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FOCUS ARTICLE

U.S. Shale Oil

The New Global Swing Producer

The shale oil boom is rewriting the global supply equation.

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Focus
Article

U.S. Shale Oil:
The New Global Swing Producer

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Over the past decade, U.S. shale oil has become an important swing factor in the global supply equation. Recently, falling crude prices have prompted a precipitous decline in drilling activity in these plays. Despite this, production has continued to rise. A declining rig count is only the start of a supply response. The eventual impact on production will likely be measured in quarters not months.

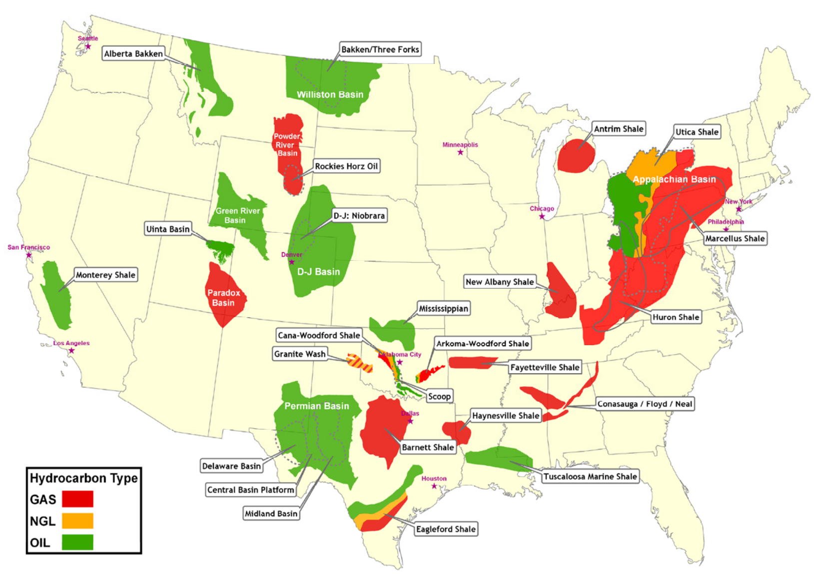
Growth from U.S. oil shale has been responsible for nearly all of the new oil produced globally since 2008. The widespread use of hydraulic fracking technology to extract oil has been so successful, that over the past decade, U.S. oil imports have been cut by half to 6 million barrels per day (bbl/day) in 2014.

The dramatic increase in activity has been at least partially responsible for the collapse in oil prices. Further, the unique characteristics of unconventional U.S. oil shales complicate the expectation that a drop in rig count will translate into a drop in production.

U.S. Land Rig Count

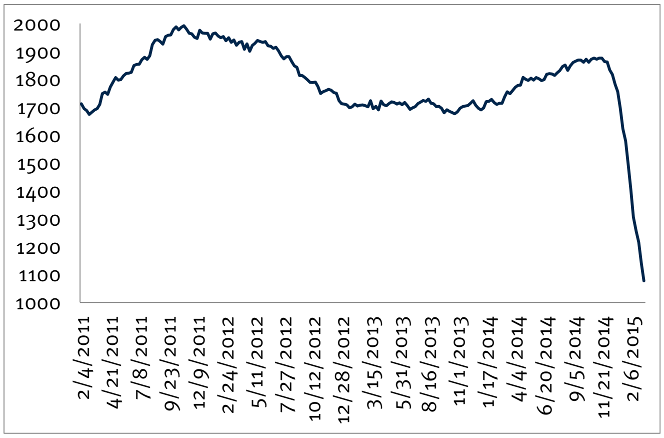
The halving of oil prices has led producers to significantly reduce capital expenditures. RBC Capital Markets expects spending budgets to fall about 35%–40% in 2015 for independent exploration and production (E&P) companies, with some having dropped by over 60% already.

U.S. Exploration & Production: Established and Emerging Oil Plays



Source - RBC Capital Markets, company reports, FactSet

U.S. Land Rig Count for Drilling Oil



Source - Baker Hughes; data through 3/13/15

As in prior oil routs, rig activity is collapsing.

Producer objectives have broadly shifted from a growth-orientated focus to a mantra of "living within cash-flow means."

In general, larger international oil companies have lowered spending budgets by a more modest 10%–30%. The lion's share of this expenditure decline is tied to lower drilling and completion activity, but a drilling cost deflation of about 20%–30% by vendors is also a contributor.

Producer objectives have broadly shifted from a growth-orientated focus to a mantra of "living within cash-flow means." For highly leveraged producers, maintaining or increasing output has become important just to make interest payments in the face of lower prices and hence cash flows.

The active rig count for U.S. onshore oil drilling has dropped by 43% from its recent peak, with activity in major shale oil plays down 45% in the Bakken (Williston Basin), 37% in the Eagle Ford, and 42% in the Permian Basin.

The response in rig activity is in line with the reactions observed during prior oil routs.

The Baker Hughes oil rig count declined 56% from peak to trough from September 2008 to June 2009, 35% from September 2001 to April 2002, and 57% from April 1998 to April 1999. In the current downdraft, RBC Capital Markets expects the active rig count to drop about 50% from peak to trough.

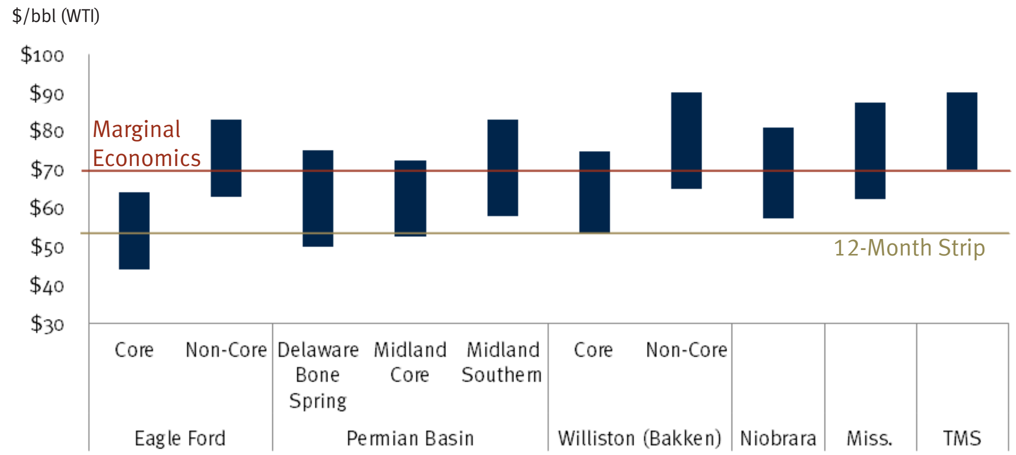
U.S. Shale Oil Economics

Each shale region exhibits variability in well productivity and efficiency.

We expect drilling activity to center on the core areas of each play that typically provide the best economics. We expect the Permian, which has the best economics, to generate the most growth, followed by the Eagle Ford, and finally the Bakken, where we see production growth levelling out. Total U.S. oil production should increase by 900,000 bbl/d in 2015, mostly from oil shales.

Unlike conventional wells, which when shut-in require significant stimulation for restart, the nature of shale production allows wells to be more easily shut-in and restarted. Weather, flooding, or other environmental concerns have "trained" firms to start and stop production repeatedly over the life of a well. Shale wells typically have adequate pressure due to the recent nature of their development, allowing a more rapid restart.

U.S. Shale Oil Break-Even Economics



Note: Miss. represents Mississippian and TMS represents Tuscaloosa Marine Shale; Price required for 15% IRR
Source - RBC Capital Markets estimates

Partial development can also add flexibility, with some producers choosing to carry on drilling but holding back on completion (fracking). As of year-end 2014, RBC Capital Markets estimates there were approximately 4,200 horizontal wells in the Bakken, Eagle Ford, Niobrara, and Permian that were drilled but not yet completed.

Despite the sharp decline in the rig count, RBC Capital Markets forecasts production to grow in 2015 ...

U.S. Shale Oil Production Trends

Total U.S. oil production (including condensate, excluding other natural gas liquids) hit record levels in 2014, averaging 8.7 million bbl/d, up 1.1 million bbl/d. Despite the sharp decline in the rig count, RBC Capital Markets forecasts production to grow in 2015 by 0.9 million bbl/d and a further 0.3 million bbl/d in 2016. The continued growth stems from a combination of factors:

- Development of the core, or most profitable, regions of the various shale plays
- Greater productivity per dollar deployed, as drilling costs fall
- Hedge protection of near-term cash flows (about 40%–45% for E&Ps, on average)
- The incentive for debt-laden companies to produce more just to remain solvent
- A shadow inventory of some 4,200 wells awaiting tie-in

Unique Characteristics of the Major Shale Plays

Bakken Three Forks Shale

Located in the Williston Basin primarily in North Dakota, Montana, and Saskatchewan, the Bakken Shale is a hybrid unconventional play with reserves estimated by the U.S. Geological Survey at 3.65 billion barrels. The region is defined by a wide disparity of break-evens. This variability has caused operators to “core-up” production as low commodity prices persist.

The basin is characterized by a few large players, but also a broader group of smaller companies with concentrated acreage. Prior to the oil price collapse, Bakken production was predicted by our research source to exceed 2 million bbl/d by mid-to-late 2017. With no productivity improvement, production should flatten in 2015.

U.S. Shale Oil

With U.S. oil production likely to grow in the near term, we believe the timing of any bottoming in crude prices will remain difficult to predict.

Permian Basin

Located in West Texas and parts of southeastern New Mexico, the Permian, which contains an estimated 30 billion barrels of oil, has been actively drilled since 1925. It returned to prominence in 2012 as horizontally drilled wells started to fully exploit the region's potential.

Despite the decline in the rig count, production, which has risen 60% over the past 12 months, will likely continue growing in 2015. This growth will be driven by a backlog of 1,100 wells in the focus area, as well as continued productivity gains.

Eagle Ford

The region, which extends from South Central Texas into northern Mexico, has produced nearly 1.1 billion barrels of oil and 4.6 trillion cubic feet (tcf) of natural gas since it was discovered in 2009. Recent data appears to suggest a flattening of the production trend, which should then decline beginning in Q3 2015.

Similar to the Bakken, the core region continues to demonstrate among the highest internal rates of return in the shale industry, which could be further enhanced with services cost deflation. Our research sources estimate that about one-third of Eagle Ford production is "uneconomic" at $50/bbl WTI, even assuming 20% cost deflation, and about one-quarter may be uneconomic at $60/bbl WTI.

Implications for Global Oil Price Trends

The key characteristics of U.S. shale oil are its flexibility with respect to drilling activity, shut-in potential, and sharp production declines. This flexibility has made U.S. shale oil a significant swing producer in the global oil market.

RBC Capital Markets believes it may be well into H2 2015 before oil prices find any degree of equilibrium, forecasting WTI at $41.50/bbl for Q2, $55.31 for Q3, and $70.16 for Q4. With U.S. oil production likely to grow in the near term, we believe the timing of any bottoming in crude prices will remain difficult to predict.

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