

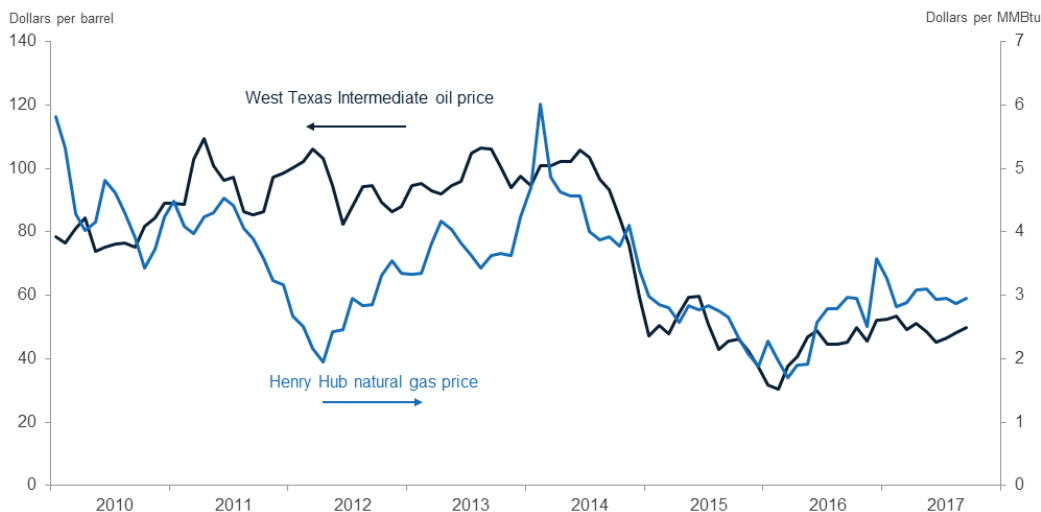
## October 2017

Prices for both West Texas Intermediate (WTI) crude oil and Henry Hub natural gas rose slightly in September. The WTI–Brent spread widened to the highest level since March 2015 as crude inventories at Cushing rose. The Brent futures curve is now in backwardation (or downward sloping) through 2019. Oil production growth in the Permian Basin continued to remain strong. Permian natural gas production continues to rise and currently exceeds the Eagle Ford and the Haynesville. Activity within the industry continues to grow, but at a slower place, according to the latest Dallas Fed Energy Survey.

### Oil and Natural Gas Prices

The average WTI spot price increased to \$49.82 per barrel in September from \$48.04 in August on continuing signs that the global oil market is rebalancing (*Chart 1*). Strong OPEC compliance, geopolitical issues and strong demand drove the increase in crude oil prices. Henry Hub natural gas prices were \$2.96 per million British thermal units (MMBtu) in September, compared with \$2.87 in August. Energy Transfer began partial service of the Rover Pipeline at the start of September, adding to gas flows from the Marcellus basin to markets in the Midwest. Once fully in service, the pipeline will have a design capacity of 3.25 billion cubic feet per day (bcf/d). The futures curve for Henry Hub continues to remain flat at roughly \$3/MMBtu on expectations of ample supply of natural gas to meet demand.

**Chart 1**  
**Oil and Natural Gas Prices**



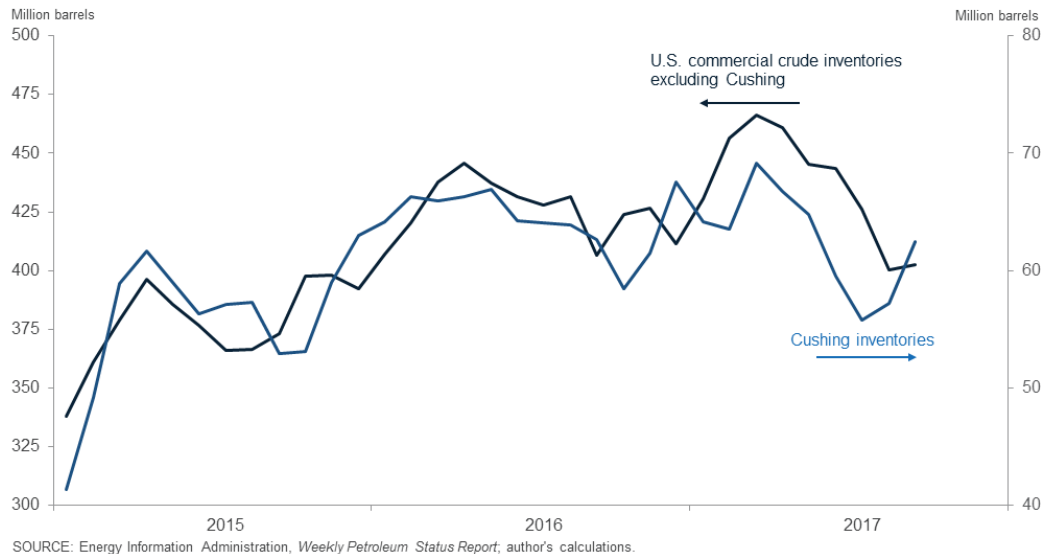
NOTE: MMBtu stands for million British thermal units.

SOURCES: Energy Information Administration (West Texas Intermediate); Wall Street Journal (Henry Hub).

## U.S. Crude Inventories

Crude oil inventories in Cushing, Oklahoma, rose significantly in September by 5.2 million barrels to 62.5 million (9.1 percent increase), while U.S. commercial crude oil inventories excluding Cushing rose by only 2.0 million barrels to 402.5 million (0.5 percent increase) (Chart 2). Rising production in the U.S. coupled with temporary refinery outages from Hurricane Harvey have pushed more production into storage in Cushing, deepening the discount between WTI and Brent. The WTI–Brent spread widened to -\$6.33 per barrel in September from -\$3.66 in August, the largest discount since March 2015. Crude exports for the U.S. reached record levels toward the end of September as marketers took advantage of the differential.

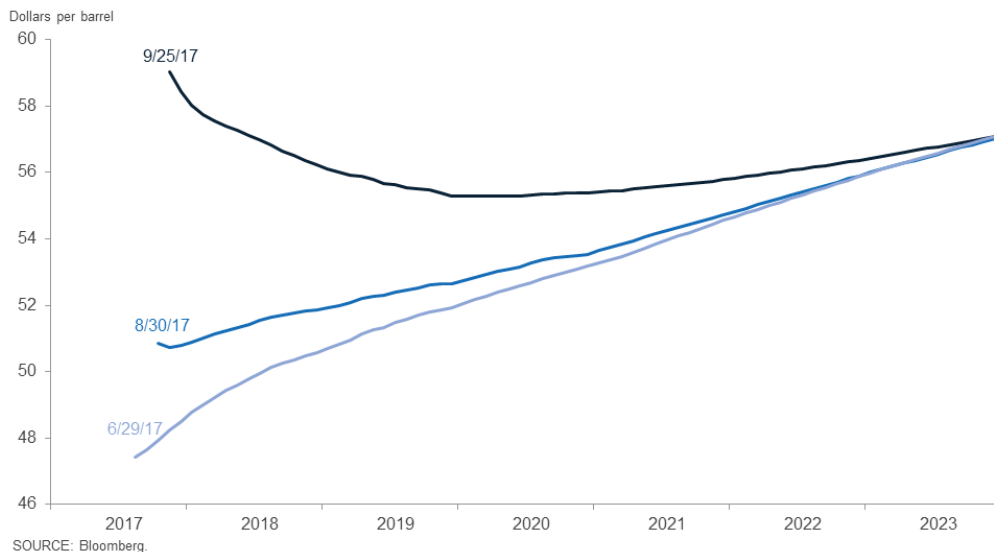
**Chart 2**  
**U.S. Crude Inventories**



## Brent Backwardation

The Brent futures curve went into backwardation (downward sloping) through year-end 2019 on Sept. 25, 2017, a shift in the shape of the curve compared with the end of June when it was fully in contango (upward sloping) (Chart 3). An oil futures curve in backwardation can be seen as a sign of demand in the near-term outpacing supply, with higher near-term prices incentivizing market participants to sell today rather than place crude into storage. Strong OPEC compliance, continuing signs that the global market is rebalancing, and higher-than-expected global demand have helped drive strength to the front part of the curve.

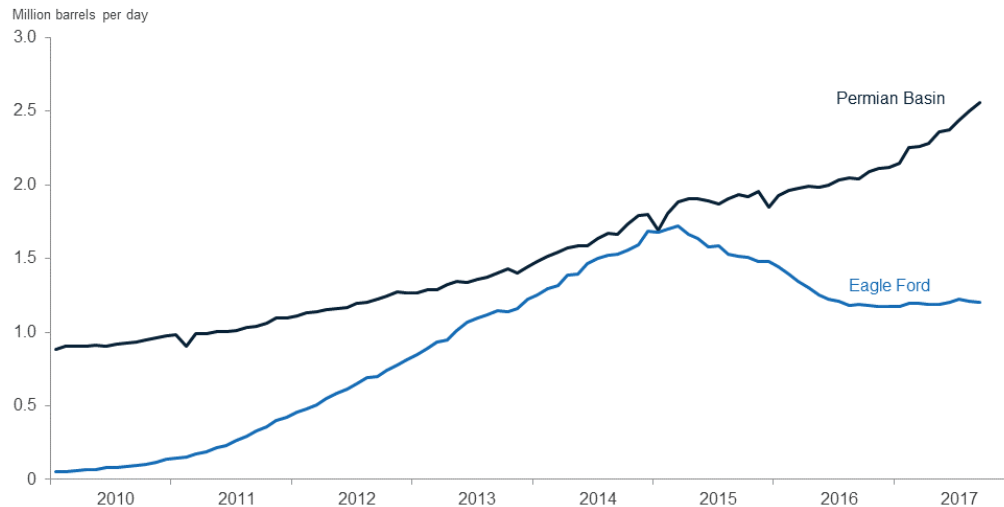
**Chart 3**  
**Brent Futures Curve Backwardation**



## Eleventh District Oil Production

Permian Basin production rose in September by 58,600 barrels per day (b/d) to 2.56 million, while Eagle Ford production was down by 1,100 b/d to 1.21 million (*Chart 4*). Eagle Ford production data were recently revised down and now show production to be flat since the start of the year. Operating rigs numbered 385 in the Permian Basin and 68 in the Eagle Ford at the end of September.

**Chart 4**  
**Eleventh District Oil Production**

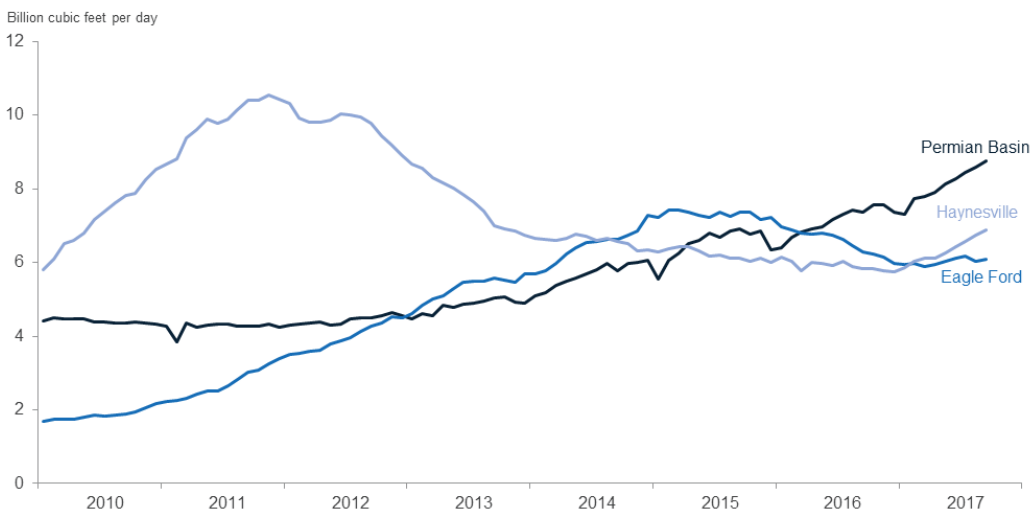


SOURCE: Energy Information Administration, Drilling Productivity Report, October 2017.

## Permian Natural Gas Production

Permian Basin natural gas production rose in September by 0.2 bcf/d to 8.8 bcf/d (*Chart 5*). Production in the basin has been growing since early 2013 and currently exceeds that of the Eagle Ford (6.1 bcf/d) and the Haynesville (6.9 bcf/d). Despite largely being considered a byproduct by producers in the region, natural gas production in the Permian continues to grow due to the sheer number of oil wells being completed.

**Chart 5**  
**Permian Natural Gas Production**



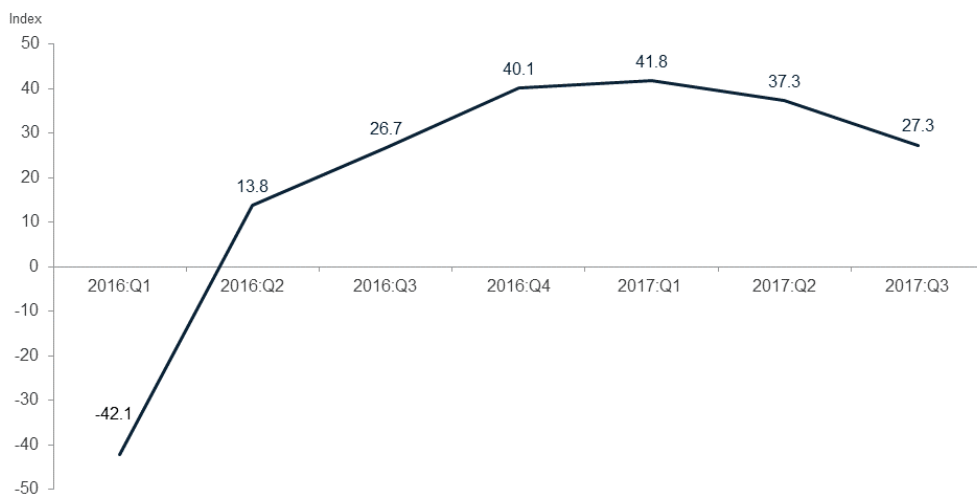
SOURCE: Energy Information Administration, Drilling Productivity Report, October 2017.

## Energy Survey

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Activity in the Eleventh Federal Reserve District's energy sector continued to rise in third quarter 2017 but at a slower pace, according to the Dallas Fed Energy Survey. The business activity index—the survey's broadest measure of business conditions—fell to 27.3, below the 37.3 reading in the second quarter (*Chart 6*). Both business activity and employment continue to be strong among oilfield services firms.

**Chart 6**  
**Dallas Fed Energy Survey Business Activity Index**



SOURCE: Dallas Fed.

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### About Energy Indicators

Questions can be addressed to Kunal Patel at [kunal.patel@dal.frb.org](mailto:kunal.patel@dal.frb.org). *Energy Indicators* is released every third Thursday of the month and can be received by signing up for an email alert. For additional energy-related research, please visit the Dallas Fed's energy home page.