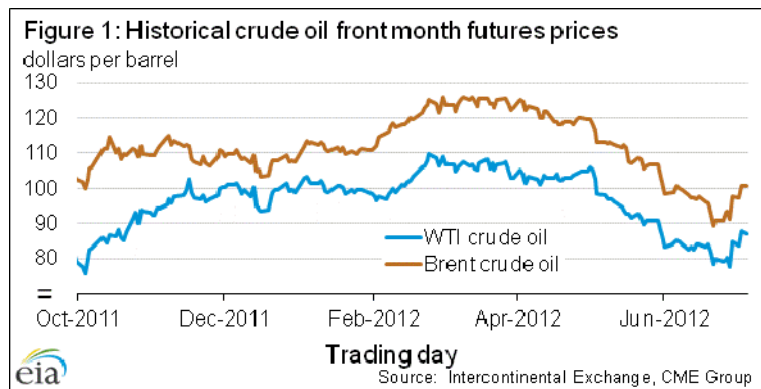


## Short-Term Energy Outlook Market Prices and Uncertainty Report<sup>1</sup>

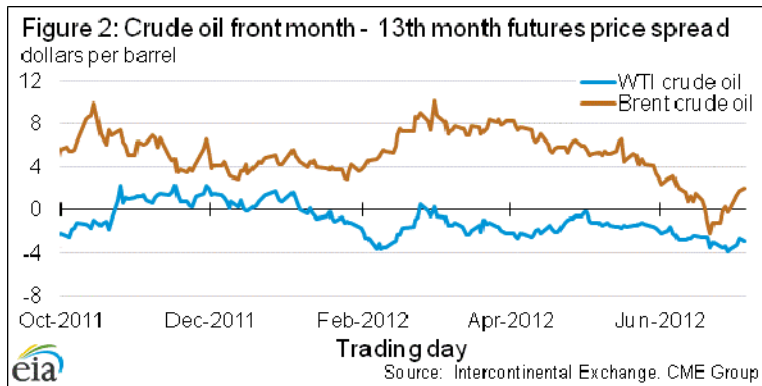
### Crude Oil

**Prices:** Crude oil futures prices continued their downward trend for the first half of June but rebounded over the week from June 29 to July 5. Both crude oil benchmarks are currently close to their settlement prices at the beginning of June (**Figure 1**). The outcome from the European Union summit, which alleviated some short-term fears of a banking crisis, held on June 29 has contributed to the recent rise in oil prices. Reports that Saudi Arabia is beginning to cut back production could also be contributing to the recent price increases.

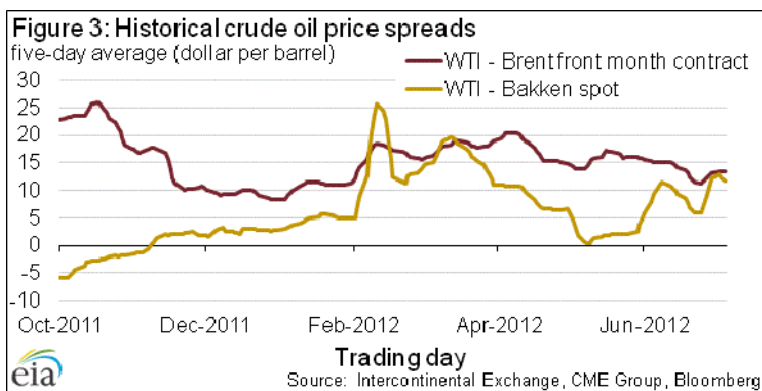


The front – 13<sup>th</sup> month spread for the Brent futures curve was in contango (when current prices are lower than farther dated futures prices) for the first time in a year from June 20 to June 26 (**Figure 2**). The spread has since returned to backwardation, settling at \$2 per barrel on July 5, but remains well below the \$9 per barrel peak seen earlier this year and is a signal that current oil market conditions are looser compared to market conditions a few months ago. The contango in the WTI futures curve increased during most of the month of June, then declined over the past week.

<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)

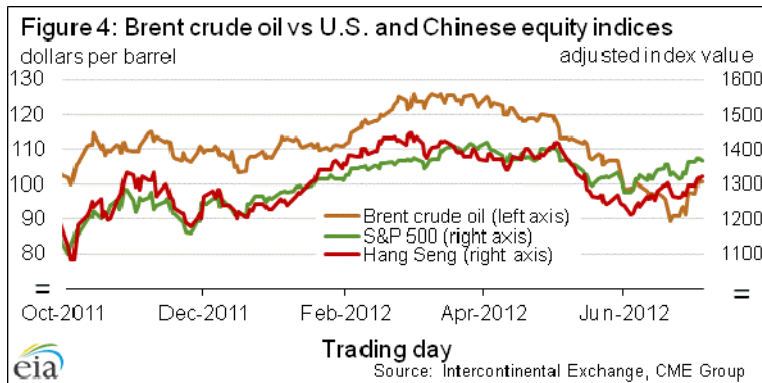


The Brent – WTI spread has been trending downward for the last two months, decreasing from \$20 per barrel for the first week in April to \$13 per barrel for the five days ending July 5 (**Figure 3**). The location spread is indicative of the marginal transportation cost of moving crude oil from Cushing, Oklahoma, the delivery point for the WTI futures contract, to refining centers on the U.S. Gulf Coast. Other transportation constraints also affect central North America, for instance between the Bakken in North Dakota and Cushing, Oklahoma. The spreads between Bakken and WTI crude oils suggest that it now costs about the same to move crude oil from North Dakota to Cushing as from Cushing to the Gulf Coast. Overall, Bakken now trades at a \$25 per barrel discount to Brent.

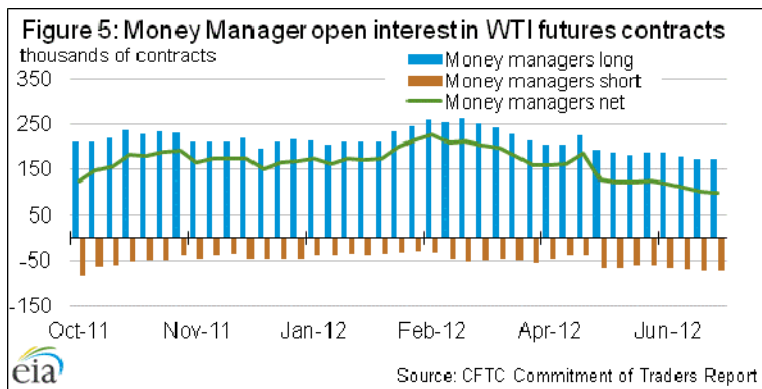


**Crude oil and equity markets:** Expectations for future crude oil demand are closely tied to economic growth in the U.S. and China, the world’s two largest consumers of petroleum products. Economic growth expectations also influence equity markets as expected corporate earnings tend to rise and fall with shifts in economic growth. These dual linkages are one of the reasons crude oil is positively correlated with both the S&P 500 and the Hang Seng index, the part of the Chinese stock market that trades in Hong Kong (**Figure 4**). In the second quarter of 2012, daily movements in the Brent crude oil price have had a correlation of 0.68 and 0.59 with the S&P 500 and Hang Seng indices, respectively, with adjustments made to account for the different trading times between Brent and the Chinese equity benchmark. For more information on the correlation

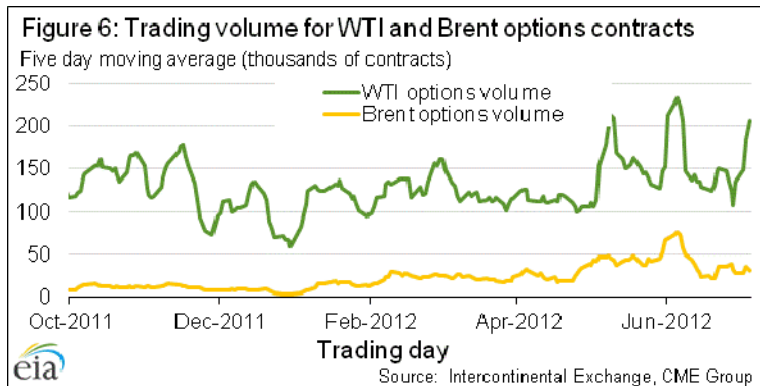
between crude oil and other markets, please see EIA’s [What Drives Crude Oil Prices?](#) website.



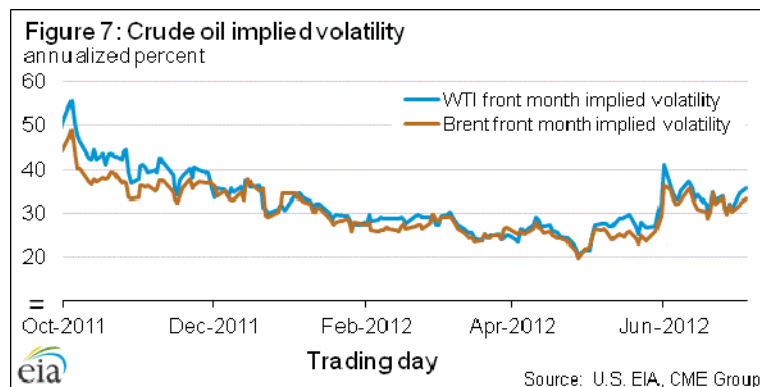
**Open interest:** The net open interest in WTI futures contracts held by money managers, reported in the Commodity Futures Trading Commission’s (CFTC) weekly Commitment of Traders report, has trended slowly downward for the 8 weeks ending June 26 (**Figure 5**). During that time, WTI prices fell by 18 percent and net open interest held by money managers has fallen by 23 percent. Money manager positions are now about 48 thousand contracts below October 2011 levels, the last time that WTI prices were as low as they were in June 2012.



**Volume:** As noted in the [May issue of the Market Prices and Uncertainty Supplement](#), the trading volume of Brent futures contracts surpassed the volume for WTI contracts in April 2012 and has remained higher in both May and June. The market for options traded on Brent futures contracts has also been increasing since the beginning of this year. Nearly 32 thousand Brent contracts traded hands per day during the five day period ending July 5, with a large portion of that volume concentrated in the front month (**Figure 6**). The WTI options market is still considerably larger and more liquid, notwithstanding the growth in Brent options activity, and remains the only crude oil for which significant longer dated options are traded.

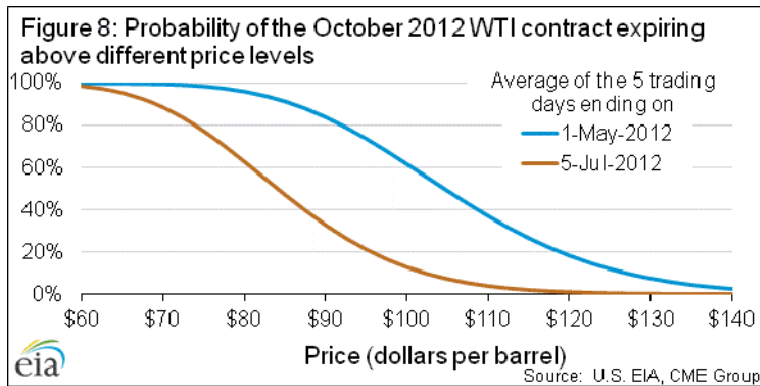


**Volatility:** Implied volatility is derived from the price of options traded on crude oil futures contracts. Since the Brent options market is becoming more active, especially in the front month, implied volatility for both Brent and WTI near month futures contracts can now be tracked. After spiking higher at the beginning of June, implied volatility for both Brent and WTI has decreased since June 1 by 3 and 5 percentage points, respectively (**Figure 7**). Implied volatility for Brent settled at 33 percent and WTI settled at 36 percent on July 5.



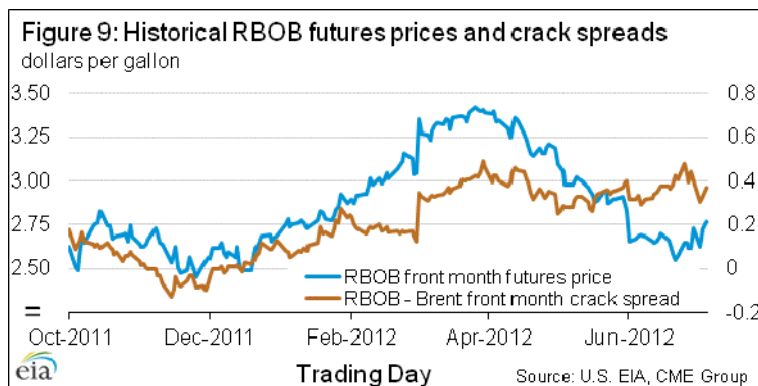
**Market Derived Probabilities:** The probability of the October 2012 WTI futures contract expiring above \$110 per barrel is now 4 percent, a 33 percentage point decrease from the five day period ending June 1 (**Figure 8**).<sup>2</sup> The average price of WTI crude oil for October delivery for the five days ending July 5 has decreased by \$21 per barrel since May 1, while implied volatility for that contract has increased by 9 percentage points. Given the higher absolute level of Brent prices relative to WTI prices, the probabilities that the October Brent contract will exceed specified dollar thresholds are higher.

<sup>2</sup> 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.)

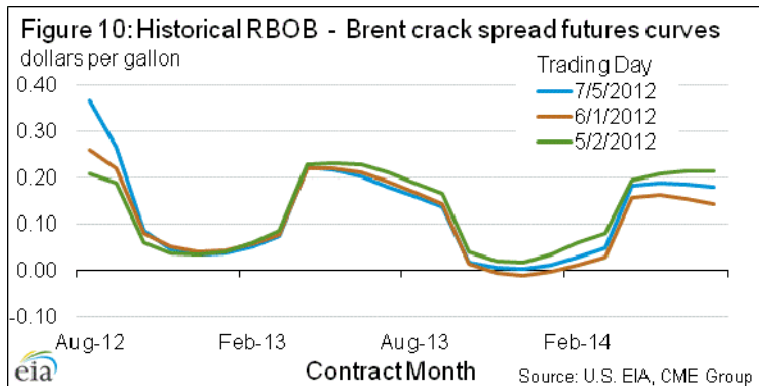


## Gasoline

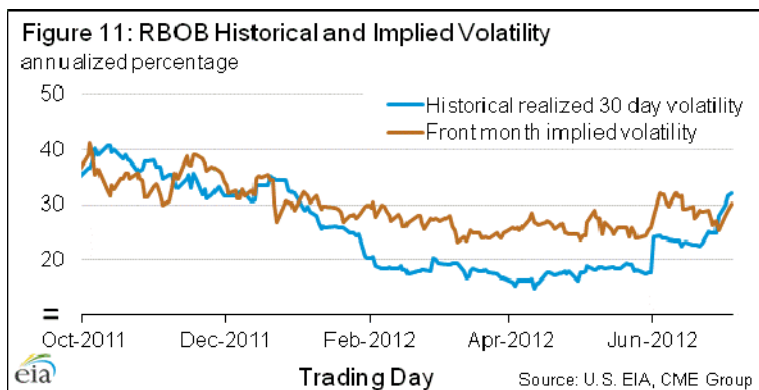
**Prices:** Futures prices for New York Harbor Reformulated Blendstock for Oxygenate Blending (RBOB) gasoline moved lower during the first half of June but have since recovered to levels near where they started the month of June. The front month futures price settled at \$2.76 per gallon on July 5, an increase of \$0.10 per gallon since June 1 (**Figure 9**). The RBOB – Brent crack spread increased to \$0.48 per gallon on June 25, near its 2012 high, and as gasoline prices rose slightly while crude oil prices were falling. The RBOB – Brent front month crack spread has since decreased and settled at \$0.37 per gallon on July 5, an increase of \$0.05 per gallon since June 1.



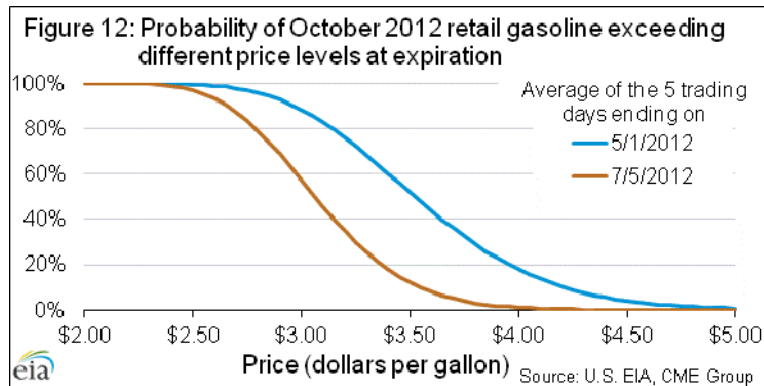
The increase in the RBOB – Brent crack spread over the last two months has only occurred in the front part of the futures curve and signals only a temporary tightness in the gasoline market. In fact, the RBOB – Brent crack spread for months farther out on the futures curve is unchanged compared to one and two months ago. While the crack spread for August 2012 delivery is at \$0.37 per gallon, the crack spread for delivery in August 2013 settled at \$0.16 per gallon on July 5 and is actually near zero for delivery in the winter months of 2013 to 2014 (**Figure 10**).



**Volatility:** Implied volatility for the front month RBOB futures contract settled at 30 percent on July 5, an increase of 2 percentage points since June 1. Historical volatility rose at the start of June and has continued to move higher in the last week. Historical volatility for the front month RBOB contract was 32 percent on July 5, an increase of 8 percentage points since June 1 (**Figure 11**).

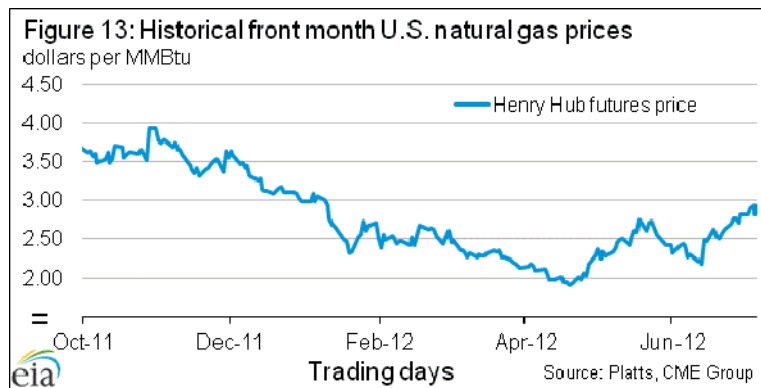


**Market Derived Probabilities:** The October 2012 RBOB futures contract averaged \$2.39 for the five trading days ending July 5 and has a probability of exceeding \$2.80 per gallon (\$3.50 retail) at expiration of approximately 12 percent. The same contract as of the five trading days ending May 1 had a probability of exceeding \$3.50 retail of 52 percent. A combination of lower crude oil prices and decreased time to expiration contributed to a lower probability of the October contract exceeding price levels when compared to market conditions on May 1 (**Figure 12**).



## Natural Gas

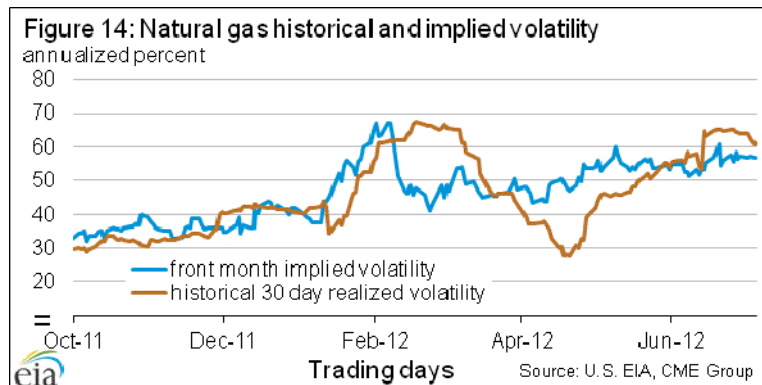
**Prices:** The front month futures contract price for delivery of natural gas to Henry Hub in Louisiana increased in month of June to near its highest levels so far in 2012. The contract settled at \$2.82 per MMBtu on July 5, \$0.50 per MMBtu higher than its price on June 1 but still \$1.41 per MMBtu lower than at this same time last year (**Figure 13**). The large overhang of natural gas inventories at the start of the injection season, caused by a mild past winter in the U.S., has resulted in smaller inventory builds compared to the five year averages, reflecting storage capacity constraints. The slower inventory builds necessitate that more natural gas be sold in the spot market and is contributing to the lower prices compared to market conditions at this time last year.



**Volatility:** After diverging significantly in recent months, implied volatility and historical volatility for the front month natural gas futures contract closed within four percentage points of each other on July 5, at 57 and 61 percent, respectively (**Figure 14**). Implied volatility and historical volatility are two ways to measure the uncertainty surrounding natural gas futures prices. Implied volatility is derived daily from the prices of options traded on futures contracts and is inherently forward looking. Historical volatility is calculated from the variance of daily percent movements over the last 30 trading days and is inherently backward looking.

From the middle of January through the end of February, natural gas futures prices traded in a range of \$2.32 to \$2.71 per MMBtu with 5 out of those 30 trading days

showing a change of greater than 5 percent. This time period coincided with highest points of historical volatility. It was then followed by prices moving steadily downward from \$2.61 to \$1.90 per MMBtu, with only 2 trading days experiencing drops of more than 5 percent, and the lowest levels of historical volatility so far in 2012. As these changes in historical volatility indicate, prices moving in a range will have a higher variance than prices that are steadily trending in one direction. At the same time, implied volatility was reflecting the expectations of the future distribution of prices. Since historical price behavior is one factor the market uses to develop expectations for price movements in the future, these two measures tend to revert back towards each other over time.



**Market Derived Probabilities:** The probability that the October contract will settle higher than \$3.00 per MMBtu rose by 15 percentage points from 24 to 39 percent when compared to market conditions on the five trading days ending May 1 (**Figure 15**).<sup>3</sup> The average price over the five trading days ending on July 5 for the October 2012 natural gas futures contract increased by \$0.36 per MMBtu since May 1. Combined with an increase in implied volatility of 5 percentage points for that contract, the increase in price was responsible for the higher probability of natural gas prices exceeding different price levels compared to market conditions two months ago.

<sup>3</sup> 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).



