

PIRA Price Forecast Methodology

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PIRA Energy Group

- Upside surprises to non-OPEC production. This could include, but would not be limited to, much higher shale liquids production in both North America and abroad than assumed under our Reference Case. Note, however, that not only would the shale liquids volumes have to be higher but they would have to be economically attractive at the lower prices of this case. Current estimates suggest that a price of between \$50 and \$70/Bbl (WTI 2011\$) is required to provide an acceptable return on shale liquids wells. That breakeven cost could drift down with improved technology or drift up with increased activity and scarcity of resources, as oil sands costs have done in Alberta.

Under these assumptions, we define a representative low case with an average WTI price of around \$60/Bbl over the 2012-2025 period. This average price would be about 37% lower than our Reference Case price — slightly smaller than the differential assumed back in November of 2009 between our Reference and Low cases.

The reason that our outlook for the Reference Case has recently been revised down more than the Low case has to do primarily with the economics of shale liquids. It is now clear that we will have far more shale liquids supply than anticipated at prices above \$100. Previously, we had assumed that price would have to rise above marginal costs to destroy demand growth. Now it appears that supply is more responsive to high prices so that \$120-130 prices will not be necessary. However, this incremental shale supply is relatively high cost supply. If the wellhead price begins to fall below \$70, a growing proportion of the volume will become economically unattractive and will not be produced. While the availability of price responsive shale liquids is helping to put a cap on long-term prices, it also serves to put a floor on those prices as well.

Comparison with November 2009 Outlook

The Reference Case that was developed in November of 2009 was slightly higher than our current view. Comparing the forecasts in the same constant 2010\$, over the same time period, our average Reference Case WTI price then was \$100/barrel and the current price for the same 2009-2025 period would be slightly lower at \$91/barrel. An assumption that WTI will sell at a long-range discount to Brent accounts for most of the difference. Our Reference case outlook for Brent price, a better indicator of global prices, is nearly unchanged. The comparable numbers for the Low Case were \$46/barrel (2010\$) then and \$58/barrel now. As mentioned above, the emergence of shale liquids as an important marginal supply step not only reduced the Reference Case but provided greater support in the Low case.

The risk profile was assumed to be biased to the upside in 2009 and we now see it biased to the downside but not by much. With the ever growing uncertainties in the Middle East, including the possibility of a confrontation with Iran that could impact both Iranian and regional production, the potential for severe price spikes cannot be dismissed.