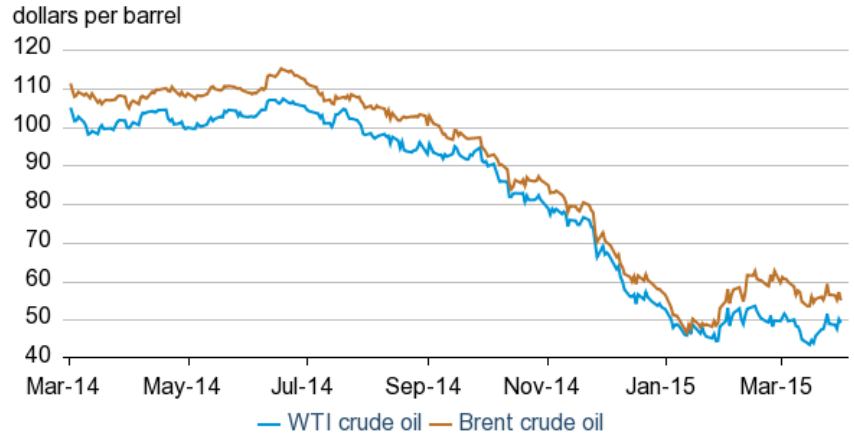
Short-Term Energy Outlook
Market Prices and Uncertainty Report

Crude Oil

Prices: After increasing in February, global crude oil prices declined in March. The North Sea Brent front month futures price settled at $54.95/bbl on April 2, a decline of $4.59/bbl since the close on March 2 **(Figure 1)**. The West Texas Intermediate (WTI) front month futures price declined by $0.45/bbl over the same period to settle at $49.14/bbl on April 2. The average Brent price for March was 3.2% lower compared to the average in February, the smallest monthly average change since June 2014.

Figure 1. Historical crude oil front month futures prices



March was one of the more stable months for international crude oil prices compared to the past half-year. Supply-side developments put downward pressure on crude oil prices amid increased exports from Libya and Iraq as well as the potential for increased future production from Iran, with sanctions potentially lifted as part of the framework agreement. On the demand side, initial data from first-quarter 2015 suggest end users are increasing consumption in response to low oil prices, which provided price support. Overall, oil market uncertainty remains at elevated levels and the potential for large upward or downward shifts in price remain.

This is a regular monthly companion to the EIA *Short-Term Energy Outlook* (http://www.eia.gov/forecasts/steo/)
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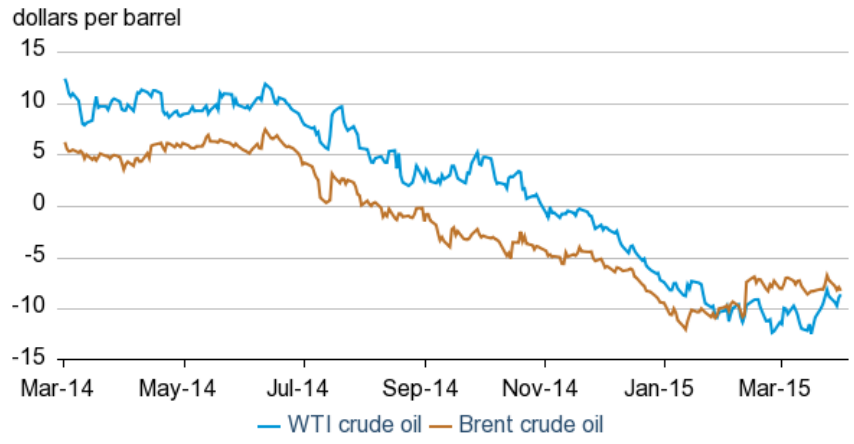
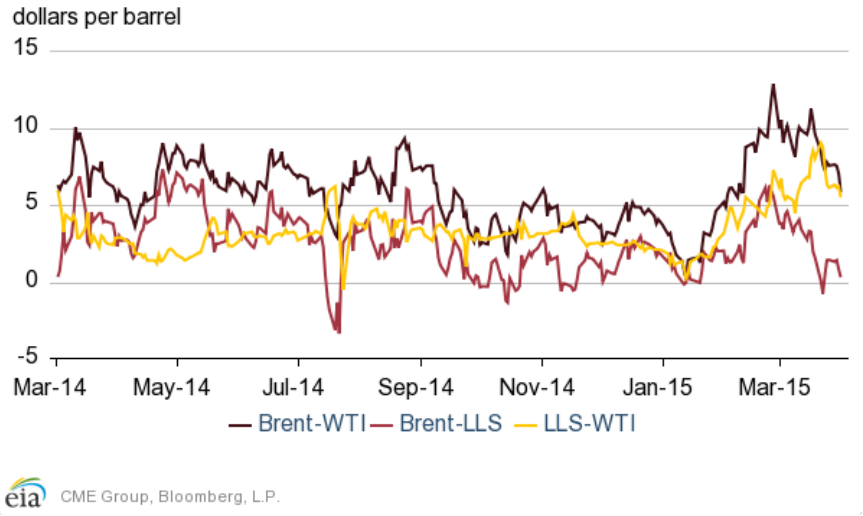
U.S. commercial crude inventories continued to build in March, reaching 471 million barrels as of March 27. With U.S. refineries beginning to return from maintenance, future inventory builds are likely to slow, and this contributed to a decrease in contango (when near-term prices are less than longer-term ones) in the WTI futures curve. The 1st-13th spread for WTI futures contracts settled at -$8.61/bbl on April 2, $2.70/bbl higher than the close on March 2 **(Figure 2)**. In contrast to the U.S. market, refinery maintenance in Europe and Asia over the next two months could lead to higher international crude oil inventories. This contributed to keeping the futures curve for Brent crude oil relatively unchanged, with the 1st-13th spread settling at -$8.25/bbl on April 2.

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



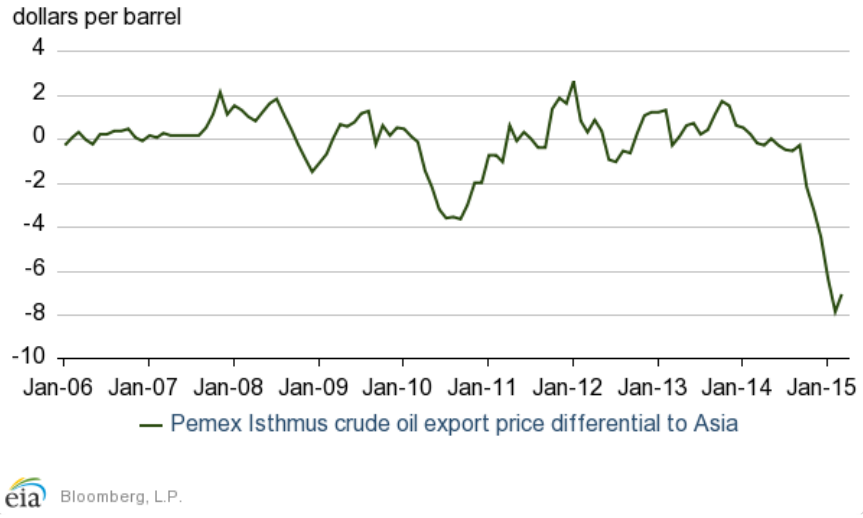
The Louisiana Light Sweet (LLS)-WTI spread reached $9.00/bbl on March 23 **(Figure 3)**, the highest differential since January 2014 as WTI weakened significantly and LLS strengthened in mid-March. With record high inventory levels at the WTI delivery point at Cushing, Oklahoma, the differential could increase crude oil flows from Cushing to the U.S. Gulf Coast. The Brent-LLS spread declined $3.49/bbl from March 2 to $0.31/bbl on April 2, with LLS briefly reaching a premium to Brent. A narrow Brent-LLS spread can attract crude oil imports to the U.S. Gulf Coast in the near term, which, combined with the potential for crude oil shipments from Cushing, indicates that market participants are anticipating a rise in refinery runs as more refineries come back online in the coming weeks. If, however, runs do not increase as much as expected, the spread between international and domestic crudes could widen.

Figure 3. Historical crude oil differentials



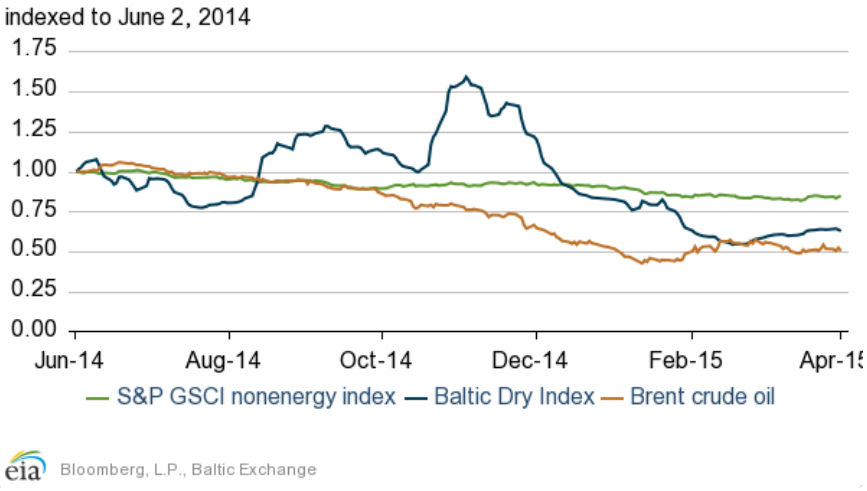
Over the past several years, when crude oil production dramatically increased in the United States, reliance on crude oil imports to meet domestic demand declined. As a result, traditional U.S. trading partner Mexico is trying to expand and diversify its customer base. Petroleos Mexicanos (Pemex), Mexico's state-owned oil company, lowered its Isthmus crude Official Selling Price (OSP) for Asian consumers to $7.85 below the Dubai/Oman benchmark in February and to $7.05 in March **(Figure 4)**, two of the largest discounts since at least 1995. As a result, some Asian countries, responsible for most of crude oil demand growth, have reportedly bought shipments of Mexican crude oil, which are now competitive in price with their usual Middle Eastern crude oil feedstock. South Korea's GS Caltex, a major oil refiner, purchased 1 million barrels of crude oil from Pemex for March delivery, its first purchase of Mexican crude in over two decades. Additionally, it was reported that Pemex will ship a total of 5 million barrels of crude oil to South Korea through April.

Figure 4. Pemex Isthmus Crude Oil OSP Differential To Asia



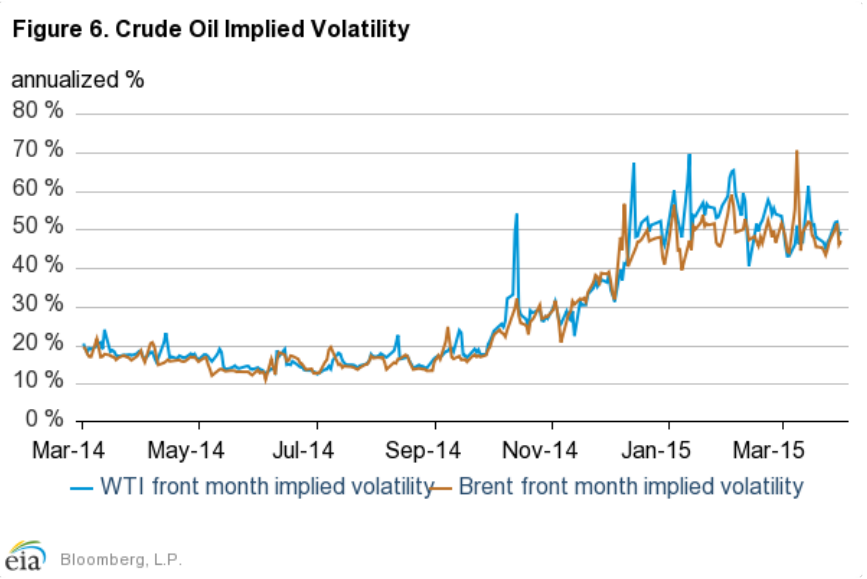
Brent, nonenergy commodities, and the Baltic Dry Index: Similar to energy commodities, nonenergy ones such as copper, silver, and wheat within the Standard & Poor's Goldman Sachs Commodity Index (S&P GSCI) nonenergy subindex fell over the last half of 2014 and into 2015. These broad-based declines in prices for globally traded commodities were indicative of lowered expectations for global economic growth. Another real-time proxy for global economic activity, the Baltic Dry Index (BDI), which measures the cost of shipping raw materials, reached an all-time low in February. From June 2, 2014, through March 2, 2015, Brent, the BDI, and the nonenergy GSCI subindex declined 45%, 41%, and 16%, respectively **(Figure 5)**. From March 2 to April 2, however, the BDI and the nonenergy GSCI subindex are up 7.3% and 1%, respectively, with Brent down 7.7%. An increase in some commodity prices and the BDI may indicate economic activity can provide support for future global crude oil and petroleum product consumption.

Figure 5. Brent crude oil price, Baltic Dry Index, and S&P GSCI nonenergy Index



Volatility: Implied volatility for both Brent and WTI front month futures contracts decreased slightly over the past month. Brent implied volatility settled at 47% on April 2, a decrease of 4.5 percentage points since March 2, and WTI implied volatility settled at 49.3% on April 2, a decrease of 4.1 percentage points over the same period **(Figure 6)**. The implied volatilities for both crudes remain at elevated levels reached in mid-December 2014.

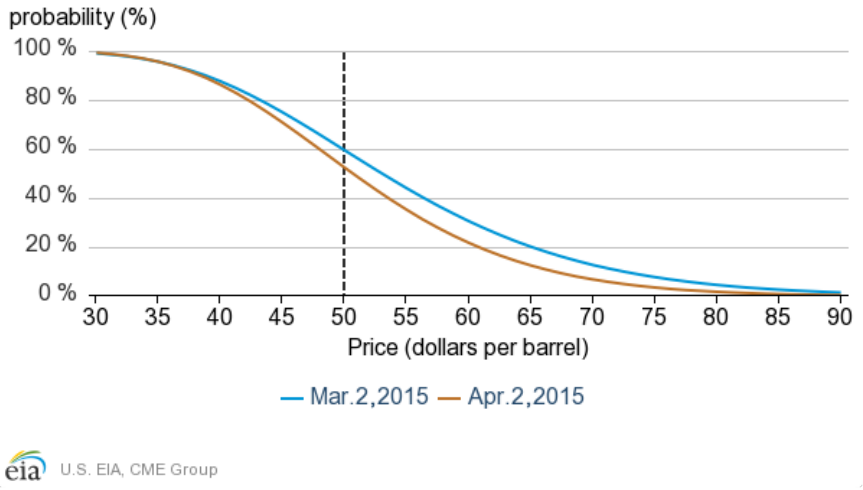
Figure 6. Crude Oil Implied Volatility



Market-Derived Probabilities: The July 2015 WTI futures contract averaged $51.86/bbl for the five trading days ending April 2 and has a probability of exceeding $50/bbl at expiration of 52%. The same contract for the five trading days ending March 2 had a probability of exceeding $50/bbl of 60% (**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 July 2015 WTI contract expiring above price levels

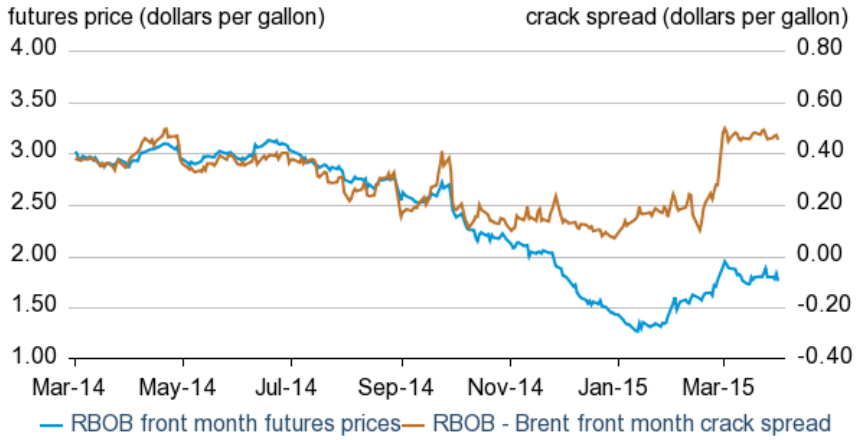


Petroleum Products

Gasoline prices: The reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline) front month futures price declined $0.14 per gallon (gal) from March 2 to settle at $1.76/gal on April 2 **(Figure 8)**. The RBOB-Brent crack spread settled at $0.45/gal on April 2, $0.03/gal lower than at the beginning of March.

U.S. gasoline consumption plus exports totaled 9.57 million bbl/d and remain near five-year highs. Lower gasoline prices compared to this time last year are likely contributing to robust demand both domestically and internationally. U.S. gasoline inventories also began the typical, seasonal decline as winter grade gasoline is sold to make room for summer grade production. Inventories drew for the fourth consecutive week ending March 27 and are now 11 million barrels lower compared to the end of February. This is in contrast to strong builds in both commercial crude oil and distillate inventories during that time.

Figure 8. Historical RBOB futures prices and crack spread



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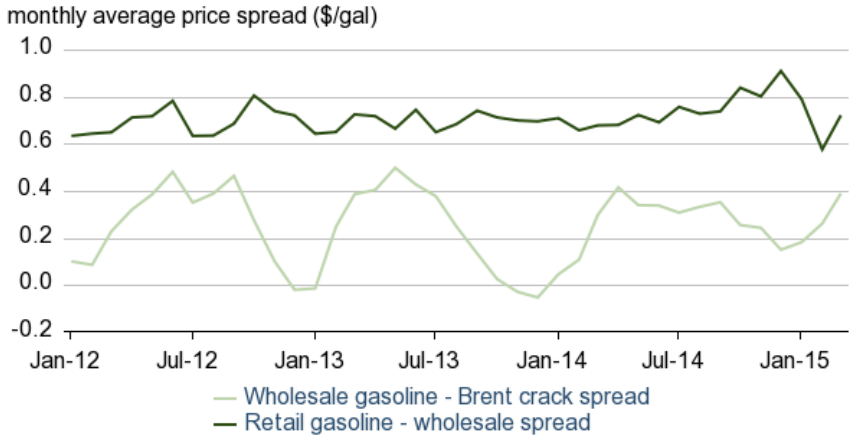
Crude oil prices were relatively stable from 2012 through the first half of 2014, and during that time, gasoline crack and retail spreads followed normal, seasonal patterns. However, with the decline in oil prices in the second half of 2014, both gasoline crack and retail spreads were elevated. The retail-wholesale spread averaged $0.91/gal in December 2014 **(Figure 9)**, when crude oil prices declined at the fastest rate. Similarly, gasoline-Brent crack spreads averaged $0.15/gal in December 2014, $0.20/gal above December 2013 levels. As crude oil prices stabilized recently, these spreads returned to levels near respective 3-year averages.

Figure 9. Monthly wholesale and retail gasoline price spreads



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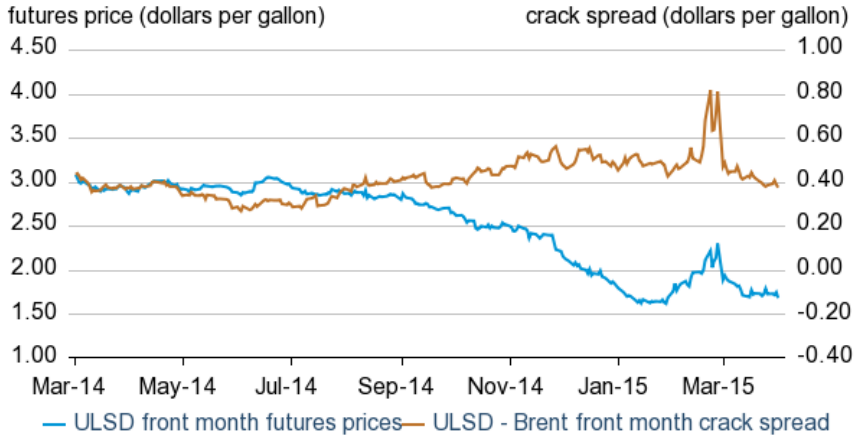
Ultra-Low Sulfur Diesel prices: The front month futures price for the New York Harbor Ultra-Low Sulfur Diesel (ULSD) contract declined $0.20/gal from March 2 to reach

$1.68/gal on April 2 **(Figure 10)**. The ULSD-Brent crack spread decreased by $0.10/gal since March 2 to settle at $0.37/gal on April 2.

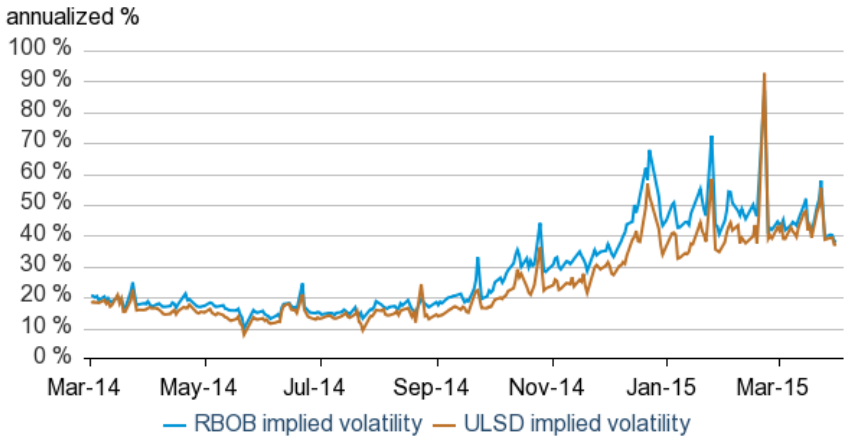
As cold weather subsided in the eastern United States over the past few weeks, demand for distillate declined. For the four weeks ending March 27, distillate consumption plus exports declined 0.40 million bbl/d from February, compared to an average decline of just 0.06 million bbl/d over the last five years. As a result, distillate stocks rose 4.2 million barrels as of March 27 from February, in contrast to a 4-million-barrel average decline over the last five years.

Figure 10. Historical ULSD futures price and crack spread



Volatility: Implied volatility for RBOB and ULSD front month futures settled at 38.1% and 37%, respectively, on April 2, a decline of 6.5 percentage points and 5.7 percentage points, respectively, compared to March 2 **(Figure 11)**. The spread between RBOB and ULSD implied volatility decreased over the past few months and both are now below Brent and WTI crude oil implied volatility levels. This suggests that uncertainty in product markets is currently being driven by uncertainty in crude oil markets.

Figure 11. RBOB and ULSD Implied Volatility



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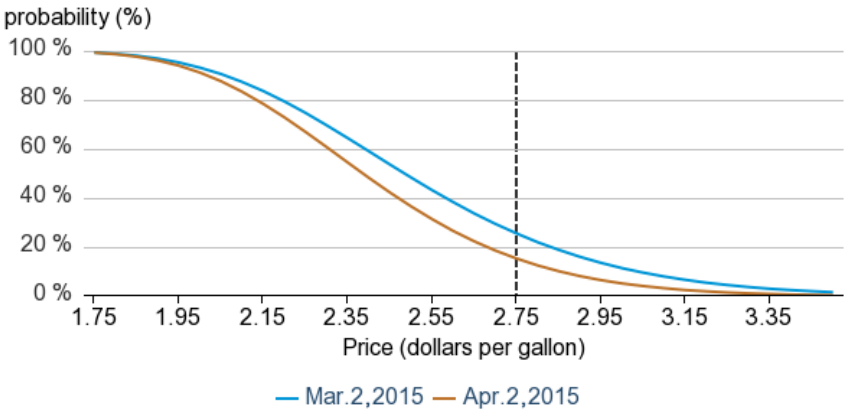
Market-Derived Probabilities: The July 2015 RBOB futures contract averaged $1.77/gal for the five trading days ending April 2 and has a 15% probability of exceeding $2.10/gal (typically leading to a retail price of $2.75/gal) at expiration. The same contract for the five trading days ending March 2 had a 26% probability of exceeding $2.10/gal **(Figure 12)**.

Figure 12. Probability of July 2015 retail gasoline exceeding different price levels at expiration



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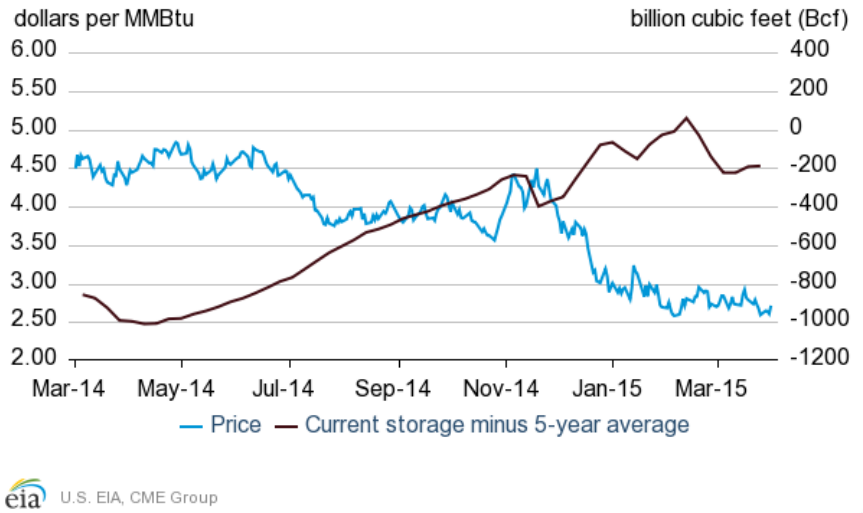
Natural Gas

Prices: Henry Hub futures prices traded in a $0.33/MMBtu range in March, closing at $2.71/MMBtu on April 2, $0.02/MMBtu lower than the close on March 2. April marks the beginning of injection season, as consumption decreases with the decline in winter heating demand. April of this year has a remarkably different inventory situation compared with the beginning of injection season last year. In April 2014, nationwide

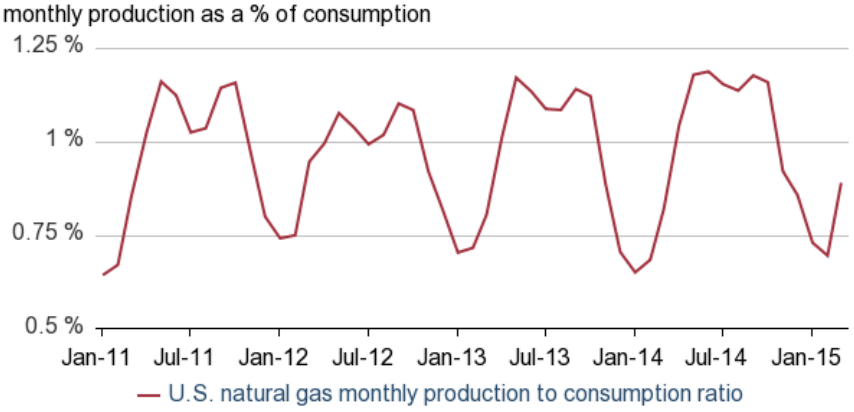
inventories stood about 1,000 billion cubic feet (Bcf) below their respective five-year average, while as of March 27, the deficit had been cut to 190 Bcf below the five-year average **(Figure 13)**. U.S. natural gas production remains at an all-time high that, if continued throughout the injection season, could lead to a surplus compared to the five-year average by November.

Figure 13. U. S. natural gas prices and storage



U.S. natural gas production accounted for a higher percentage of monthly consumption compared to last year's winter and contributed to lower price volatility compared to one year ago. For December 2014 through March 2015, 78% of U.S. natural gas consumption was met by production that occurred during those months **(Figure 14)**, 7.4 percentage points higher than the December 2013 through March 2014 period. The proportion of consumption met by production in January and February, typically the coldest time of the year, was similar to levels in 2013 and less than those in 2012, but temperatures were colder this past winter compared to those years. Strong year-over-year growth in U.S. natural gas production, particularly during winter months, means that less natural gas needs to be taken out of inventories, lessening the effect of short-term increases in demand based on colder-than-expected temperatures, and thus reducing natural gas price volatility.

Figure 14. Ratio of monthly U.S. natural gas production to consumption



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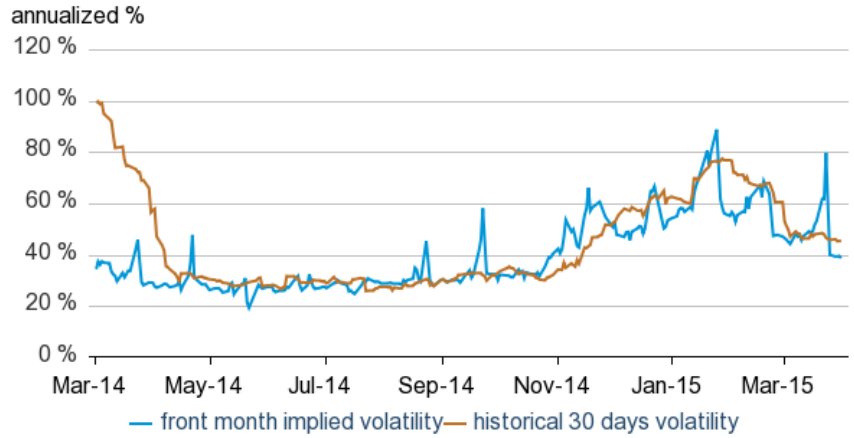
Volatility: Implied volatility for the front month natural gas futures contract decreased as the market comes to the end of the winter heating season and the start of storage builds. Implied volatility settled at 38.7% on April 2, 8.4 percentage points lower compared to March 2 **(Figure 15)**. With U.S. temperatures increasing, the risk of unexpected demand shocks impacting the market is reduced and prices become seasonally less volatile. Historical 30-day volatility also declined, settling at 45.4% on April 2.

Figure 15. Natural gas historical and implied volatility



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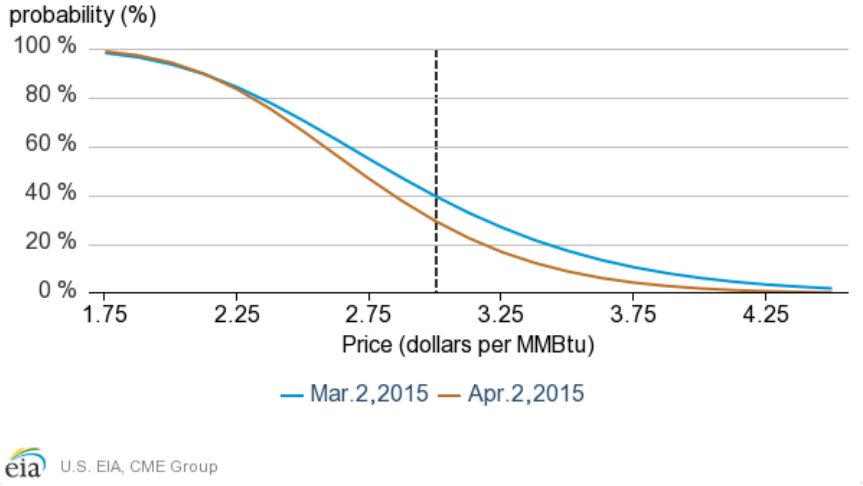
Market-Derived Probabilities: The July 2015 Henry Hub futures contract averaged $2.76/MMBtu for the five trading days ending April 2 and has a 30% probability of exceeding $3.00/MMBtu at expiration. The same contract for the five trading days ending March 2 had a 40% probability of exceeding $3.00/MMBtu **(Figure 16)**.

Figure 16. Probability of the July 2015 Henry Hub contract expiring above price levels



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