



## *Short-Term Energy Outlook*

# Energy Price Volatility and Forecast Uncertainty<sup>1</sup>

June 8, 2010 Release

**Crude Oil Prices.** WTI crude oil spot prices averaged less than \$74 per barrel in May 2010, almost \$11 per barrel below the prior month's average and \$7 per barrel lower than forecast in last month's Outlook. EIA projects WTI prices will average about \$79 per barrel over the second half of this year and rise to \$84 by the end of next year, a decrease of about \$3 per barrel from the previous Outlook ([West Texas Intermediate Crude Oil Price Chart](#)). Energy price forecasts are highly uncertain, as history has shown. Prices for near-term futures options contracts suggest that the market attaches significant likelihood to the movement of prices over a wide range within a relatively short period.

Implied volatility in the crude oil futures options market moved higher in May, as a combination of events – the U.S. response to the Deepwater Horizon oil spill, an unusually severe hurricane outlook, financial-market uncertainty in Europe and China, and robust oil demand in global energy markets – caused prices to fall sharply then correct sharply over the course of the month.

August 2010 WTI futures at the beginning of May 2010 were trading at \$90.77 per barrel. Mid-way into the month, energy futures, commodities and securities were sold, as financial-market participants shed risky assets in reaction to reports of monetary tightening in China, which could dampen energy demand in that market, and news the German government would prohibit naked short-selling of securities, including German banking stocks. (A short sale occurs when a trading entity sells an asset it does not own hoping to buy it back cheaper in the future.) The ban lasts until March 31, 2011. The announcement was intended to calm markets, but had the effect of increasing volatility, coming as it did during heightened uncertainty in European

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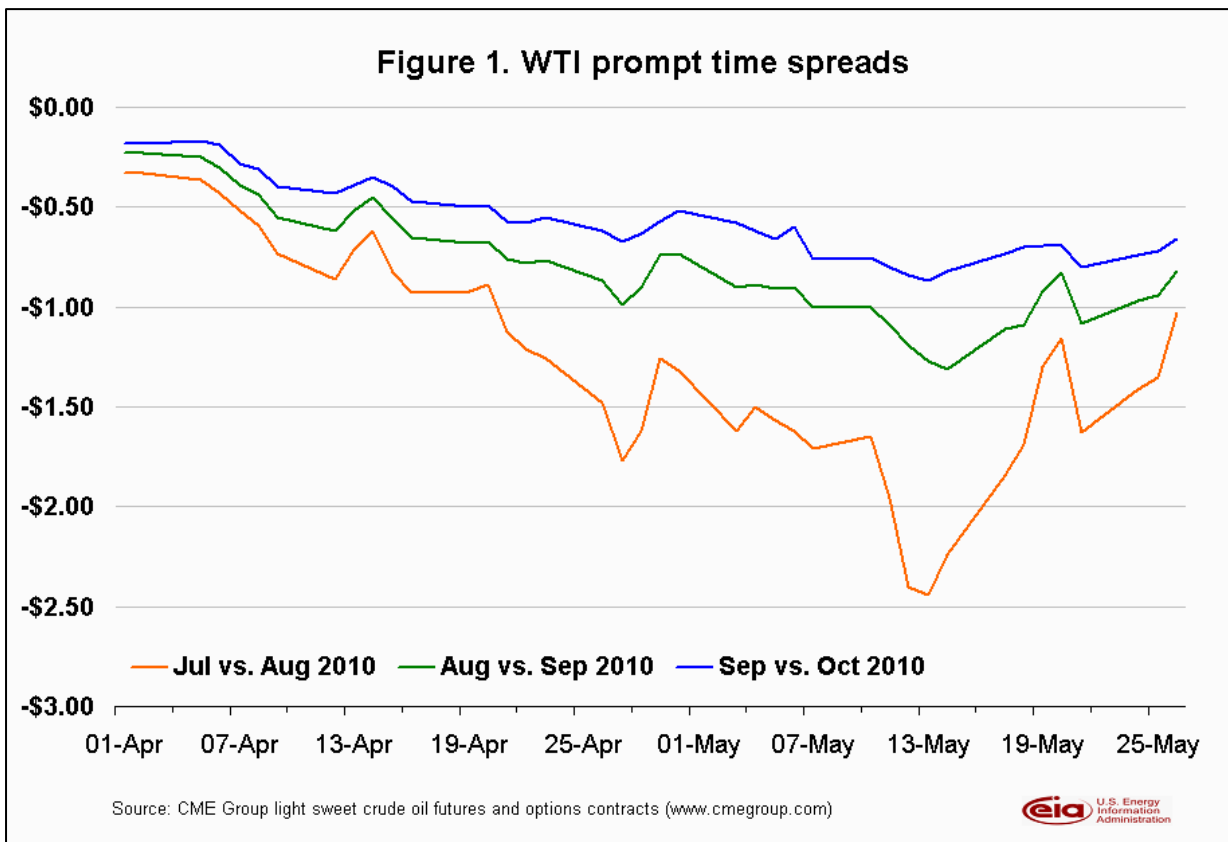
<sup>1</sup> This is a regular monthly supplement to the EIA *Short-Term Energy Outlook*.

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

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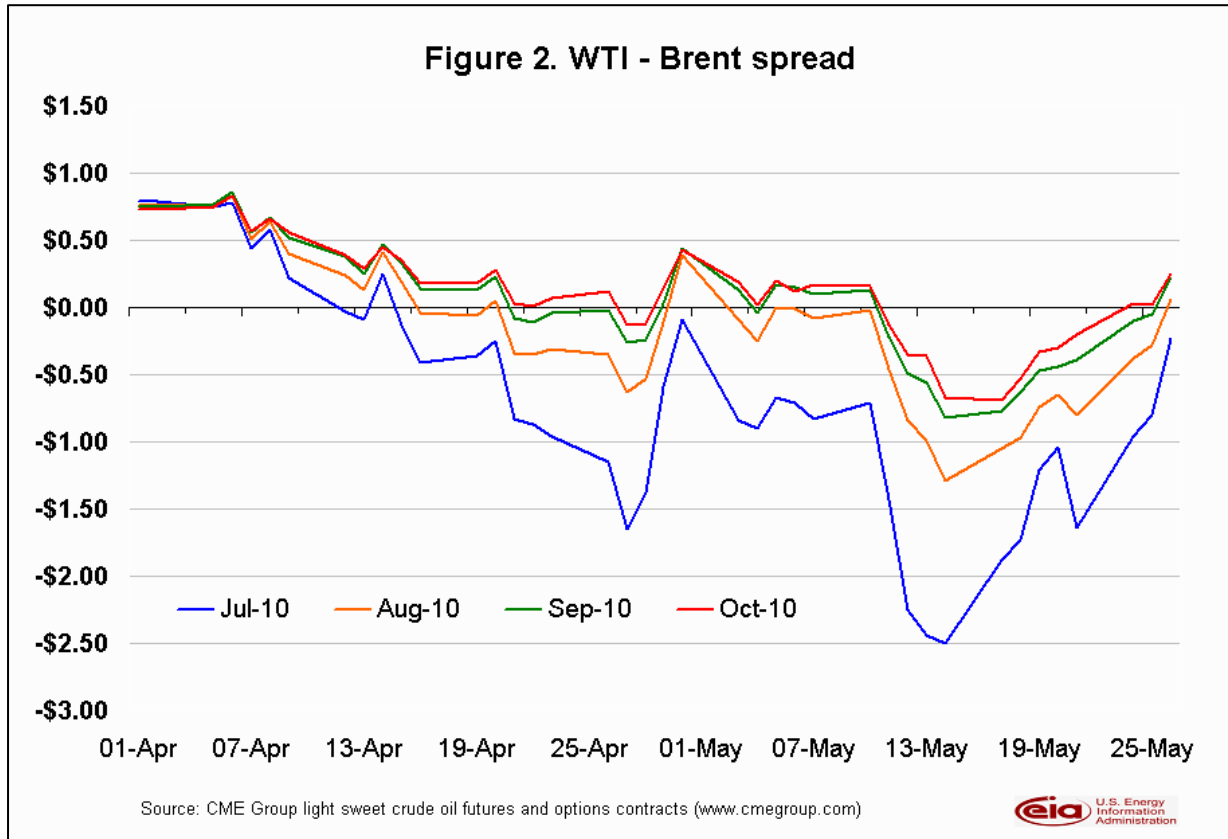
debt markets generally. By May 28, August WTI futures shed almost \$16 per barrel to settle at \$75.16 per barrel, a loss of more than 17 percent on the month.

Apparent demand in energy markets, however, was robust. Relative-price relationships that gauge supply and demand balances – i.e., WTI time-spreads and WTI – Brent spread relationships – strengthened during the month. On Wednesday, May 26, 2010, EIA's Weekly Petroleum Report confirmed the bullish signals coming from crude oil and product futures markets in the U.S. At Cushing, OK, where the NYMEX WTI futures contract delivers, EIA reported a 324,000-barrel withdrawal, the first such drawdown in 9 weeks (see Figure 1 for the evolution of WTI time-spreads). EIA's report also showed significant draws in product inventories – counter to market expectations – indicating improved gasoline and distillate demand.



In addition, imports along the U.S. East Coast were lower (down close to 300,000 barrels), consistent with the evolution of the WTI-Brent spreads over the previous week (Figure 2). Markets continue to price crude-oil withdrawals in the U.S. mid-continent into the summer. Globally, first-quarter data from [Joint Oil Data Initiative](#)

([IODI](#)) supported the view that demand is growing elsewhere, particularly in China and emerging markets in Asia.



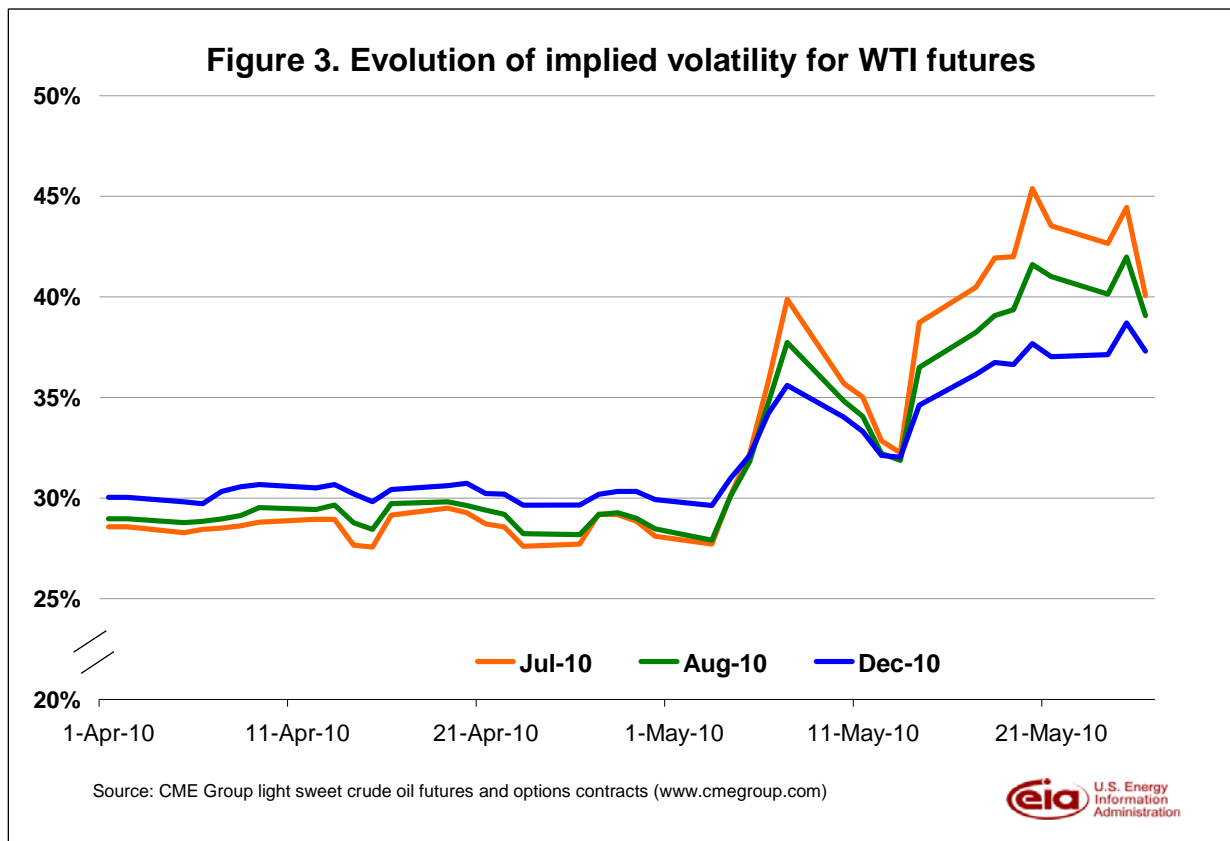
On Thursday May 27, the Obama administration extended a moratorium on drilling operations in the U.S. Gulf for 6 months, and canceled proposed drilling plans off the Virginia coast. The administration also said it was suspending consideration of Arctic exploratory drilling applications until 2011. This added uncertainty to near-term production forecasts in the Gulf, with some analysts predicting it would lead to shortfalls of 100,000 barrels per day or more in potential production. EIA will be analyzing the implications of this policy.

Separately, the National Oceanic and Atmospheric Administration (NOAA) released its [hurricane outlook](#) for the 2010 season, and said it expects:

- 14 - 23 named storms (top winds of 39 mph or higher), including
- 8 - 14 hurricanes (top winds of 74 mps or higher), of which
- 3 - 7 storms will be major hurricanes (winds of at least 111 mph).

By the end of May, energy-price volatility moved erratically higher (Figure 3), as market participants widened the range in which they expect WTI futures prices to trade. WTI futures for August 2010 delivery for the 5-day period ending May 28 averaged \$73 per barrel, and implied volatility averaged 39.60 percent. This made the lower and upper limits of the 95-percent confidence interval \$55.13 and \$96.69 per barrel, respectively.

Last year at this time, WTI for August 2009 delivery averaged \$64.52 per barrel, and implied volatility averaged 43.50 percent, rendering the limits of the 95-percent confidence interval \$47.39 and \$87.82 per barrel.

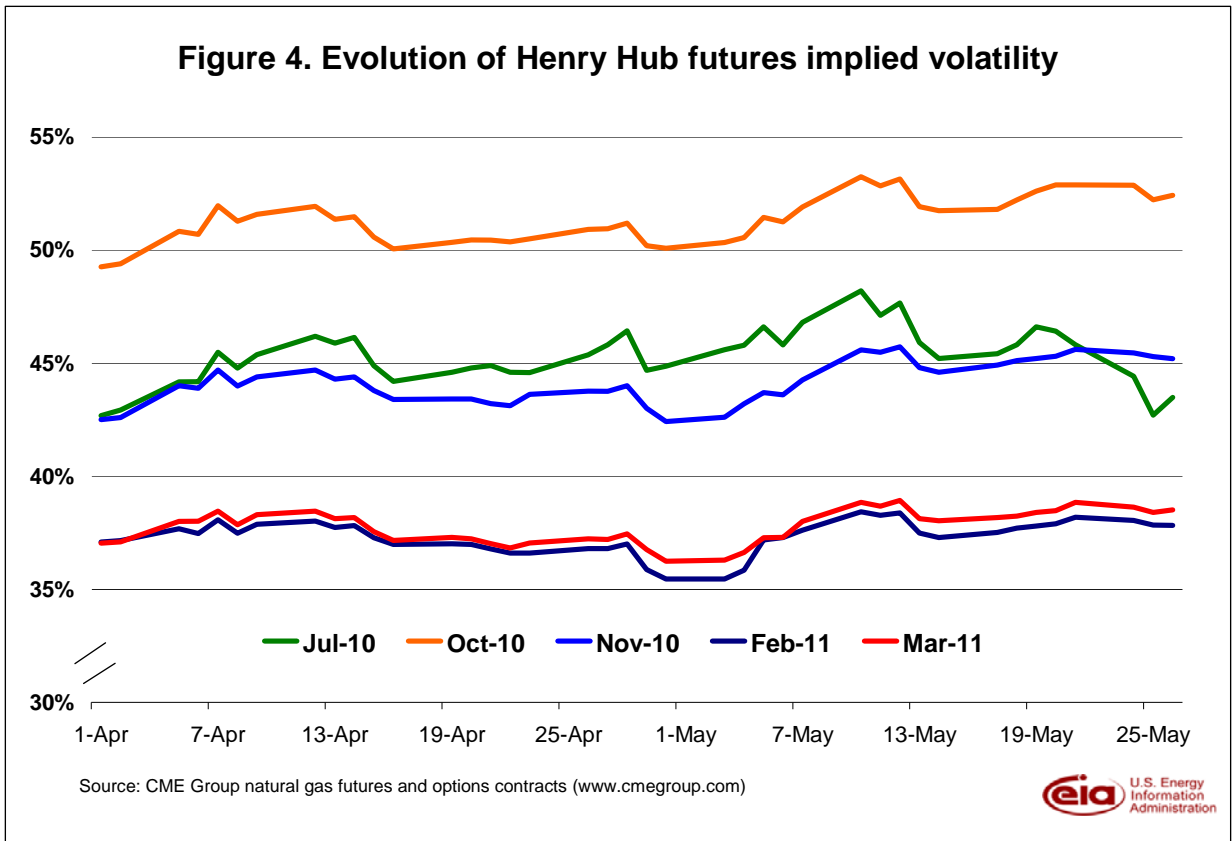


**U.S. Natural Gas Prices.** Sustained low natural gas prices this summer are expected contribute to a decline in natural gas drilling activity over the next several months. As a result, the current 2011 forecast of higher prices comes as production begins to decline later this year and next. The projected Henry Hub spot price averages \$4.49 per MMBtu in 2010 and \$5.08 per MMBtu in 2011.

Uncertainty over future natural gas prices is lower this year compared with last year at this time. The 5-day average price of the August 2010 futures contract at the end of May was \$4.27 per MMBtu, and the average implied volatility over the same period was 44.6 percent. This produced a lower and upper limit for the 95-percent confidence interval of \$3 and \$6.08 per MMBtu, respectively. At this time last year the natural gas August 2009 futures contract averaged \$3.87 per MMBtu and implied volatility averaged almost 71 percent. This rendered the lower and upper limits of the 95-percent confidence interval were \$2.21 and \$6.76 per MMBtu.

***U.S. Natural Gas Price Uncertainty.*** Hurricane activity tends to peak in September, when the October futures contract is pricing for delivery into Henry Hub, LA. This adds considerably to price uncertainty, as October also marks the end of the natural gas injection season, and, logically, implies October implied volatility should be the highest of the injection-season months during the early months of the injection season. Implied volatility in October 2010 futures contract moved a bit higher during May, from 50.3 percent on May 3 to 51.7 percent on May 31, as the contract price increased from \$4.43 to \$4.57 per million Btu (See Figure 4).

As noted in the May 2010 *Short-Term Energy Outlook*, the lead-up to October will produce greater clarity for market participants as to whether supply and demand can support a given level of injections, thus ensuring target inventories for local-distribution companies are in place for the coming withdrawal season running from November to March.



The probabilities in Figure 5 are cumulative normal densities (see [Appendix II of Energy Price Volatility and Forecast Uncertainty](#)), showing the market's assessment for various price outcomes in 2010 and 2011. EIA uses market-based parameters derived from futures and options prices to calculate these densities (see [April STEO Supplement, Probabilities of Possible Future Prices](#)).

**Figure 5. Probability of Henry Hub futures prices exceeding certain levels**

