Independent Statistics & Analysis
U.S. Energy Information Administration

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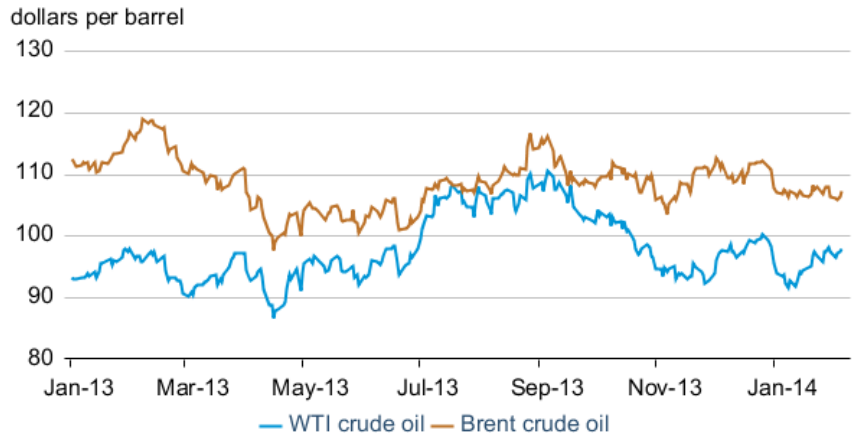
Short-Term Energy Outlook
Market Prices and Uncertainty Report

Crude Oil

Prices: International crude oil prices were relatively stable to start the year. The North Sea Brent front month futures price settled at $107.19 per barrel (bbl) on February 6, a decline of less than $1/bbl from its settle price on January 2 **(Figure 1)**. Over the same period, the West Texas Intermediate (WTI) front month futures contract rose $2.40/bbl, settling at $97.84/bbl on February 6.

Figure 1. Historical crude oil front month futures prices



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Crude oil has so far resisted the volatility and declines recently exhibited by prices in other asset markets, including equities in both developed and emerging markets. The uncertainty surrounding future economic growth, particularly in emerging market economies, as a result of the Federal Reserve winding down its long-term asset purchase program (quantitative easing), has not had a large effect on crude oil prices. Crude oil price strength in the face of potentially slower future global economic growth may reflect the perceived willingness of OPEC swing producers to cut supply and support prices should global liquid fuel demand weaken.

This is a regular monthly companion to the EIA Short-Term Energy Outlook (http://www.eia.gov/forecasts/steo/)
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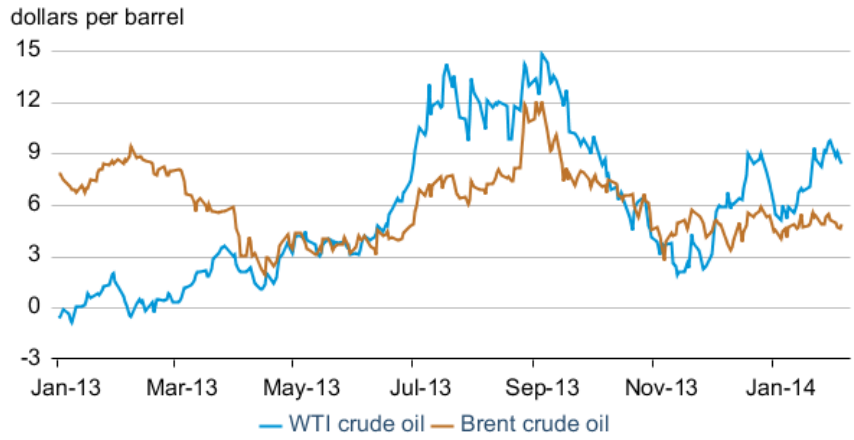
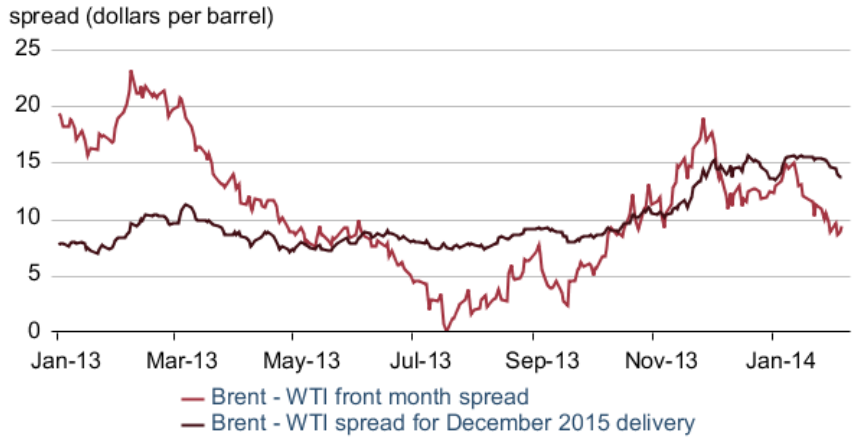
The 1st-13th WTI futures spread settled at $8.36/bbl on February 6, an increase of $2.28/bbl since January 2 **(Figure 2)**. The start-up of TransCanada's Cushing Market Link pipeline, which runs from Cushing, Oklahoma, to Port Arthur, Texas, supported a decrease in inventories at the WTI futures contract delivery point. Additionally, a strong rebound in refinery runs in the Midwest (PADD 2) after cold weather in mid-January interrupted some refining processes likely contributed to higher near-term prices. Internationally, the 1st-13th spread for Brent continued its recent relative stability, increasing slightly by $0.40/bbl since January 2 to settle at $4.83/bbl on February 6.

Figure 2. Crude oil front month - 13th month futures price spread



Beginning last September, the market's expectation for the long-term spread between Brent and WTI widened considerably. The price differential between Brent and WTI futures contracts for delivery in December 2015 displayed little volatility for the first 3 quarters of 2013, oscillating between about $7/bbl and $11/bbl **(Figure 3)**. However, starting in October, the spread widened and settled at $13.66/bbl on February 6. The shift in the long-term differential may reflect the expectation that excess light sweet crude oil on the U.S. Gulf Coast (PADD 3) could yield a large and persistent price discount of crude oil produced in the U.S. compared to international benchmarks.

Figure 3. Historical Brent - WTI crude oil price spreads



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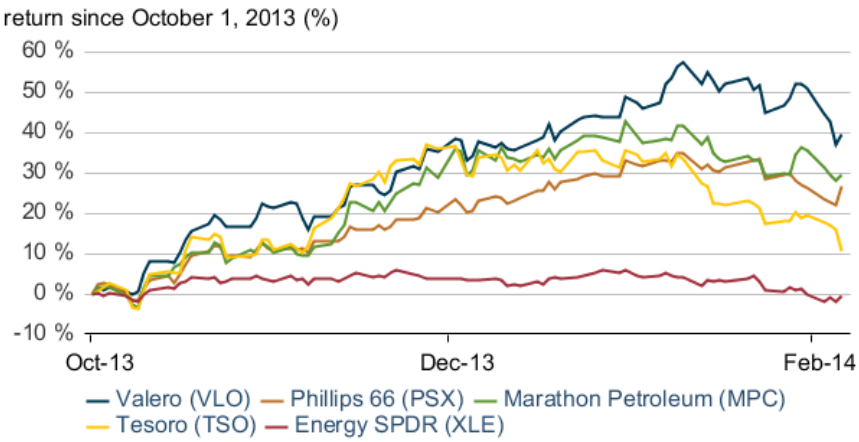
Equity returns for U.S. independent refiners: Valero, Phillips 66, Marathon Petroleum, and Tesoro are four of the five largest independent refining companies in the United States. All possess refining assets on the U.S. Gulf Coast (PADD 3), as well as marketing and transportation networks with little to no upstream crude oil exploration and production. Since October, when the long-term Brent-WTI spread began increasing, the stock prices for these refiners significantly outperformed a general energy sector benchmark, the Standard and Poor's Depository Receipt for the energy component of the S&P 500[1]. Refining companies benefit by processing discounted domestic crude oil while selling petroleum products at prices set in global markets. **(Figure 4)**.

Figure 4. Equity returns for U.S. independent refiners



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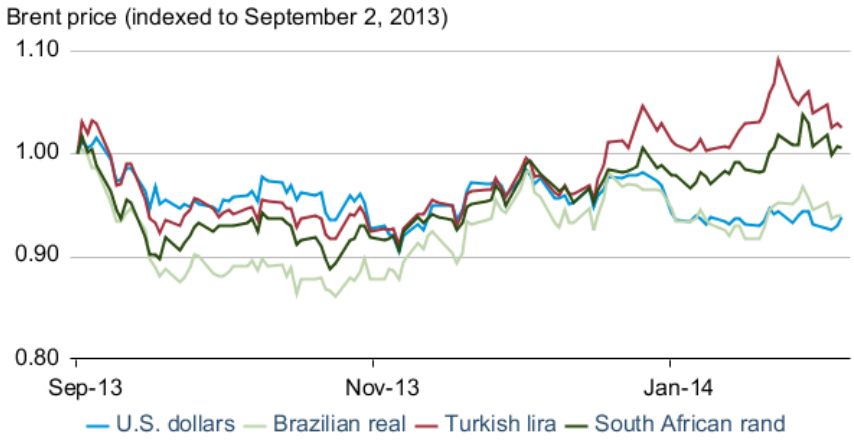
[1] Note: Returns in Figure 4 exclude dividends.

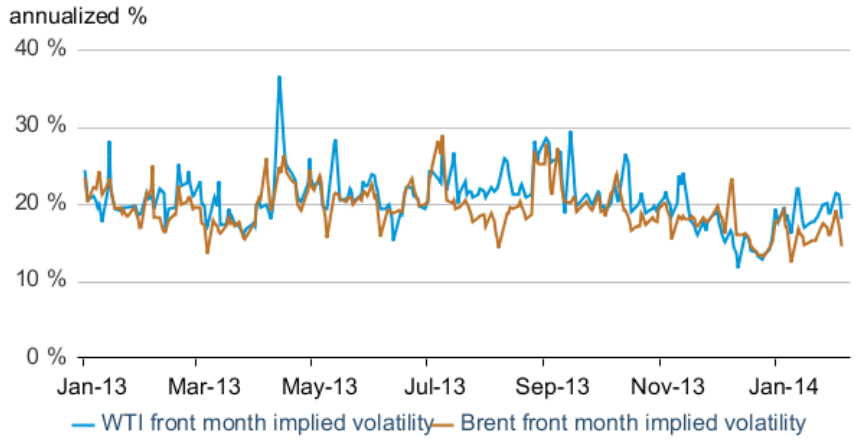
Brent in emerging market currencies: Recent uncertainty over economic growth in emerging market economies is reflected in currency market volatility, with the Brazilian real, Turkish lira, and South African rand all falling in value against the U.S. dollar over the past two months. The effect is that commodities, such as crude oil, become more expensive in these countries and potentially depress future demand. While the price of Brent in U.S. dollars dropped by 1.2% from December 17 to February 6, Brent crude oil increased by 1.5%, 7.3%, and 5.6% in reals, liras, and rands, respectively **(Figure 5)**. Central banks in some emerging market countries raised interest rates in an attempt to mitigate inflation and halt the depreciation of their currencies, but at the cost of potentially slower future economic growth, which would also negatively impact demand for crude oil.

Figure 5. Brent crude oil price in emerging market currencies



Volatility: Implied volatility for both Brent and WTI decreased in January and the first week of February. Brent and WTI implied volatility fell by 3.3 and 1.4 percentage points, respectively, since January 2 to settle at 14.5% and 18.0%, respectively, on February 6 **(Figure 6)**. Increased volatility in the Brent-WTI spread is reflected in WTI's elevated implied volatility compared to Brent's, as the market expects WTI prices to react more to shifting supply and demand factors within the United States.

Figure 6. Crude Oil Implied Volatility



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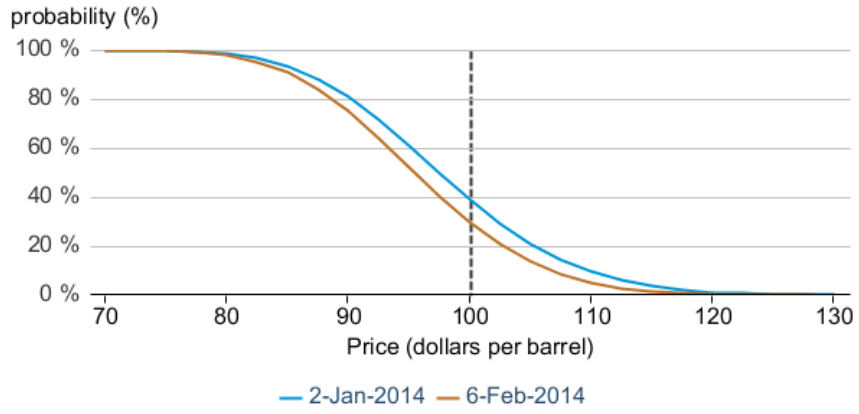
Market-Derived Probabilities: The May 2014 WTI futures contract averaged $97.90/bbl for the five trading days ending February 6 and has a probability of exceeding $100/bbl at expiration of approximately 30%. The same contract for the five trading days ending January 2 had a probability of exceeding $100 of 39% (**Figure 7**). Because Brent prices are higher than WTI prices, the probability of Brent futures contracts expiring above the same dollar thresholds is higher.

Figure 7. Probability of the May 2014 WTI contract expiring above price levels



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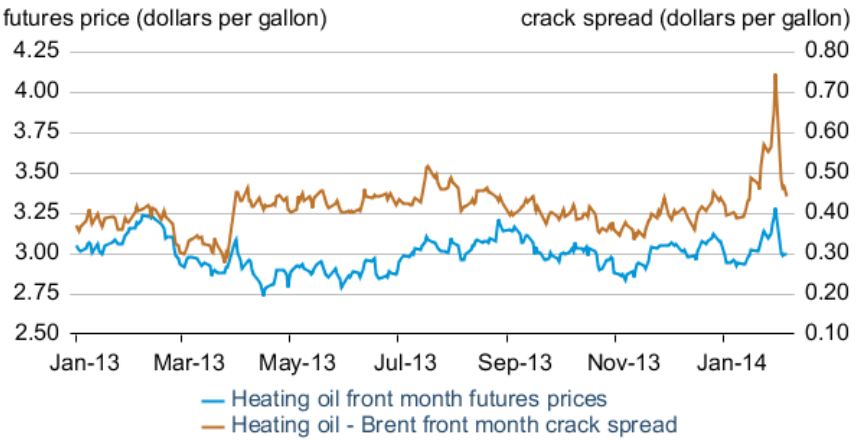
Petroleum Products

Heating Oil prices: The front month futures price for heating oil experienced a large price jump in the second half of January, reaching $3.28 per gallon (gal) on January 31, the last day of trading for the February contract. After the rollover, the front month contract for March delivery settled at $3.00/gal on February 6, nearly unchanged since January 2, but spot heating oil prices in New York harbor remain elevated. The heating oil-Brent crack spread increased by a marginal $0.02/gal to $0.44/gal on February 6. The crack spread reached its highest point since the summer of 2008 at $0.75/gal on January 31 **(Figure 8)**.

Much of the country, including the Northeast region that is home to more than 80% of the oil-heated homes in the United States, experienced colder-than-normal temperatures in January, resulting in increased need for home heating oil. U.S. distillate consumption plus exports for the four weeks ending January 31 were 5.31 MMbbl/d, the highest recorded for any January and the second highest for any month. Distillate production was up 0.18 MMbbl/d year-over-year from January 2013 as refiners increased runs in response to higher distillate crack spreads.

U.S. refiners have increased distillate exports considerably in recent years, as strong international demand absorbed distillate production during seasonal lows of U.S. consumption. During the winter months, exports fall to meet the seasonal demand for heating oil in the Northeast. Inventories of heating oil in New England and Central Atlantic states set new five-year lows for much of 2013, providing less flexibility to the market when supplies are strained. As a result, when the seasonal demand for heating oil is higher than anticipated, prices increase to bring in imports more quickly than in years when inventories are more abundant. The Northeast is currently expecting imports of distillate from Europe and Asia to arrive in February. These extra supplies along with expected warmer weather reduced futures prices for March delivery compared to February contract and the spot market.

Figure 8. Historical heating oil futures price and crack spread



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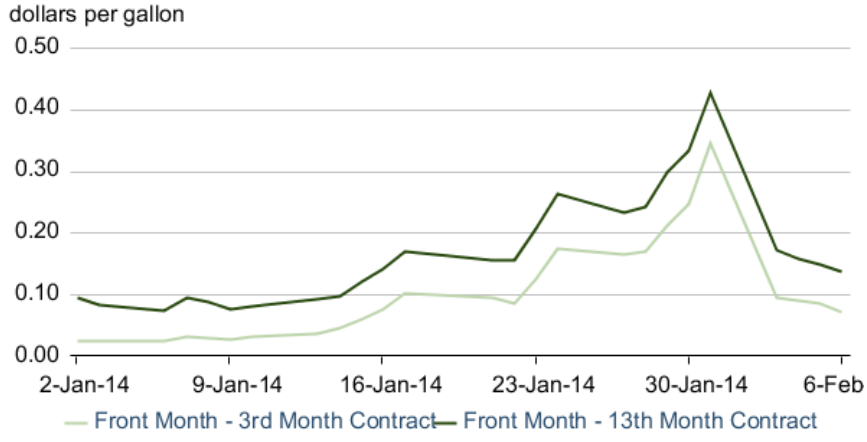
Heating Oil backwardation: As the demand for heating oil surged in January, backwardation in the heating oil futures curve increased substantially. The heating oil 1st-13th spread rose $0.33/gal to $0.43/gal from January 2 to January 31, double the highest differential seen since the futures curve became backwardated in 2011 **(Figure 9)**. A similar increase in magnitude occurred in the 1st-3rd spread, which rose $0.32/gal during the same period. Low inventories and high demand for the heating oil in the Northeast created a tight near-term market, with the expectation that once demand dropped and import supplies arrived, heating oil prices would moderate. When the heating oil contract rolled over to the March contract on February 1, front month prices declined, indicating an easing of the tight market in the near future.

Figure 9. Heating oil 1st-13th futures price spread



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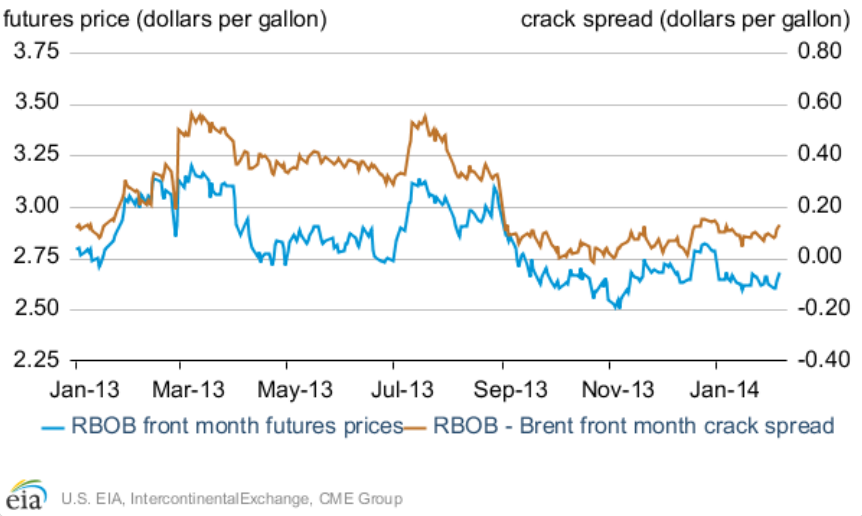
Gasoline prices: The reformulated blendstock for oxygenate blending (RBOB) front month futures contract price settled at $2.68/gal on February 6, a slight decrease of $0.01/gal from January 2 **(Figure 10)**. The RBOB-Brent crack spread remained the same, settling at $0.13/gal on February 6.

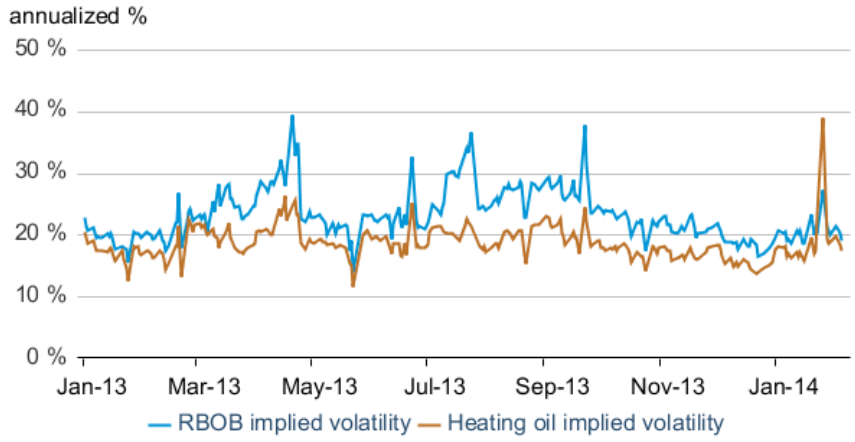
Changes in gasoline market fundamentals were relatively muted to begin the year. January U.S. gasoline consumption plus exports increased 0.05 MMbbl/d year-over-year while total U.S. gasoline production was up 0.07 MMbbl/d. Elevated gasoline inventories, resulting from refiners running crude in order to taking advantage of distillate crack spread levels not seen in six years, kept gasoline prices stable. In addition, heating oil's price premium to RBOB for the February contract grew to $0.65/gal at expiration, up from its average premium of $0.34/gal for those contracts in 2013.

Figure 10. Historical RBOB futures prices and crack spread



Volatility: The implied volatilities for the front month RBOB contract and the front month heating oil contract both decreased slightly from the beginning of January. RBOB implied volatility decreased 0.6 percentage points from January 2, settling at 19.0% on Febrary 6 **(Figure 11)**. Implied volatility for the heating oil contract decreased 0.2 percentage points, settling at 17.4%. Heating oil implied volatility reached 38.9% at the end of January, the highest since August 2012, as heating oil prices were increasing rapidly due to the uncertainty surrounding cold weather in the Midwest and Northeast.

Figure 11. RBOB and Heating Oil Implied Volatility



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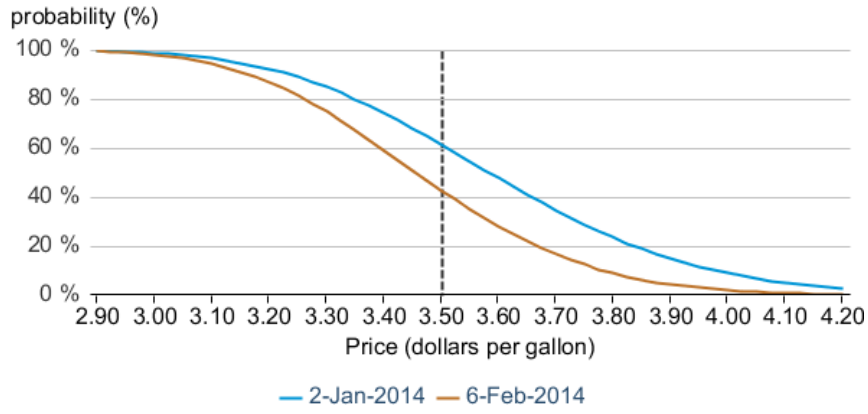
Market-Derived Probabilities: The May 2014 RBOB futures contract averaged $2.82/gal gallon for the five trading days ending February 6 and has a probability of exceeding $2.85/gal (typically leading to a retail price of $3.50/gal) at expiration of approximately 43%. The same contract for the five trading days ending January 2 had a probability of 62% of exceeding $2.85/gal **(Figure 12)**.

Figure 12. Probability of May 2014 retail gasoline exceeding different price levels at expiration



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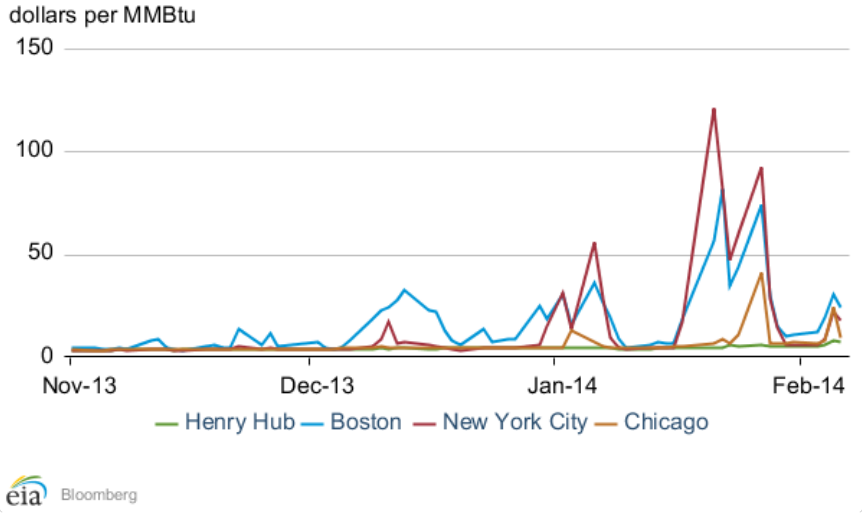
Natural Gas

Prices: Cold weather continued to affect the natural gas market in January as it did in December, causing freeze-offs in production as well as spikes in residential heating demand. January 2014 was a month of record storage withdrawals, with working inventories 11% below the 5-year minimum at the start of February. The front month Henry Hub futures contract reached a 4-year high of $5.56/MMBtu on January 29 and settled at $4.93/MMBtu on February 6, $0.61/MMBtu higher than the close on January 2.

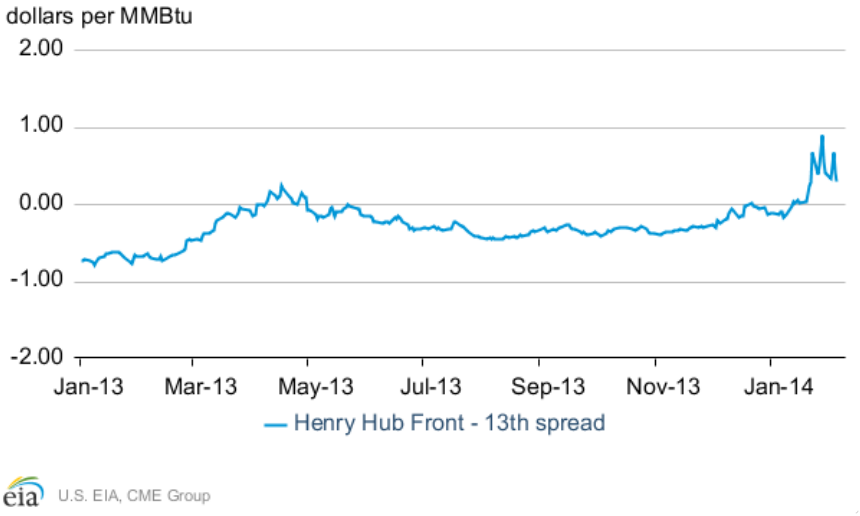
Spot prices throughout various pricing points reached record highs as well **(Figure 13)**. New York and Boston have had price spikes in previous winters, but prices had never settled above $100/MMBtu, which occurred last month at the Transco Zone 6 Hub in New York when prices settled at $120.70/MMBtu on January 21. The Midwest also saw unprecedented spikes as the Chicago Citygates price closed at $41.31/MMBtu on January 27.

Figure 13. U.S. natural gas regional spot prices



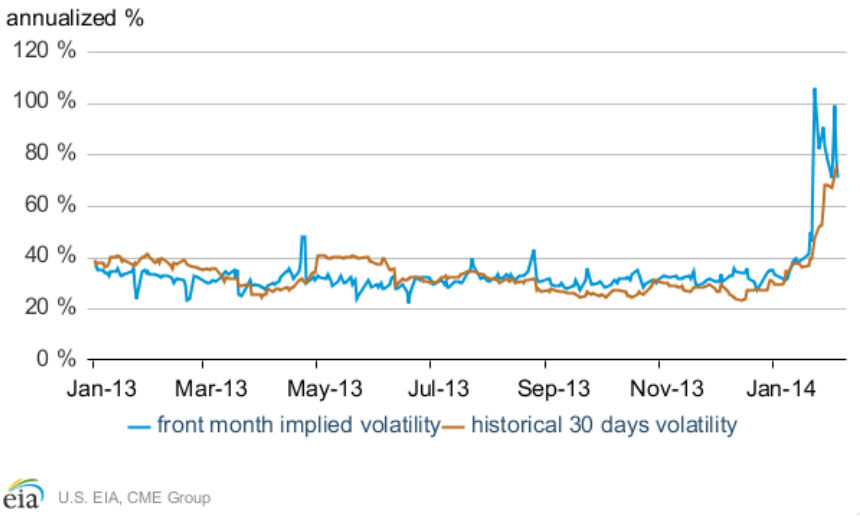
Price movements in longer dated Henry Hub contracts, however, were less pronounced relative to the front month **(Figure 14)**. The term structure is now in backwardation (when near-term prices are greater than longer-term ones), suggesting that market participants expect U.S. supply growth to offset some of the price increases of recent stock drawdowns over the course of the year.

Figure 14. Natural gas 1st-13th futures price spread



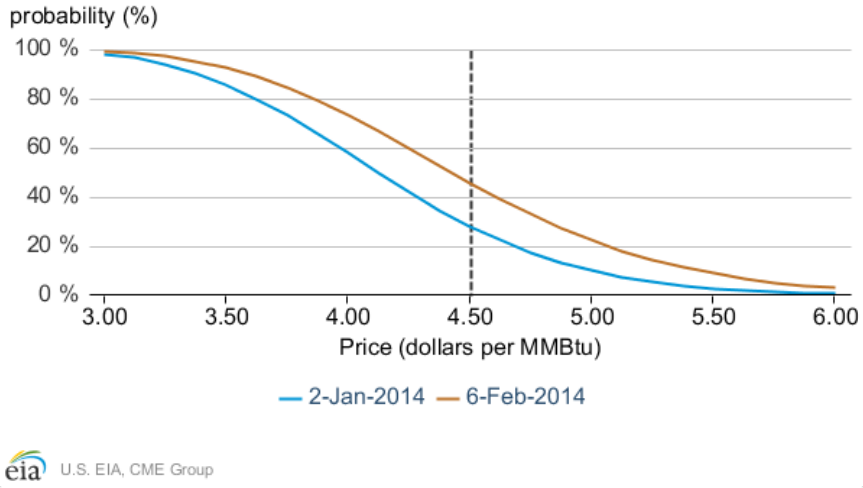
Volatility: Volatility increased substantially in January, rising from historic lows in December as market tightness rapidly increased prices and uncertainty. Implied volatility increased to 71.1% on February 6, 35.8 percentage points higher than on January 2 **(Figure 15)**.

Figure 15. Natural gas historical and implied volatility



Market-Derived Probabilities: The probability of the May 2014 Henry Hub contract expiring above $4.50/MMBtu increased to 46% on February 6, 18 percentage points higher than the probability on January 2 **(Figure 16)**.

Figure 16. Probability of the May 2014 Henry Hub contract expiring above price levels



Propane

Prices: EIA has been documenting the recent volatility in propane prices as numerous factors contributed to create a supply crunch in the Midwest at a time of high demand. Spot propane prices at Conway, Kansas, reached a record high $4.95/gal on January 23, a $3.43/gal premium over the Mont Belvieu, Texas, propane price **(Figure 17)**.

High propane prices created extraordinary market conditions for trading in the ethane/propane mix at Conway. The contract specifies that settlement is based on the ethane value, which typically accounts for 80% of the mix. The buyer must return the propane portion to the seller either through physical delivery or a separate payment at the propane market price. Propane prices were high enough that ethane prices dropped negative—that is, the seller had to pay the buyer to take more ethane. Since the seller would receive a very high price for the propane, this dynamic revealed a unique way to attract propane supplies to the Midwest.

Figure 17. Conway propane and Conway ethane/propane mix