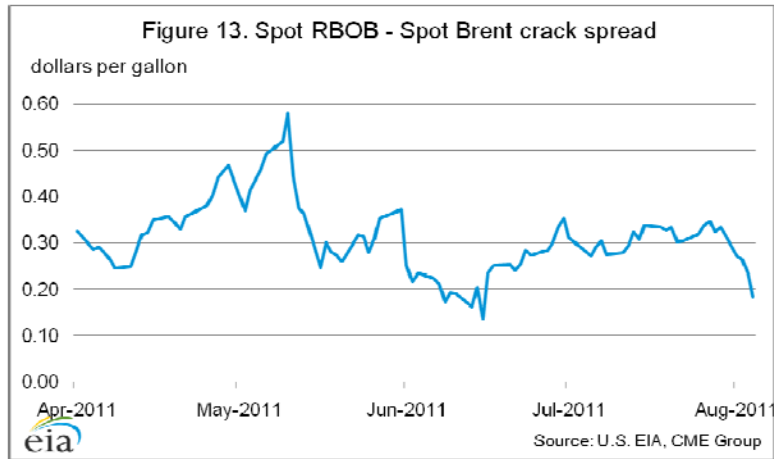
With implied volatility levels now back close to those seen two months ago, but prices considerably lower, probabilities of exceeding certain price points in future months have experienced noticeable reductions (**Figures 10 and 11**). Over the 5-day period ending August 4, the probability that the WTI futures contract for October delivery will expire above \$100 per barrel was only 29 percent, far lower than the around 50 percent level seen at the beginning of June for the same contract. The same comparison remains true for contracts further out, with the prices of futures and options for December delivery indicating a 35 percent probability of expiring above \$100 per barrel, having fallen more than 10 percentage points from early June. Similar probabilities can be constructed for North Sea crude oil by using futures and options in the Brent market. The probability of Brent exceeding \$120 per barrel by expiration of the December futures contract declined from 47 percent in early May to 35 percent in early June to 24 percent as of August 4. It should be noted, however, that there are significantly fewer options traded for Brent than for WTI, creating more uncertainty around Brent option valuation. 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.)



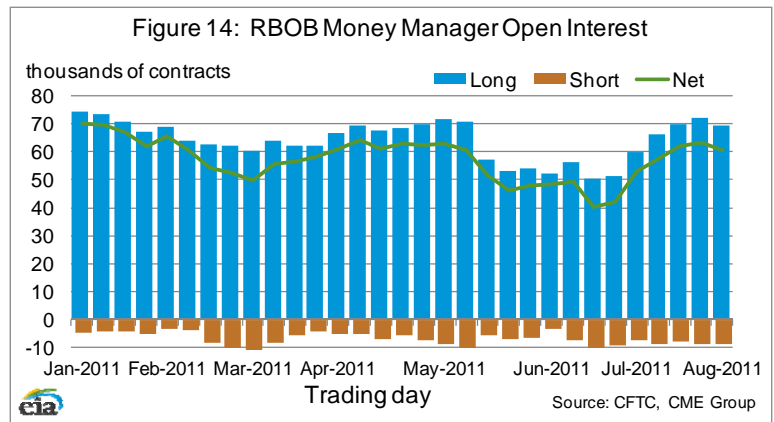


Gasoline. New York Harbor Reformulated Blendstock for Oxygenate Blending (RBOB) futures prices stabilized in the last month around \$2.90 gallon, but dropped sharply in the first week of August due to a sell-off in the crude markets (**Figure 12**). From the beginning of July through the first week of August, prompt month gasoline prices have averaged \$3.07 while Brent prompt crude oil prices have averaged just over \$116. Increases in the prompt month crack spread (representing the RBOB price minus the Brent crude oil price) were seen over this time period as the price of crude settled at a lower level relative to its end-of-April-high than did gasoline (**Figure 13**). However, in the last week this crack spread increase has reversed dramatically, as RBOB prices fell even more quickly than crude in the week ending August 5.

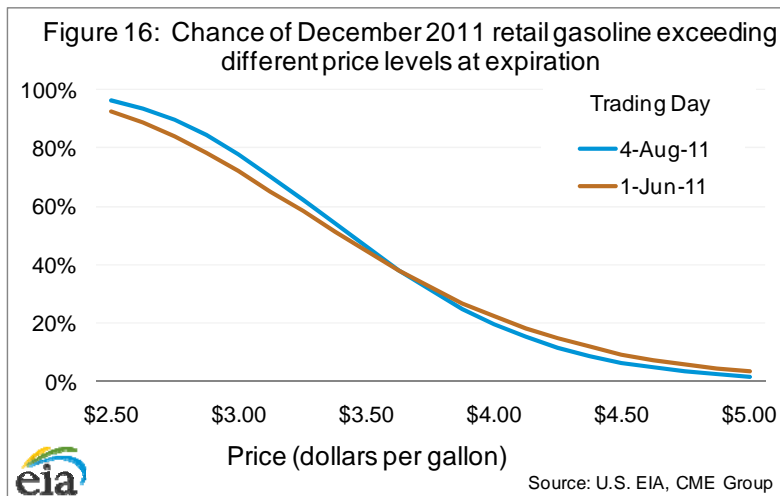
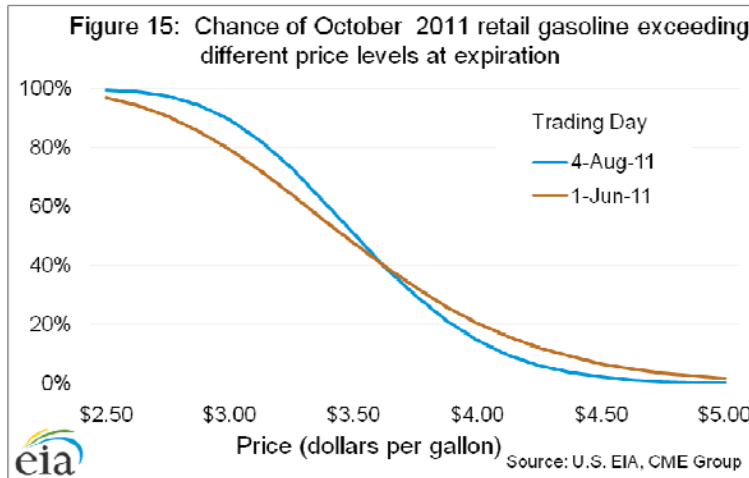




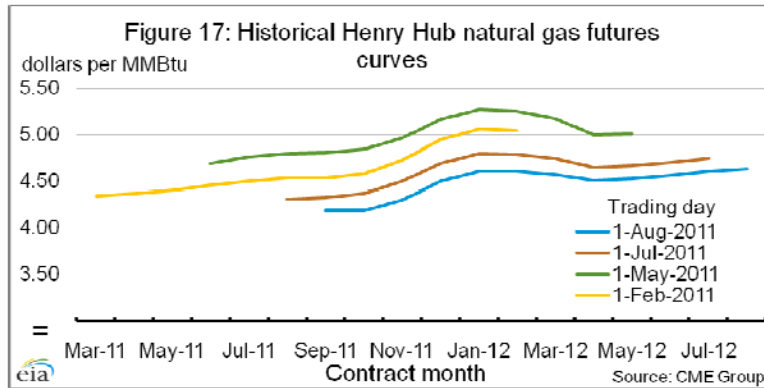
The latest CFTC report showed a decrease in net RBOB positions held by money managers, coincident with the price fall. Prior to last week's decrease in gasoline prices, net positions held by money managers in gasoline futures contracts had increased from a recent minimum of 40,000 contracts for the week ending June 21 to over 60,500 the week of August 2 (**Figure 14**). Last month's increase in long positions, not offset by an accompanying increase in short positions, pointed to increased bullish sentiment for this trader category, although this sentiment seemed to reverse in the last week as RBOB prices, and net positions, fell.



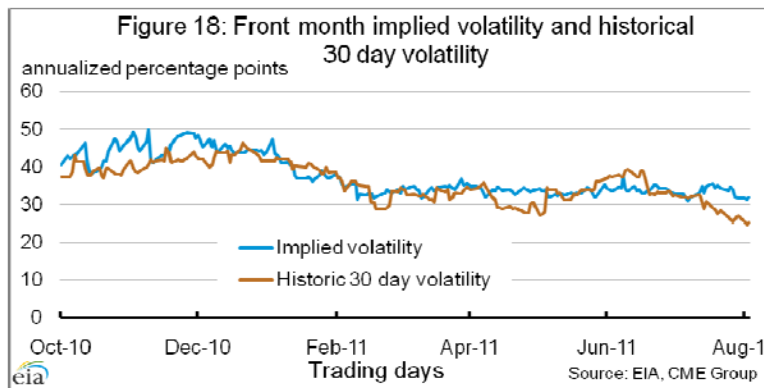
Market expectations of uncertainty in monthly average gasoline prices are reflected in the pricing and related implied volatility of futures options contracts. NY Harbor RBOB futures contracts for October 2011 delivery settled on August 4 at \$2.63 per gallon. The probability the RBOB futures price for October 2011 will exceed \$3.30 per gallon (consistent with a U.S. average regular gasoline retail price above \$4.00 per gallon) at expiration is approximately 10 percent (**Figure 15**), which is unchanged from the probability observed in early July. Looking further out on the curve, the RBOB futures contract price on August 4 for December 2011 came in at \$2.60 and has a probability of exceeding \$3.30 per gallon (\$4.00 retail) at expiration of approximately 16 percent (**Figure 16**).



U.S. Natural Gas Prices. The Henry Hub spot price averaged \$4.42 per MMBtu in July 2011, 13 cents lower than the June 2011 average ([Henry Hub Natural Gas Price Chart](#)). EIA expects that the Henry Hub price will average \$4.24 per MMBtu in 2011 and \$4.41 per MMBtu in 2012. Though the 2012 average reflects some tightening in supply as domestic production growth slows, prices have remained relatively low over the past few years as a result of abundant production.



Implied volatility for the front month natural gas contract moved slightly higher during the middle of July but fell back to the 32 percent level by the first week of August (**Figure 18**). The 30-day realized volatility for the front month natural gas contract (currently September) dropped during the month of July to a new one year low of 24.9 percent on August 2.



In the month of July, the price of the futures contract for March delivery of natural gas fell by \$0.22 per MMBtu. This drop in price can be attributed to stronger than expected builds in U.S. natural gas inventories as well as the recent tempered expectations for economic growth, which has contributed to lower prices for most commodities. With implied volatility for the March contract at similar levels as seen in early June, the probability that the March contract would exceed \$5.00 per MMBtu fell by 15 percentage points from 45 to just over 30 percent (**Figure 19**). 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).

