

 ***Short-Term Energy Outlook***
Market Prices and Uncertainty Report¹

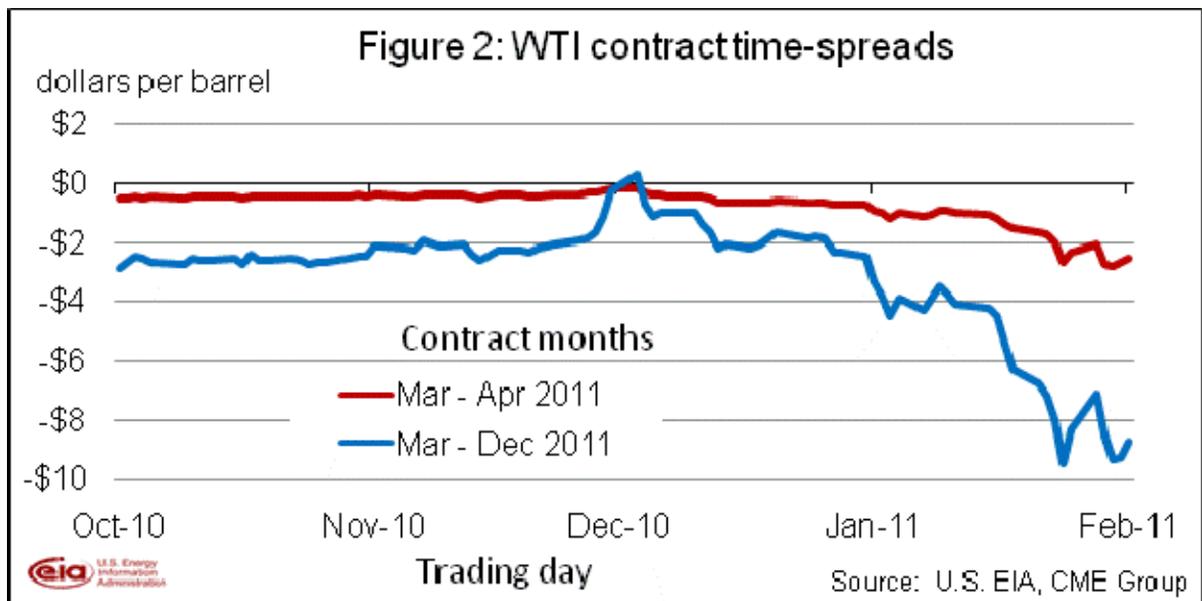
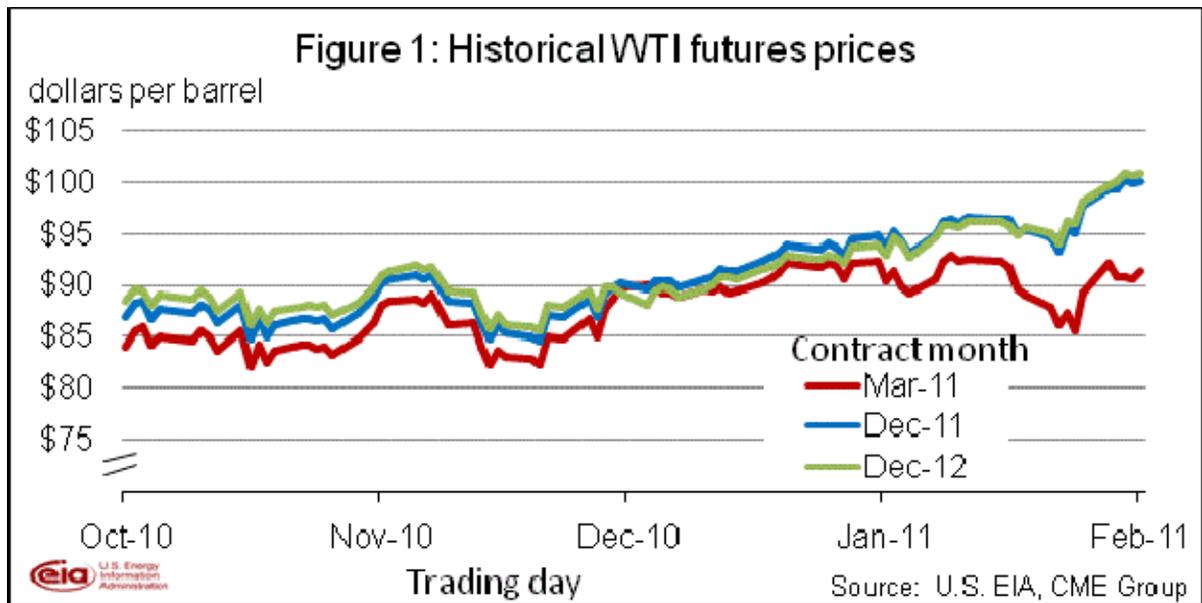
February 8, 2011 Release

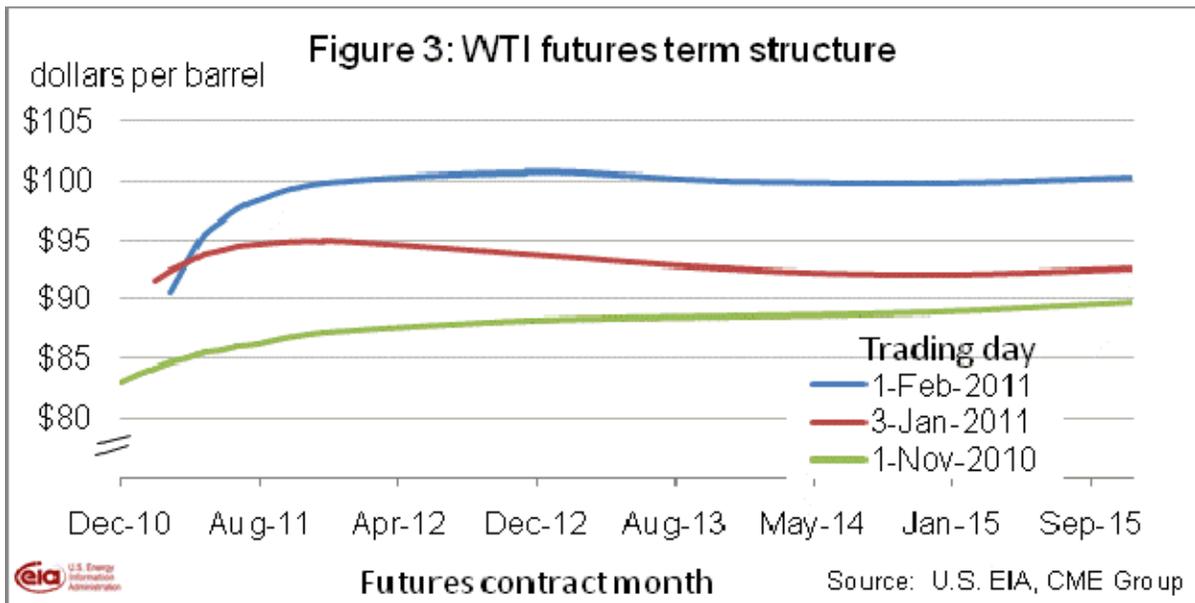
Crude Oil Prices. WTI crude oil spot prices averaged \$89 per barrel in January, about the same as the December average, while over the same time period the estimated average cost of all crude oil to U.S. refineries increased by about \$1 per barrel. Growing volumes of Canadian crude oil imported into the United States contributed to record-high storage levels at Cushing, Oklahoma, and a price discount for WTI compared with similar quality world crudes such as Brent crude oil. Projected WTI spot prices rise to an average of \$95 per barrel in December 2011 and continue to increase to \$99 per barrel by the fourth quarter of 2012.

Energy price forecasts are uncertain ([Energy Price Volatility and Forecast Uncertainty](#)). WTI futures for April 2011 delivery over the 5-day period ending February 3 averaged \$93 per barrel, and implied volatility averaged 30 percent. This makes the lower and upper limits of the 95-percent confidence interval \$76 per barrel and \$114 per barrel, respectively, for WTI delivered in April 2011. Last year at this time, WTI for April 2010 delivery averaged \$75 per barrel and implied volatility averaged 34 percent, with the limits of the 95-percent confidence interval at \$60 per barrel and \$94 per barrel. Based on WTI futures and options prices, the probability that the monthly average price of WTI crude oil will exceed \$100 per barrel in December 2011 is about 44 percent. Conversely, the probability that the monthly average December 2011 WTI price will fall below \$85 per barrel is about 32 percent.

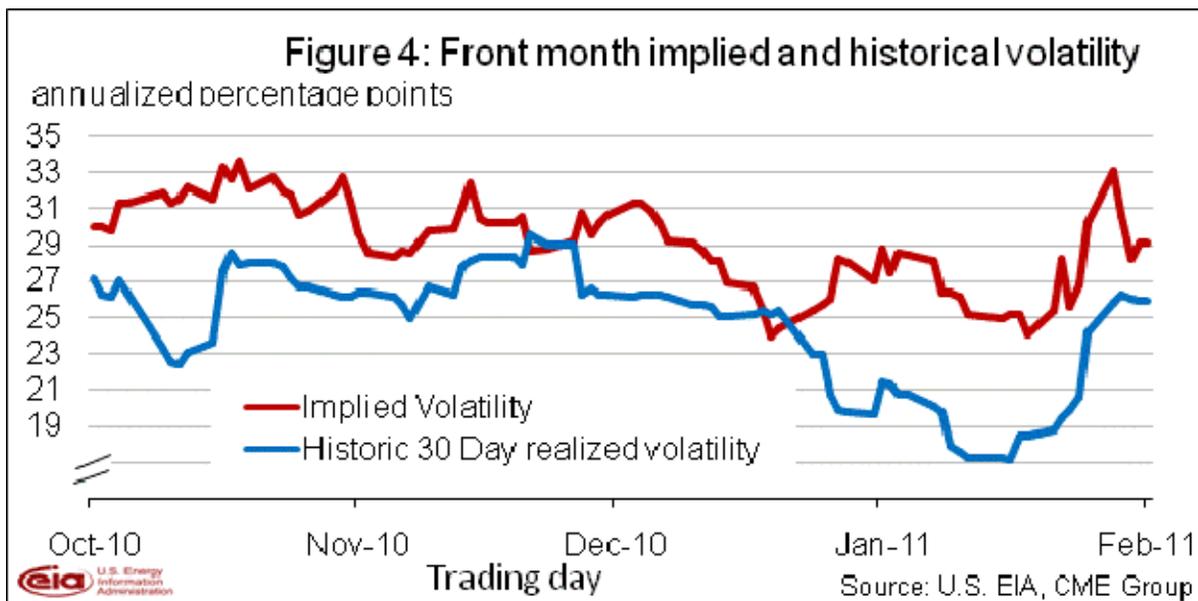
Crude oil prices along the futures curve showed a strong divergence during the month of January (**Figures 1 and 2**), increasing the contango seen at the end of 2010. The front month futures contract (currently March 2011) began the month at \$92.43 and finished January almost unchanged at \$92.19. Contrasting with this small change in the front-month contract price, the December 2011 futures contract rose \$4.40 during the same time period, breaking \$100 on the second day of February, the first time since October 2008. The current futures curve shows anticipation of higher price levels through the next few years, with most of that increase contained in the next few months (**Figure 3**). Though deferred contracts are higher, one of the factors holding near term prices down are the current high inventory levels stored in Cushing, Oklahoma; EIA's weekly report showed Cushing inventories rose above 38 million barrels by the end of last month, almost 20 percent higher than the same time last year.

¹ 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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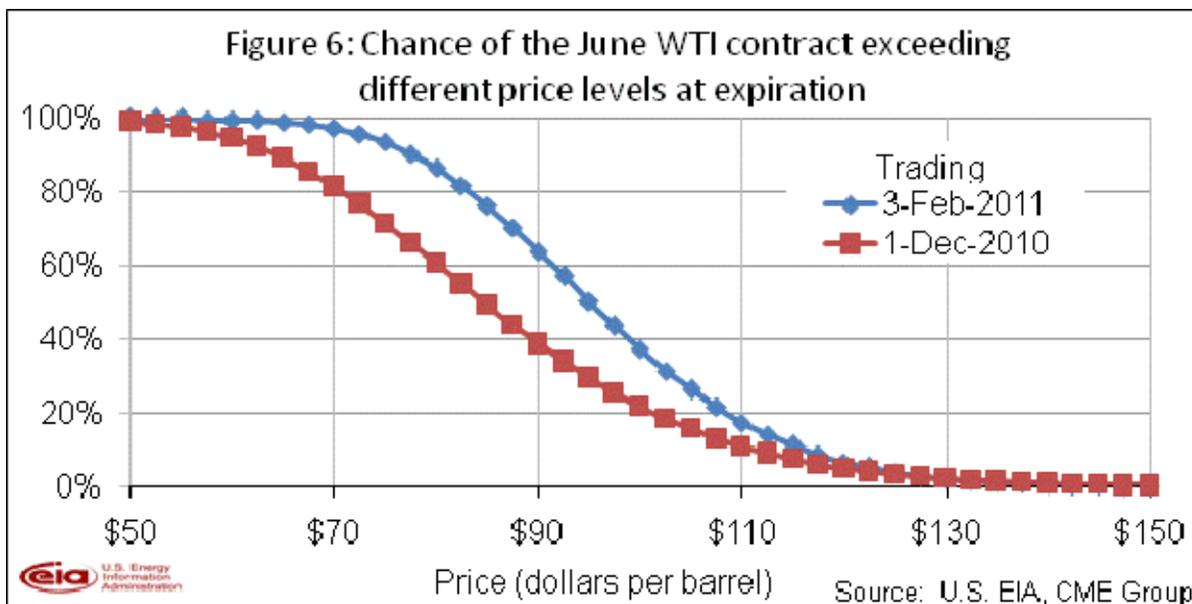
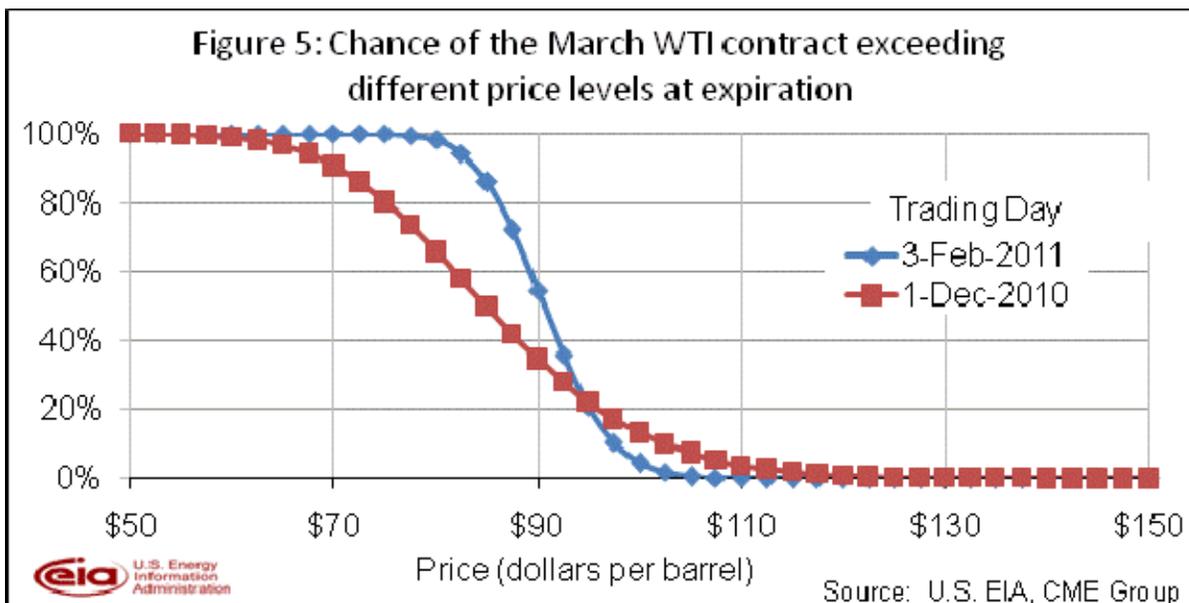


Both implied and realized volatilities continued their downward trend for the first half of January (Figure 4). During the final week of the month, however, implied volatilities rose 25 percent from the month's lows to a high of 33.1 percentage points with news of political unrest in Northern Africa. While the last few trading days have seen a calmer market, uncertainty still remains slightly higher than the January 2011 volatility average of 27.1 percentage points.



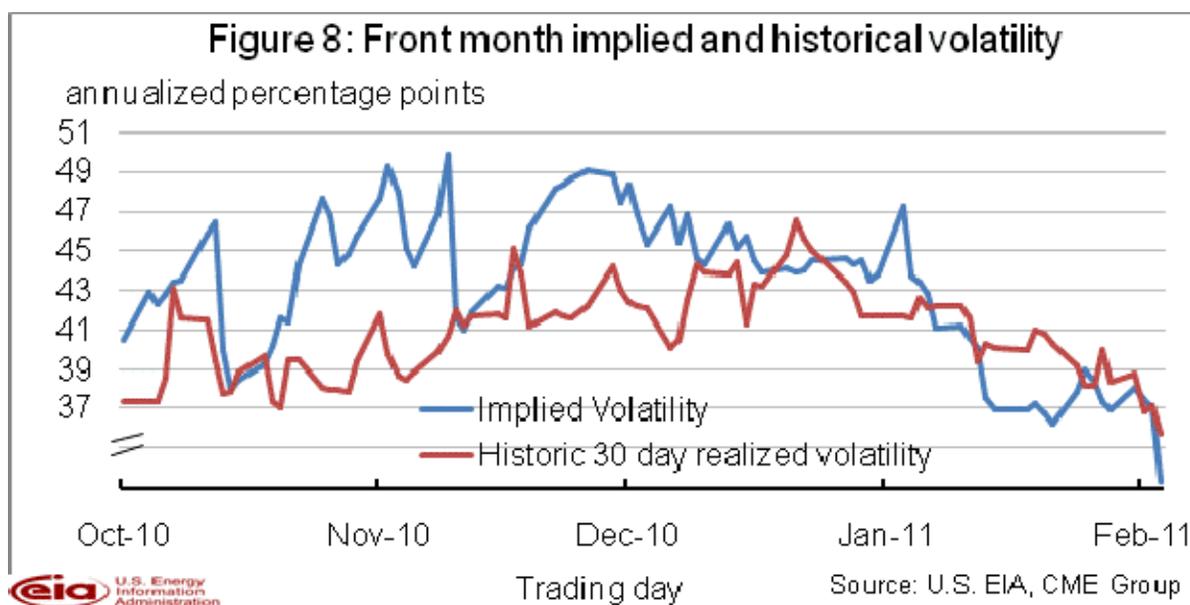
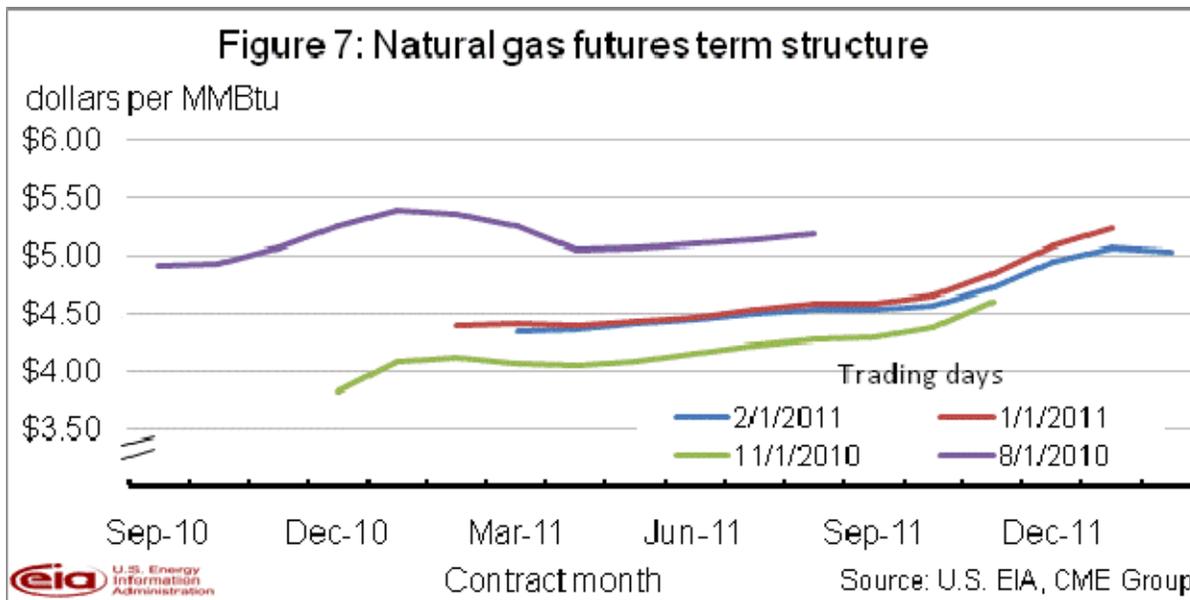
With WTI prices higher and volatility at similar levels, EIA's probability assessments for higher prices by the middle of the year generally moved up from levels two months prior (Figures 5 and 6). Though the probability of reaching \$100 per barrel by the expiration of the February 2011 contract is minimal (5 percent), this probability level rises to over 38 percent by this summer, with the price of the June contract already settling over \$96 on February 3. Though these probabilities imply prices are expected to remain under \$100 per barrel over the next several months, by the end of the year the market is pricing a probability level of 44 percent for exceeding this same level. 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 of how these probabilities are derived.)



Gasoline. The projected monthly average regular gasoline price peak for 2011 is \$3.24 per gallon in July. New York Harbor RBOB (reformulated gasoline blendstock for oxygenate blending) futures contracts for July 2011 delivery over the 5-day period ending February 3 averaged \$2.65 per gallon and implied volatility averaged 30 percent. The probability the RBOB futures price will exceed \$2.80 per gallon (and the U.S. average regular gasoline retail price exceed \$3.50 per gallon) in July 2011 is about 35 percent. The probability the RBOB futures price will exceed \$3.30 per gallon (and the gasoline retail price exceed \$4.00 per gallon assuming a \$0.70 retail – wholesale margin) in July 2011 is about 10 percent.

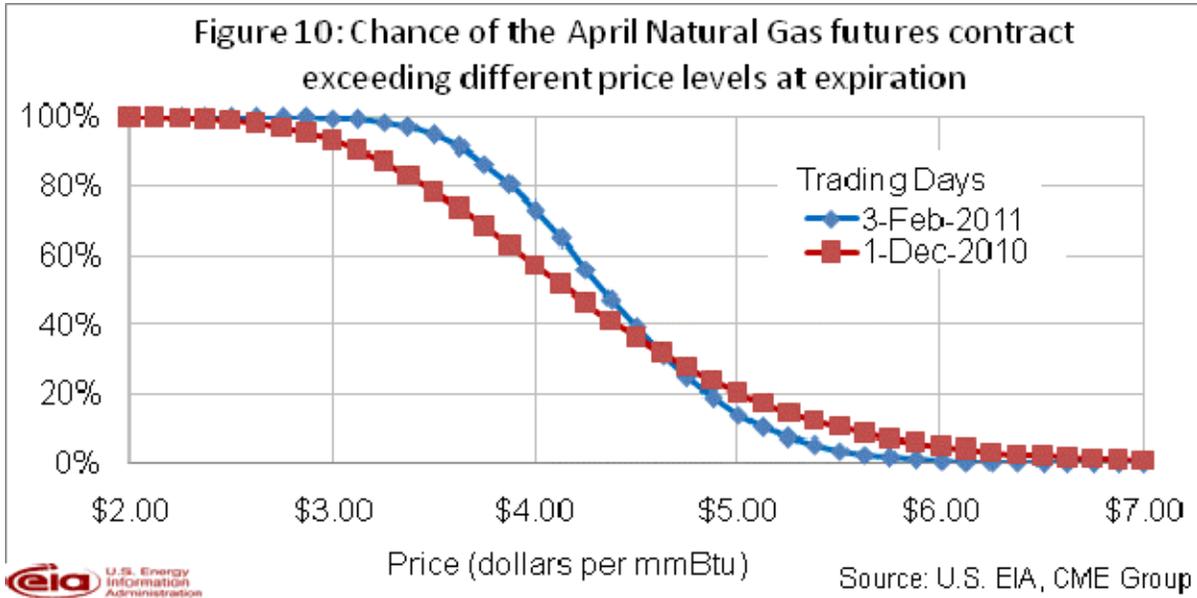
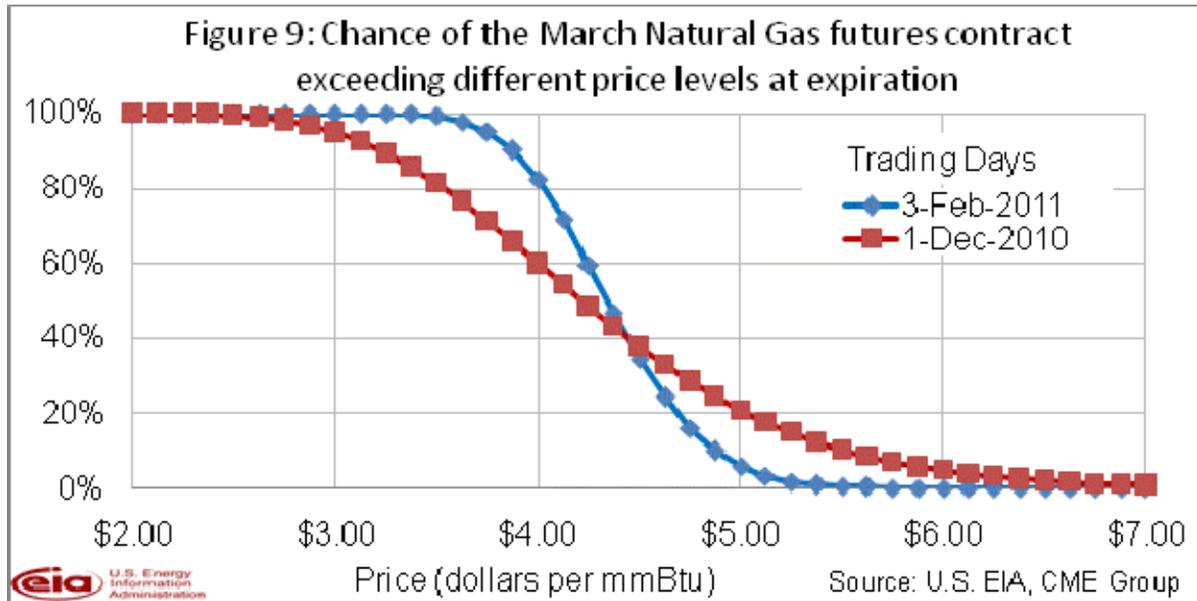
U.S. Natural Gas Prices. The Henry Hub spot price averaged \$4.49 per MMBtu in January, 2011, \$0.24 per MMBtu greater than the average spot price in December 2010. EIA expects that the Henry Hub spot price will average \$4.16 per MMBtu in 2011, a drop of \$0.22 per MMBtu from the 2010 average. EIA expects the natural gas market to begin to tighten in 2012, with the Henry Hub spot price increasing to an average of \$4.58 per MMBtu. (Figure 7).



Uncertainty over future natural gas prices is slightly lower this year compared with last year at this time. Natural gas futures for April 2011 delivery (for the 5-day period ending February 3) averaged \$4.39 per MMBtu, and the average implied volatility over the same period was 34 percent. This produced lower and upper bounds for the 95-percent confidence interval for April 2011 contracts of \$3.40 per MMBtu and \$5.66 per MMBtu, respectively. At this time last year, the natural gas April 2010 futures contract averaged \$5.35 per MMBtu and implied

volatility averaged 46 percent. The corresponding lower and upper limits of the 95-percent confidence interval were \$3.80 per MMBtu and \$7.50 per MMBtu.

Within the last few days, natural gas implied volatility has moved sharply downward (**Figure 8**). During the final week of January, implied volatility on the front month NYMEX Henry Hub futures contract has dropped by nearly five percent. This has caused implied volatility to drop below realized natural gas volatility for the previous thirty trading days.



The drop in implied volatility has also caused the probability of exceeding certain price points to decrease. The chance that natural gas prices will be greater than \$5 per MMBtu at expiration on the April futures contract has fallen by 6.29 percentage points (**Figures 9 and 10**). 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).