Tight Oil Production Trends in a Low Price Environment

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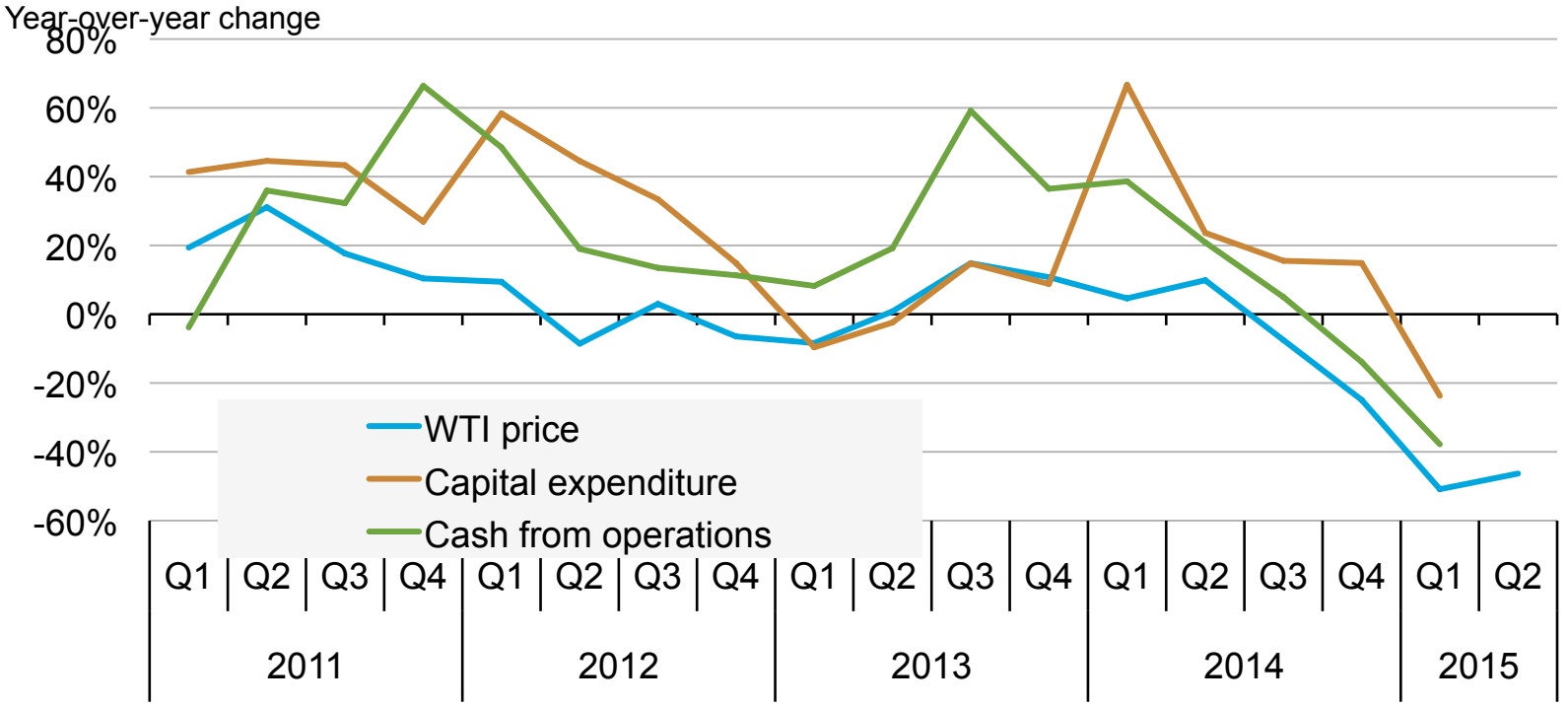
Outline

- Effects low prices are having on U.S. oil production
- EIA's short-term outlook for production
- Reasons why U.S. output may be more resilient than otherwise thought

U.S. oil supply: reasons for reduced output in the short term

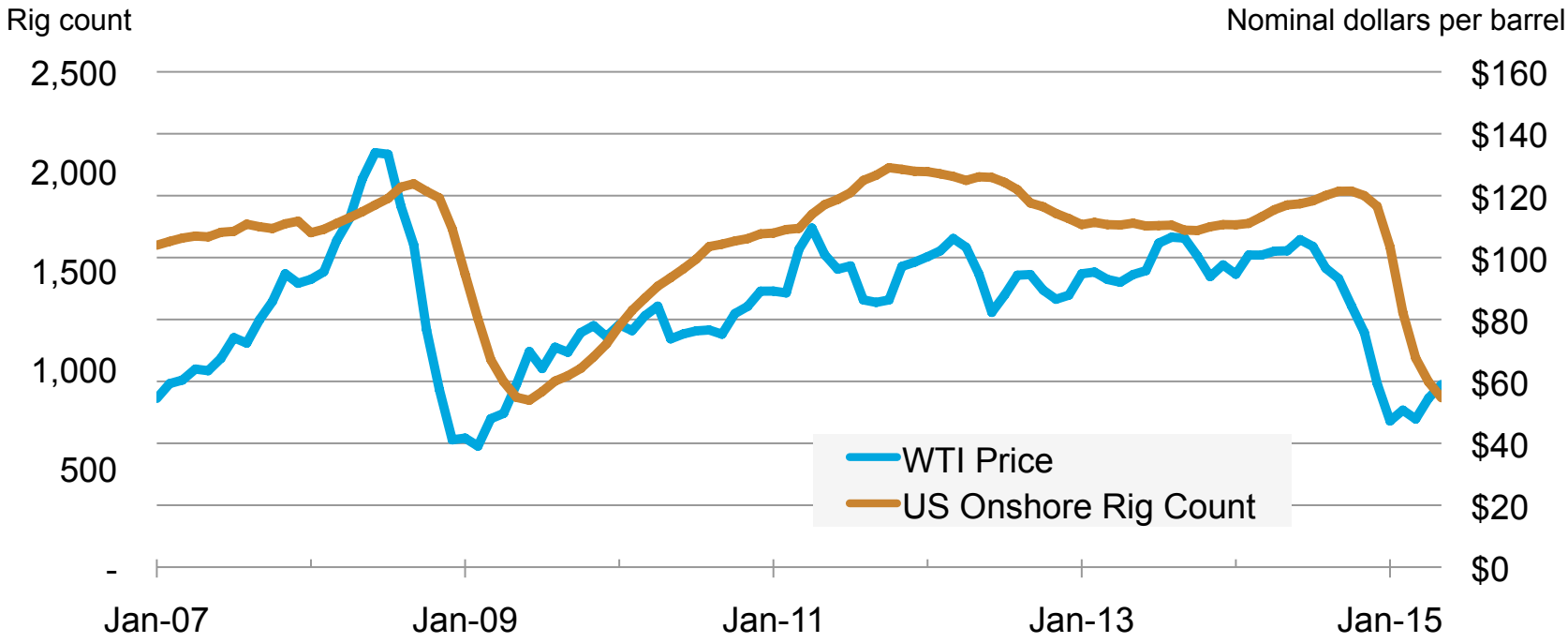
- Oil price decline
- Reduced operating cash and capital expenditures
- Falling rig counts
- Corresponding decline in well completions
- Global competition, rising world output

Operating cash, capital expenditure, drops among onshore producers



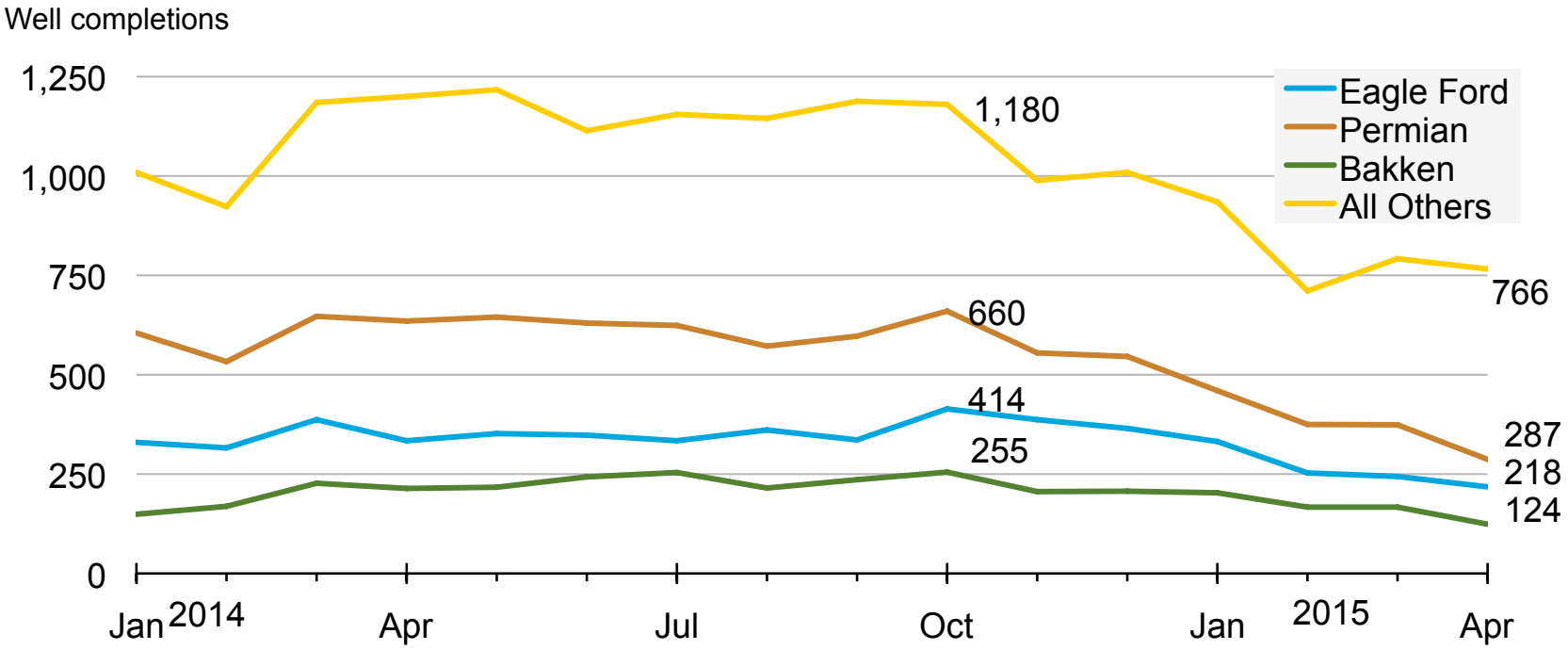
Source: Evaluate Energy

Rig count mirrors price drop, lagged by two to four months



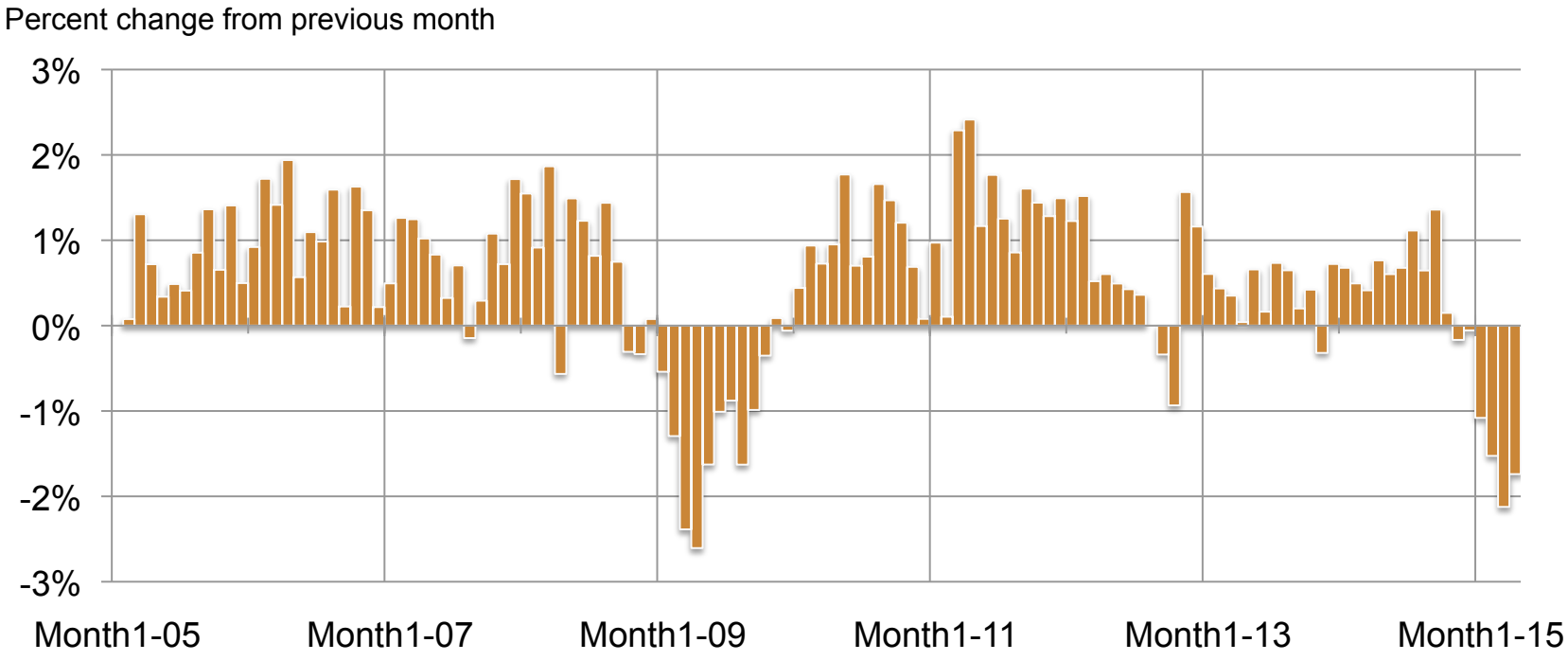
Source: Baker Hughes, Federal Reserve Bank of St. Louis

Reported well completions are falling as rig count dwindles



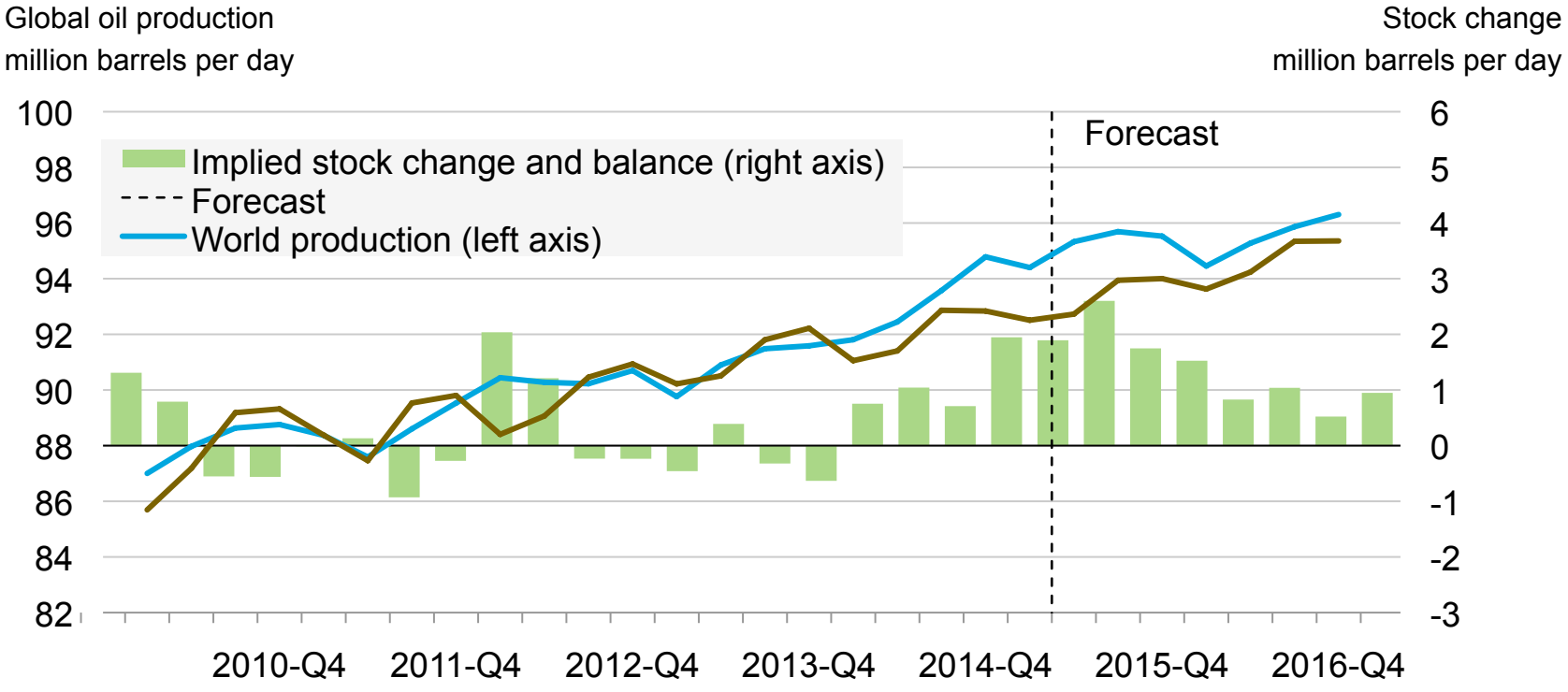
Source: EIA estimates

U.S. oil and natural gas production jobs showing month-over-month declines



Source: US Bureau of Labor Statistics, Current Employment Survey (June 2015)

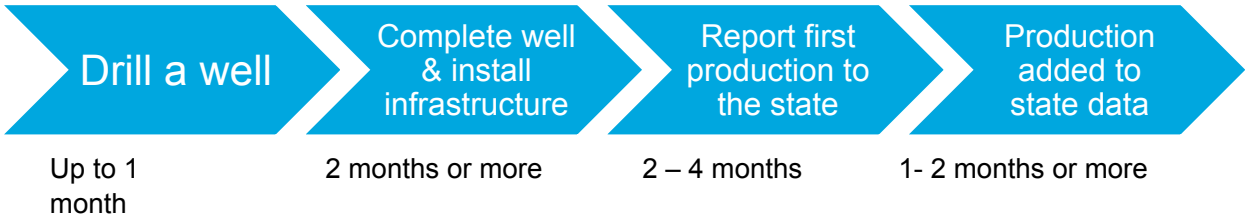
Gap between global oil production and consumption signals increasing competitive landscape



Source: EIA, Short-Term Energy Outlook, June 2015

Production Trends & Outlook

Data lags complicate understanding of turning points

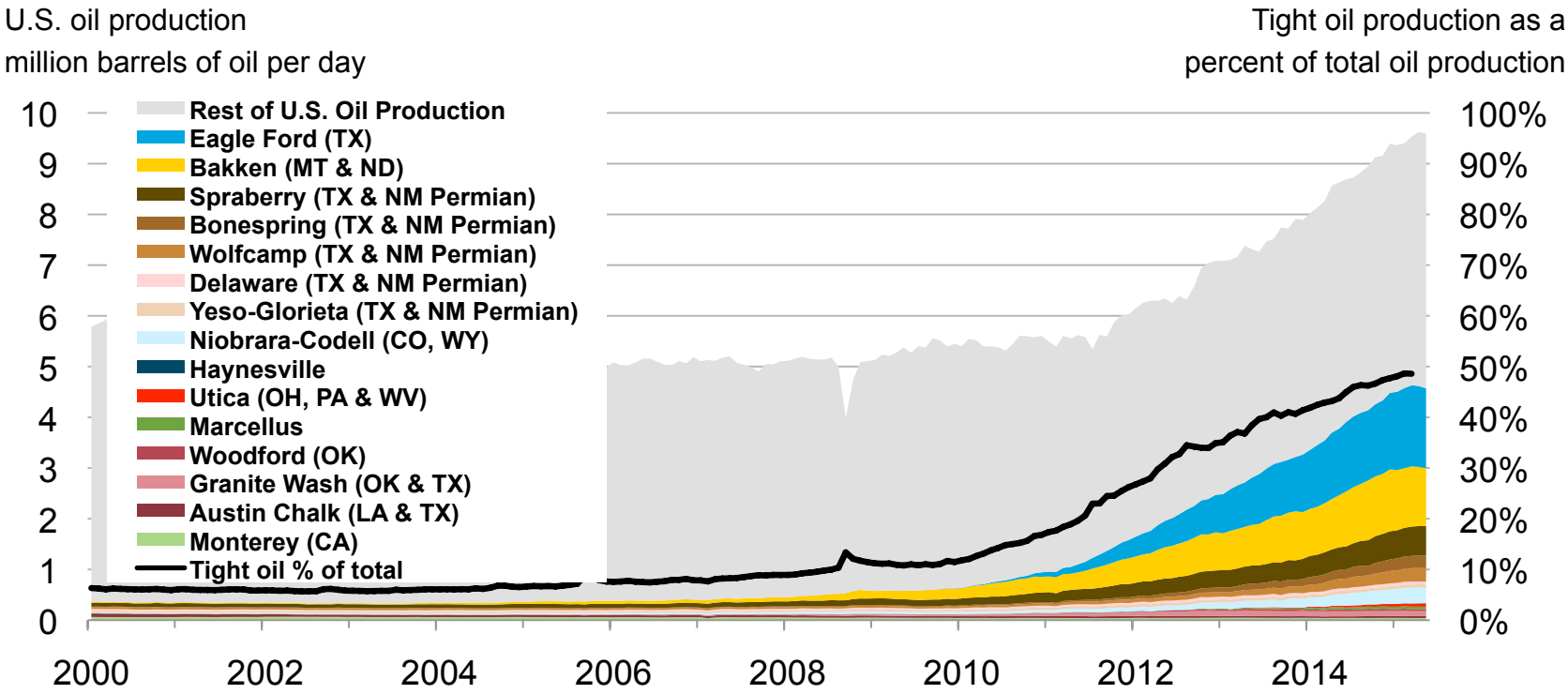


Delays of several months between drilling, well completion, production, and administrative reporting

Marked differences in reporting lag and frequency of reports among the states

Recurring revisions months or years ago

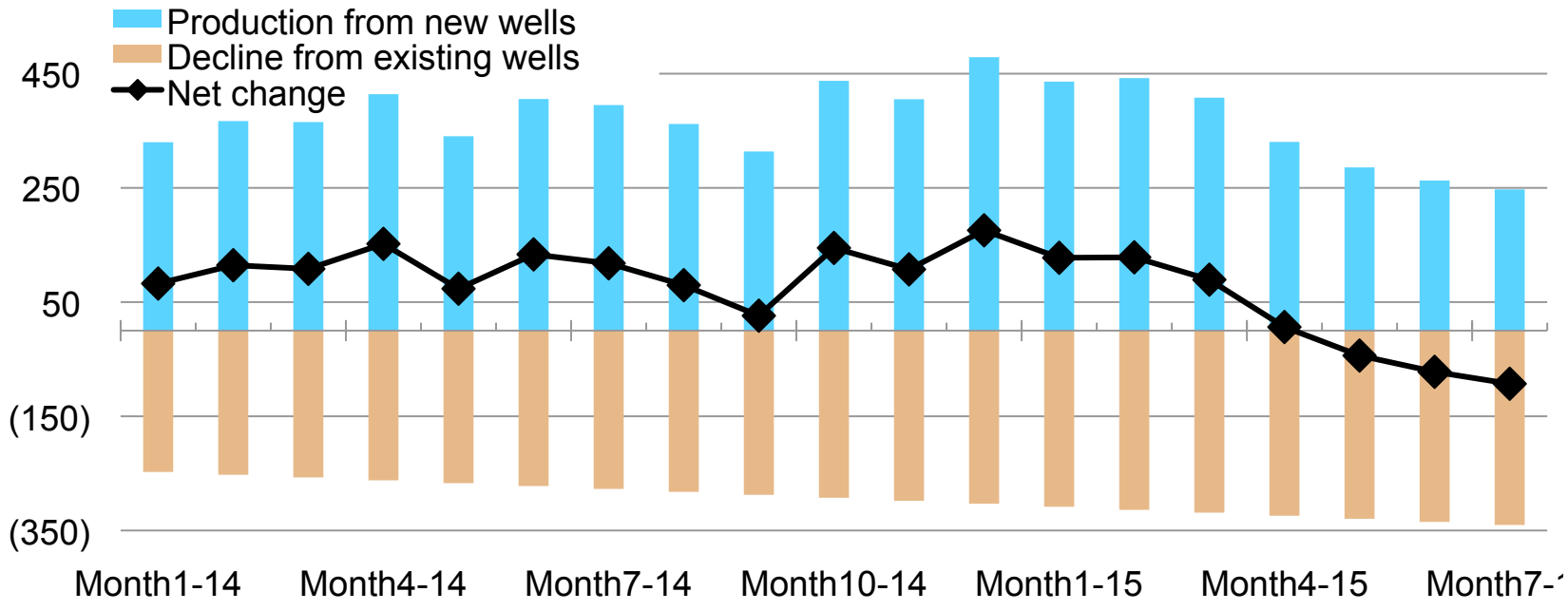
Estimated U.S. tight oil production was 4.6 million barrels/day in May 2015 48% of total U.S. oil production



Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through April 2015 and represent EIA's official tight oil estimates, but are not survey data. State abbreviations indicate primary state(s).

Sum of seven DPR regions show production from new completions beginning to trail legacy declines starting in May 2015

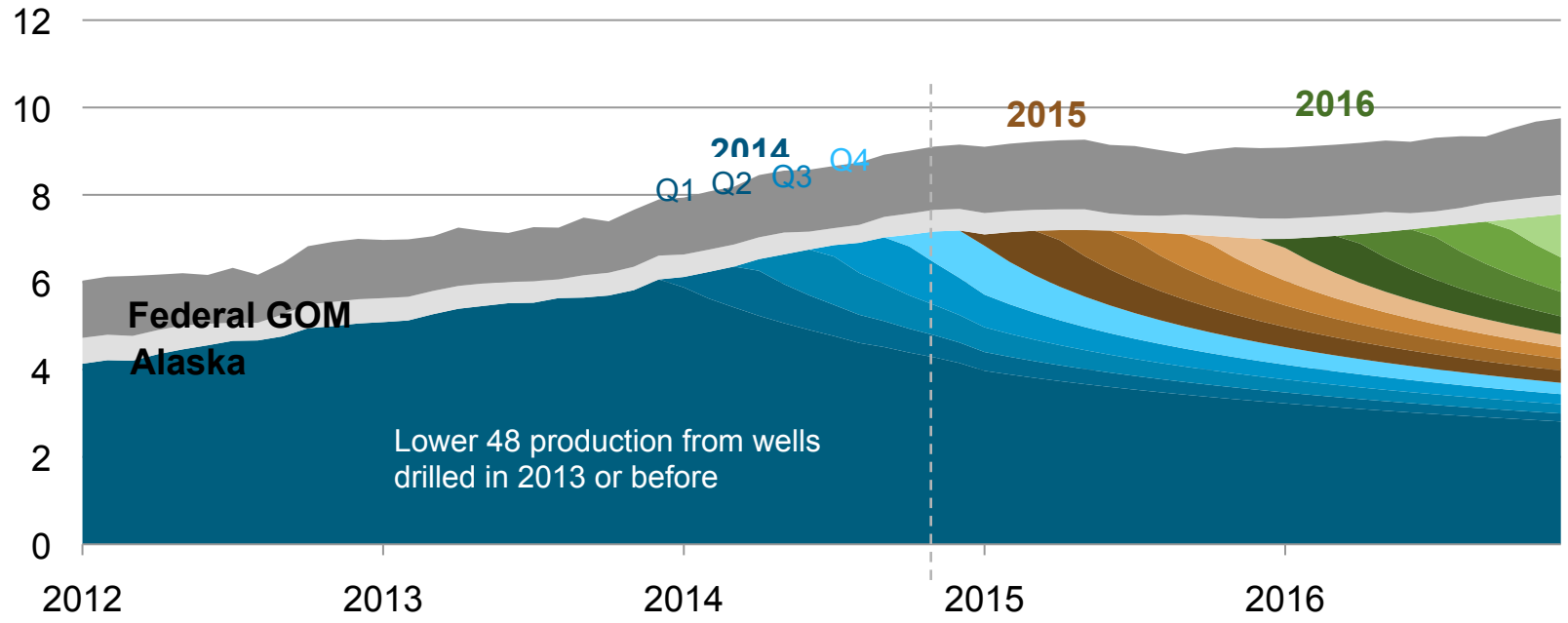
Total month-to-month change
thousand barrels per day



Source: EIA Drilling Productivity Report, June 2015

January 2015 STEO had Lower 48 y/y growth in 2015 of 502,000 bbl/d and in 2016 210,000 bbl/d.

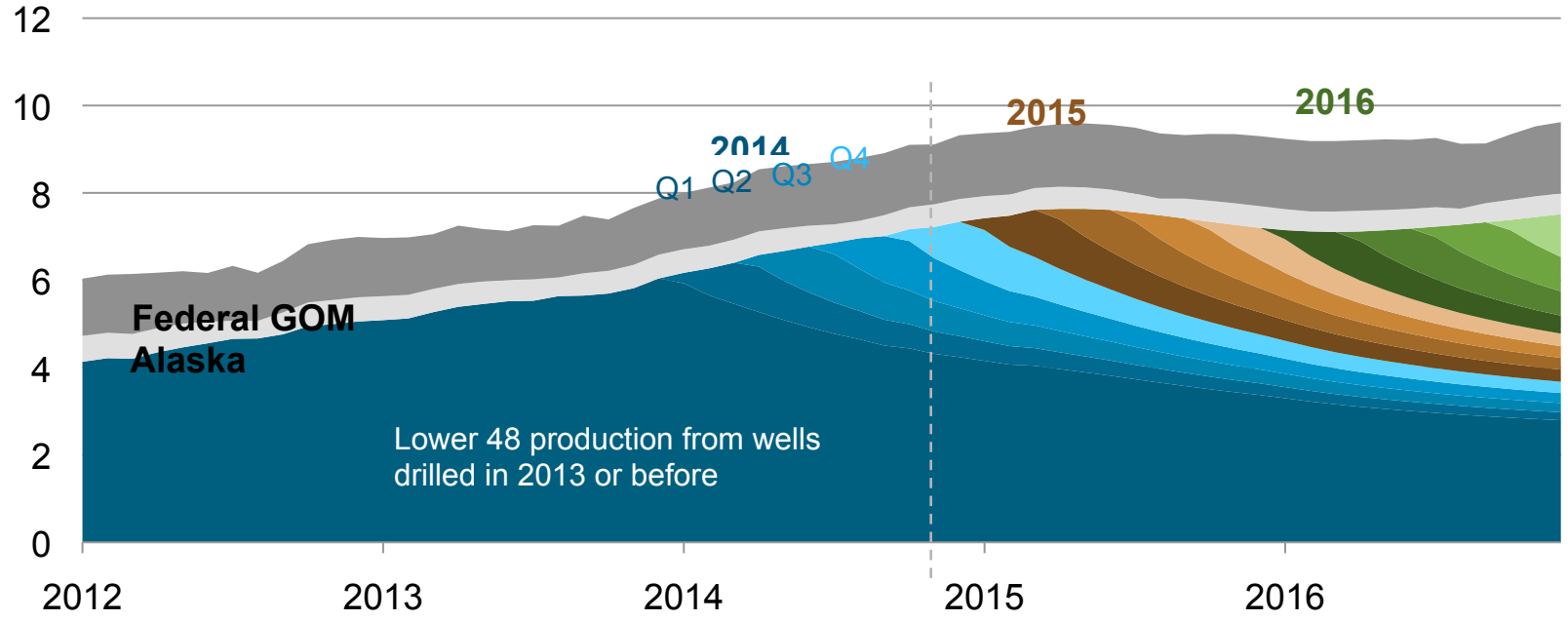
U.S. monthly crude oil production
million barrels per day



Source: EIA, Today in Energy 1/26/2015 http://www.eia.gov/todayinenergy/detail.cfm?id=19711

June 2015 STEO shows U.S. Lower 48 y/y growth in 2015 of 720,000 b/d and a decrease in 2016 of 160,000 bbl/d.

U.S. monthly crude oil production
million barrels per day



Source: EIA, Short-Term Energy Outlook (STEO) June2015

Resiliency of U.S. production

U.S. oil supply: reasons for rebound in US output

- Quality of rig fleet
- Growth in initial production rates
- Increase in well completions
- Falling costs
- Continued capital availability
- Ability to compete in global oil market

Horizontal rig share rapidly increasing as vertical/directional rigs laid down at a faster rate

Rig Type	Running Rigs October 2014	Running Rigs May 2015	% Chg
Horizontal	1,351	687	- 49%
Vertical / Directional	574	202	- 65%
Total	**1,925**	**889**	**- 54%**

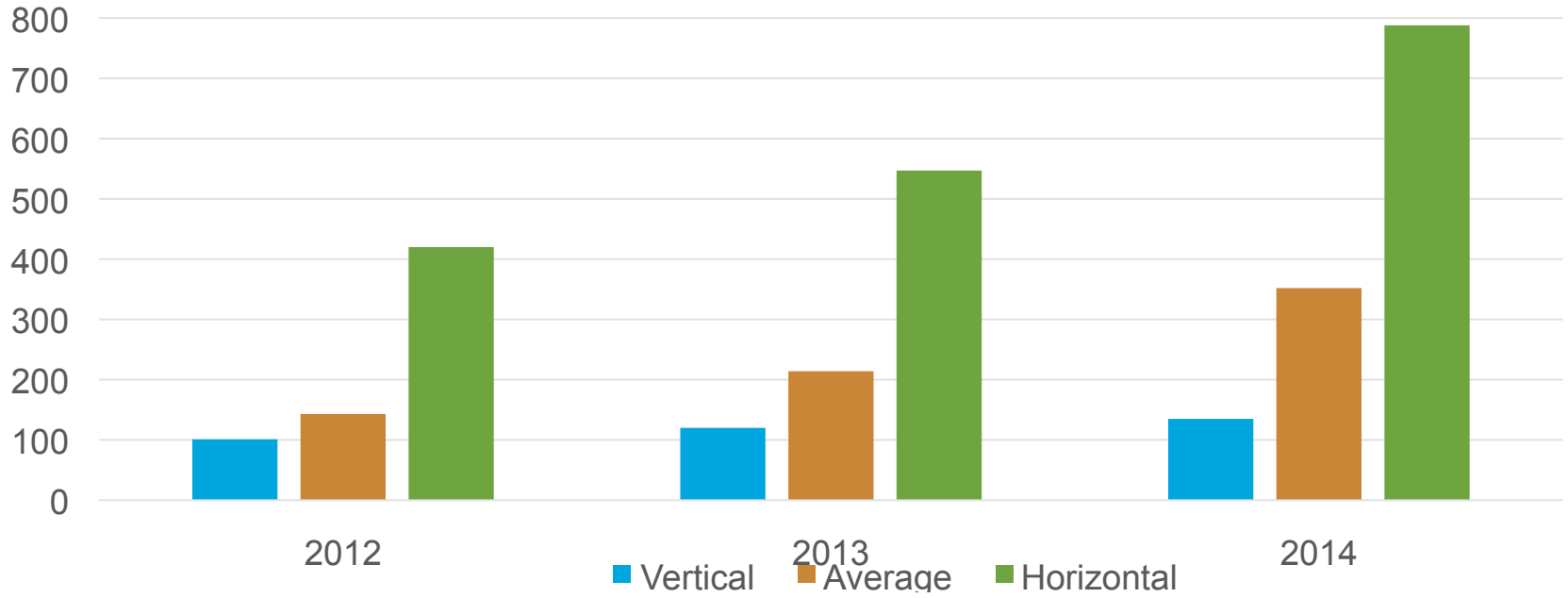
Source: Baker Hughes

Increasing well productivity will help shore up production numbers

- Analysis of 85,000 wells drilled from 2012 to 2014
  - By vintage
  - Horizontal, Vertical, Directional wells
  - All U.S. onshore regions
- Average initial production (IP) rates increasing as the number of horizontally-drilled wells increases

Permian shows rapid 30-day IP rate increases as share of horizontal wells grows from 13% to 33% of wells drilled in 2014

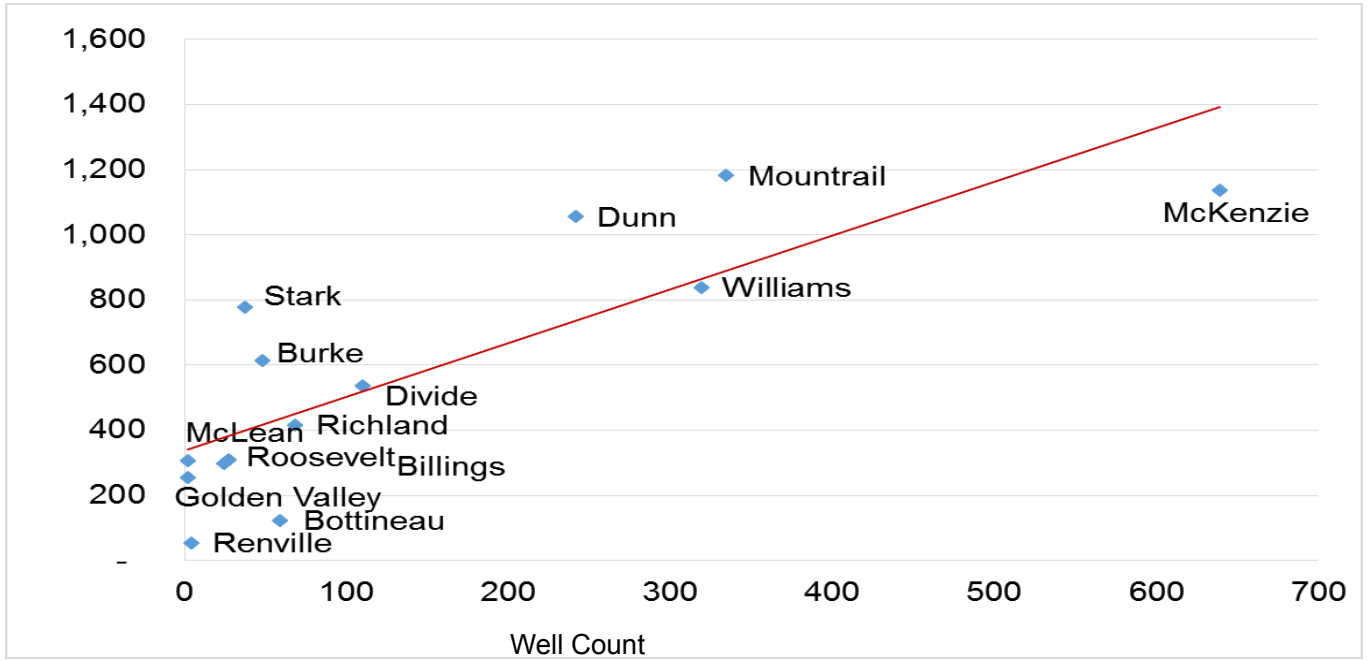
Initial production (first full month)
Barrels per day per well



Source: EIA analysis of DrillingInfo data

High IP rates driven by "core" Bakken counties

Barrels per day

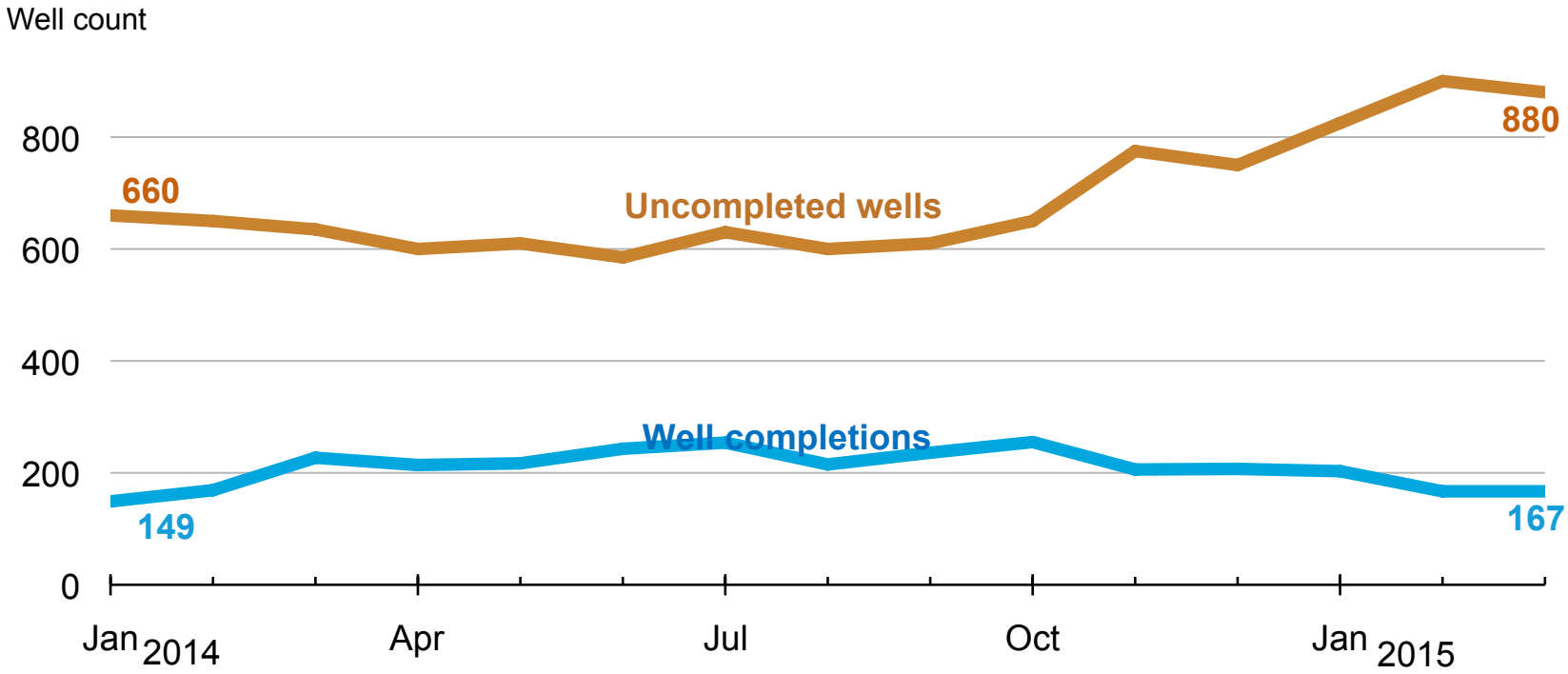


Source: EIA analysis of DrillingInfo data for 2014 wells

Inventory of "drilled but uncompleted" wells may add to production

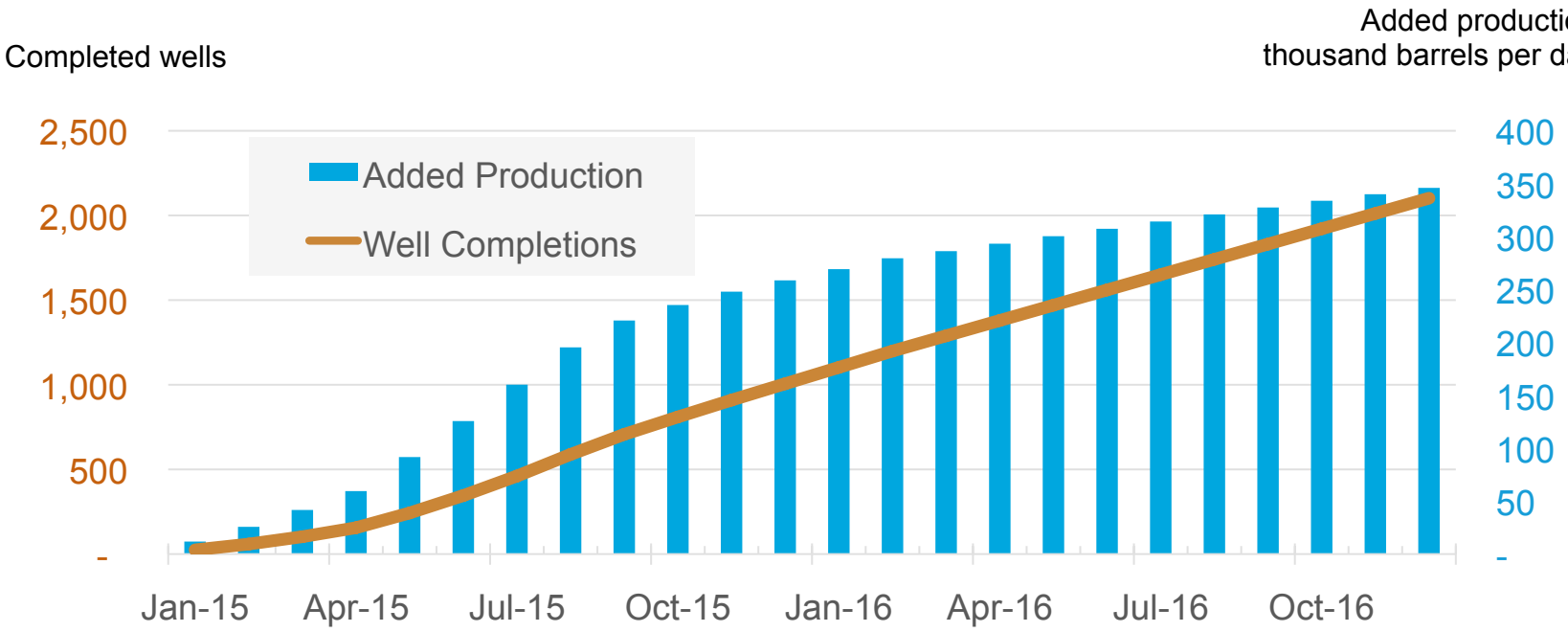
- Estimated 2,000 - 4,000 DUC wells in the Lower 48
  - Equivalent to 6-10% of the 40,000 wells in 2014
  - Predominantly located in the Eagle Ford, Bakken, and Permian
- Depending on actual DUC number and average well productivity thereof, hundreds of thousands of barrels per day could come online if all wells completed over the next 20 months
- Stabilization of oil price makes added completions likely
  - As prices have stabilized, there is a much greater incentive for operators to get wells completed to generate cash flow
  - 1-year drilling permits may help facilitate Bakken well completions

Bakken uncompleted well count growing as well completions decline



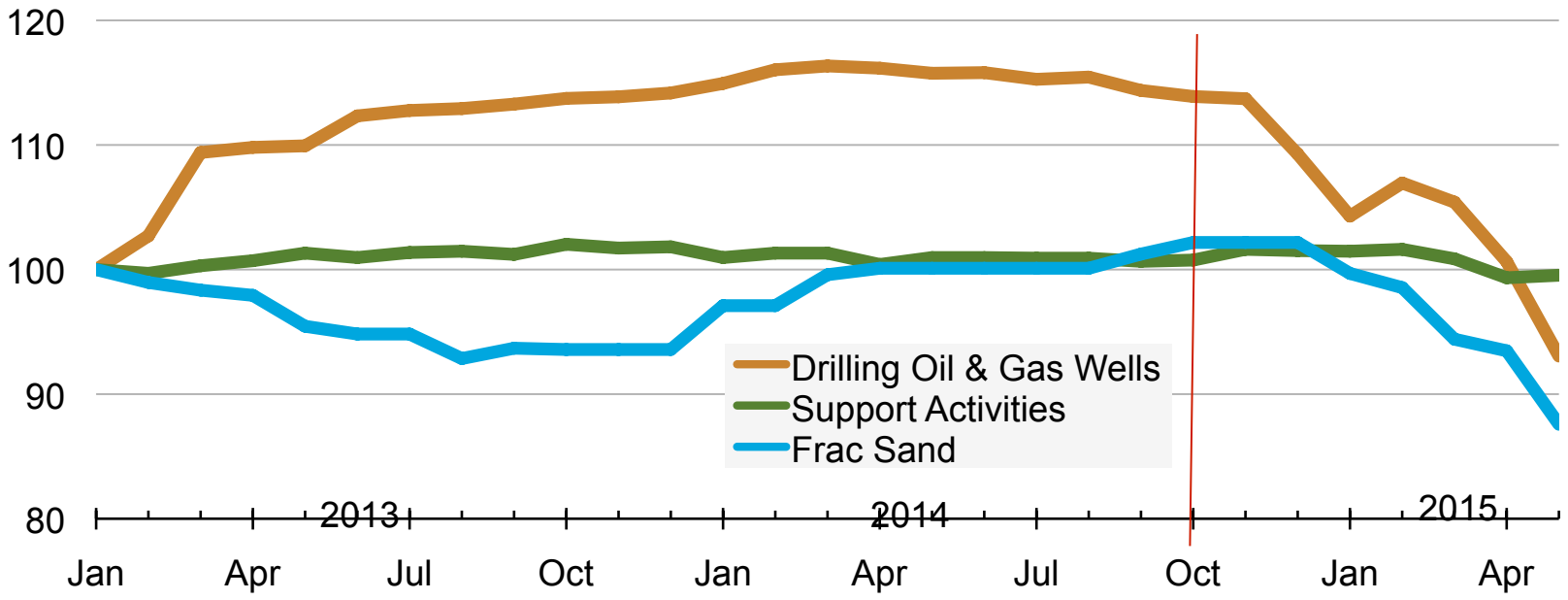
Source: North Dakota Department of Mineral Resources, EIA Estimates

Potential scenario of well completions and added production



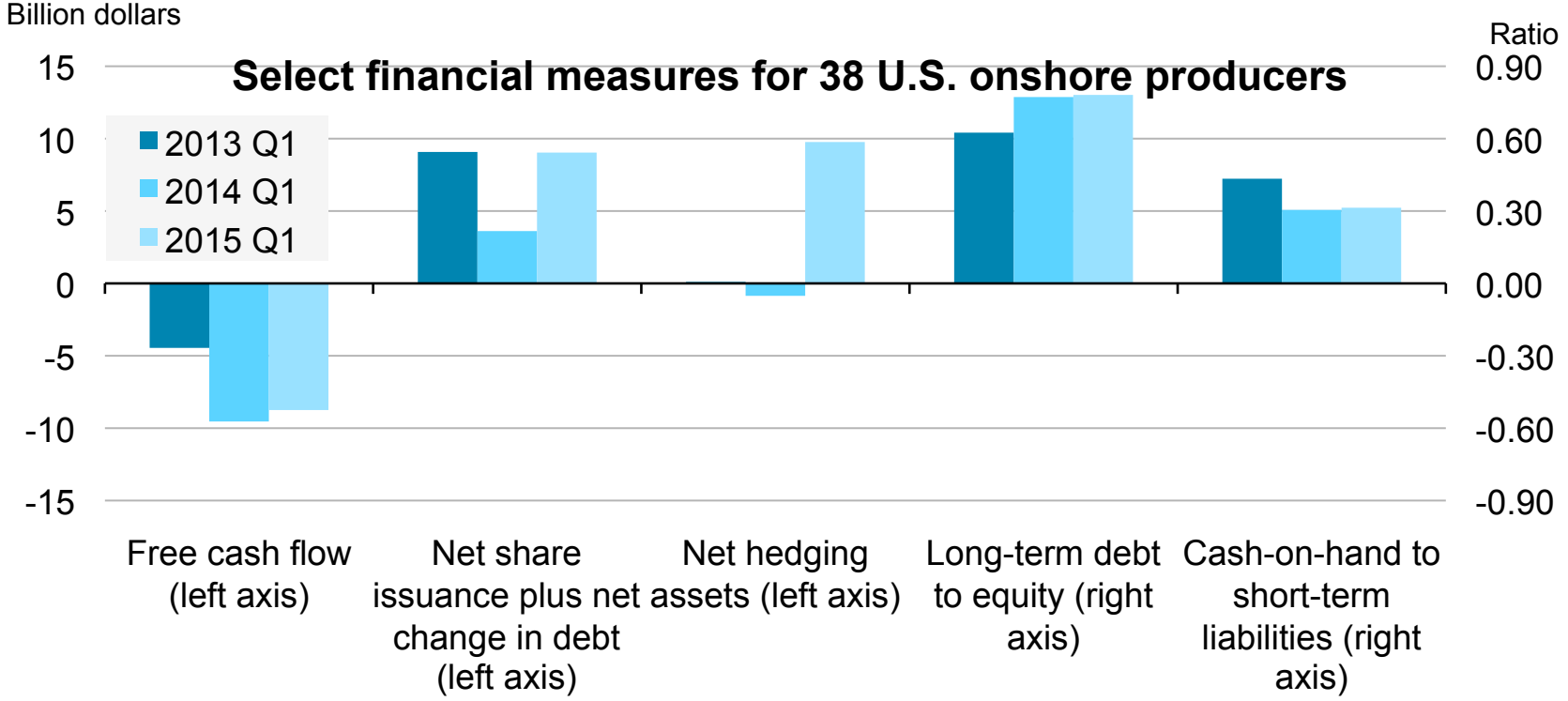
Oil industry supplier cost reductions beginning to manifest in producer price indices

Cost Index	Oct. 2014	May 2015	% Chg
Frac Sand	102.2	87.6	- 14.3%
Drilling	113.9	93.1	- 18.3%
Support	100.8	99.5	- 1.3%



Source: U.S. Bureau of Labor Statistics, June 2015

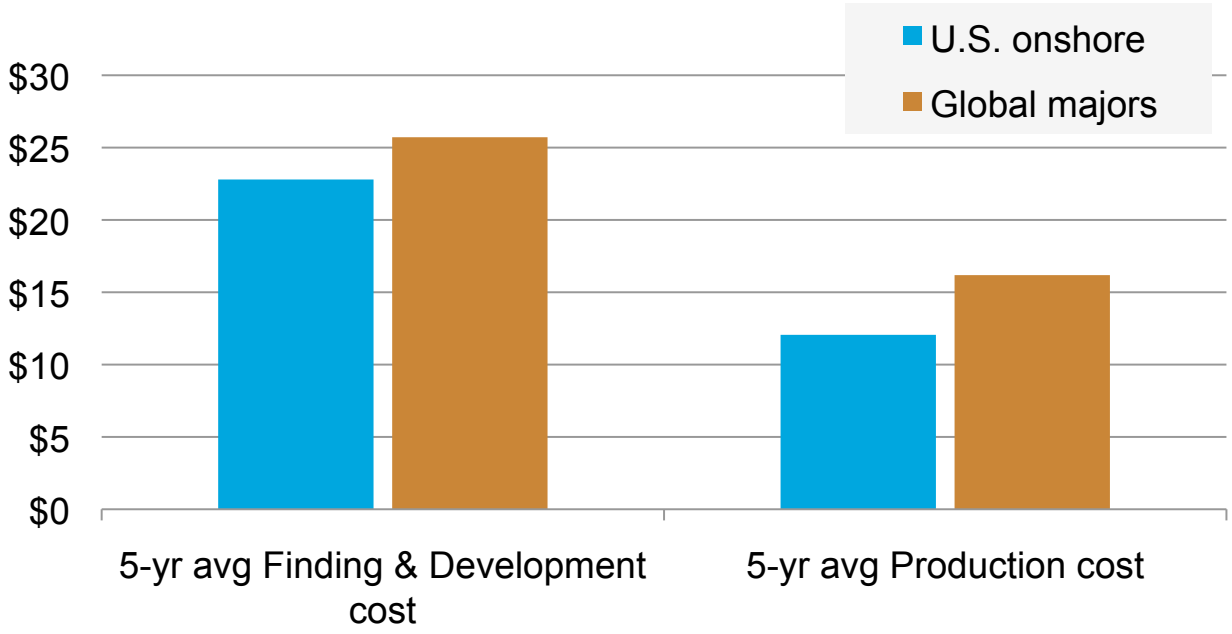
Onshore producers have not had problems raising cash, but still have a high stock of debt



Source: Evaluate Energy

U.S. onshore companies are competitive on costs

Dollars per barrel of oil equivalent



Source: Evaluate Energy, EIA Analysis

Summary

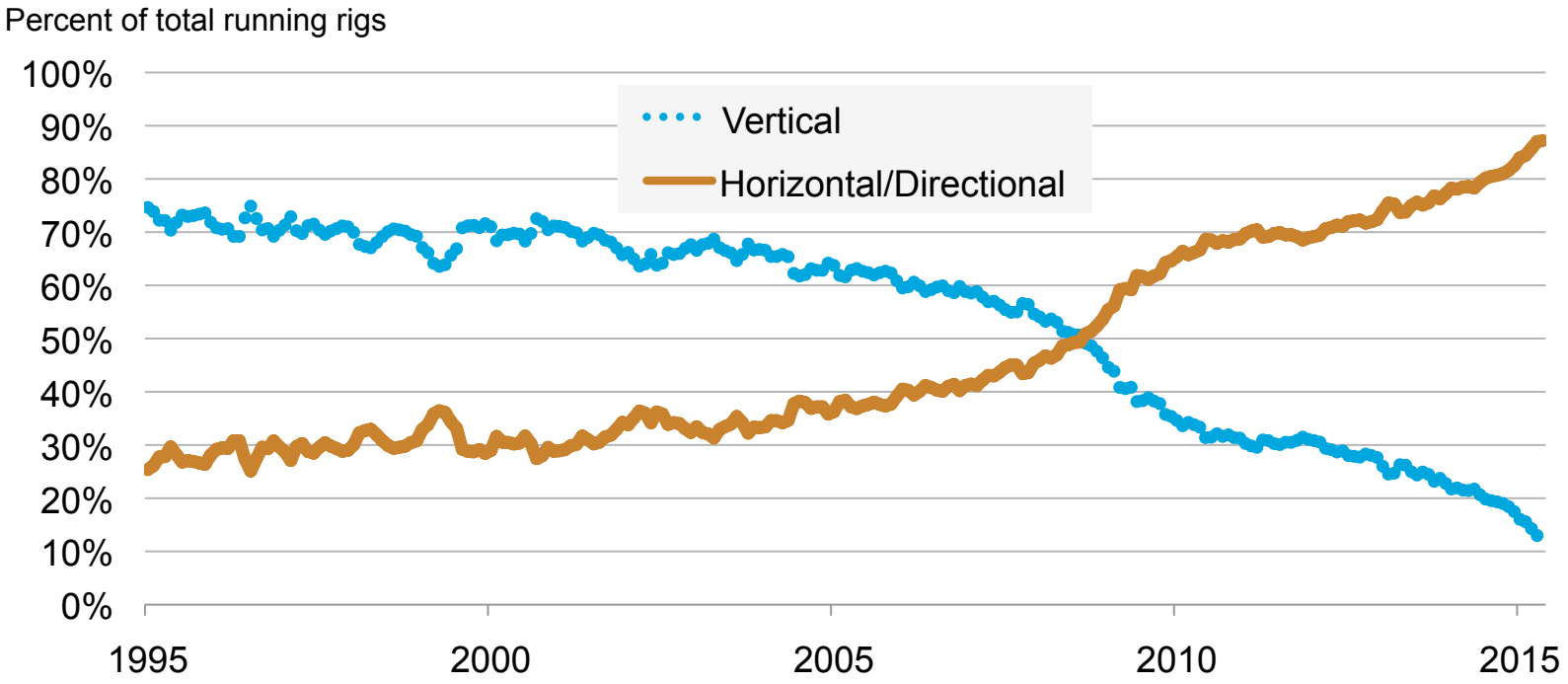
- Low oil prices are adversely affecting the U.S. onshore oil sector
- EIA's short-term production outlook anticipates decline in tight oil production
- Rig quality, well productivity improvements, and falling costs will help U.S. oil sector be more resilient amid period of low prices than otherwise thought

For more information

- U.S. Energy Information Administration home page | www.eia.gov
- Annual Energy Outlook | www.eia.gov/forecasts/aeo
- Short-Term Energy Outlook | www.eia.gov/forecasts/steo
- International Energy Outlook | www.eia.gov/forecasts/ieo
- Today In Energy | www.eia.gov/todayinenergy
- Monthly Energy Review | www.eia.gov/totalenergy/data/monthly
- State Energy Portal | www.eia.gov/state

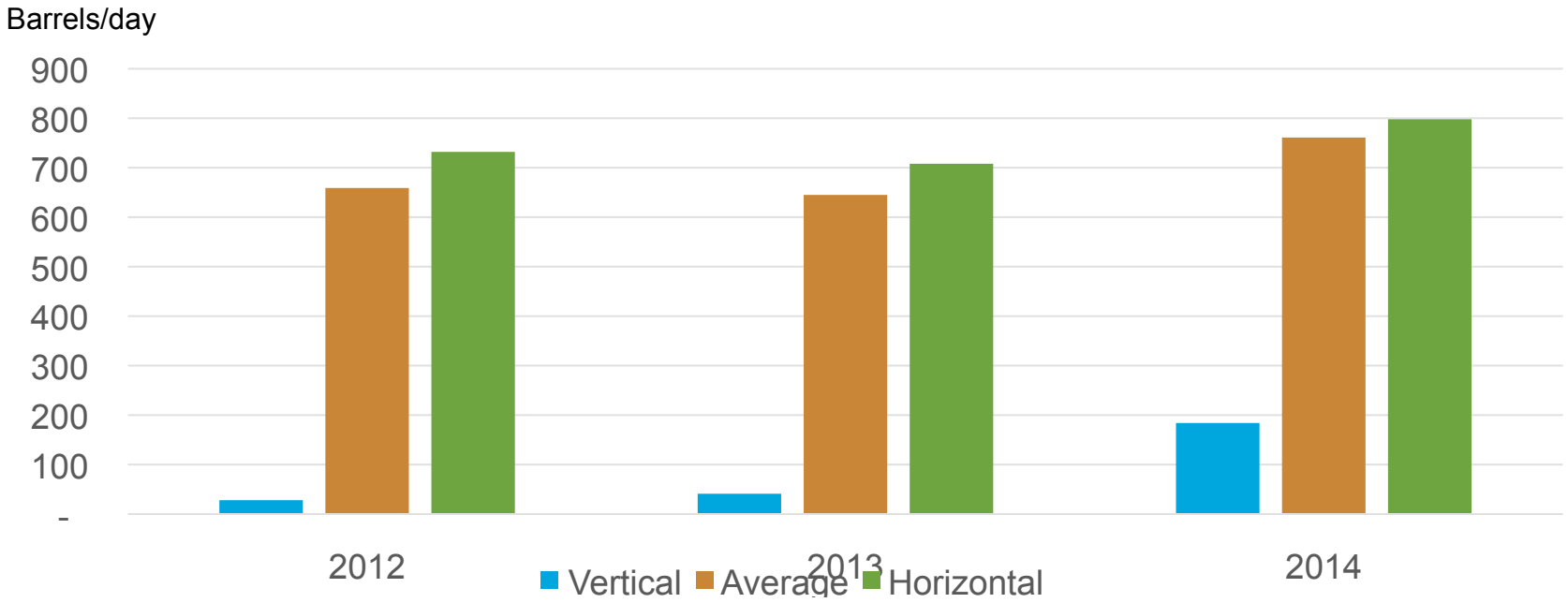
Supplemental slides

Horizontal/Directional rig share rapidly increasing as vertical rigs laid down



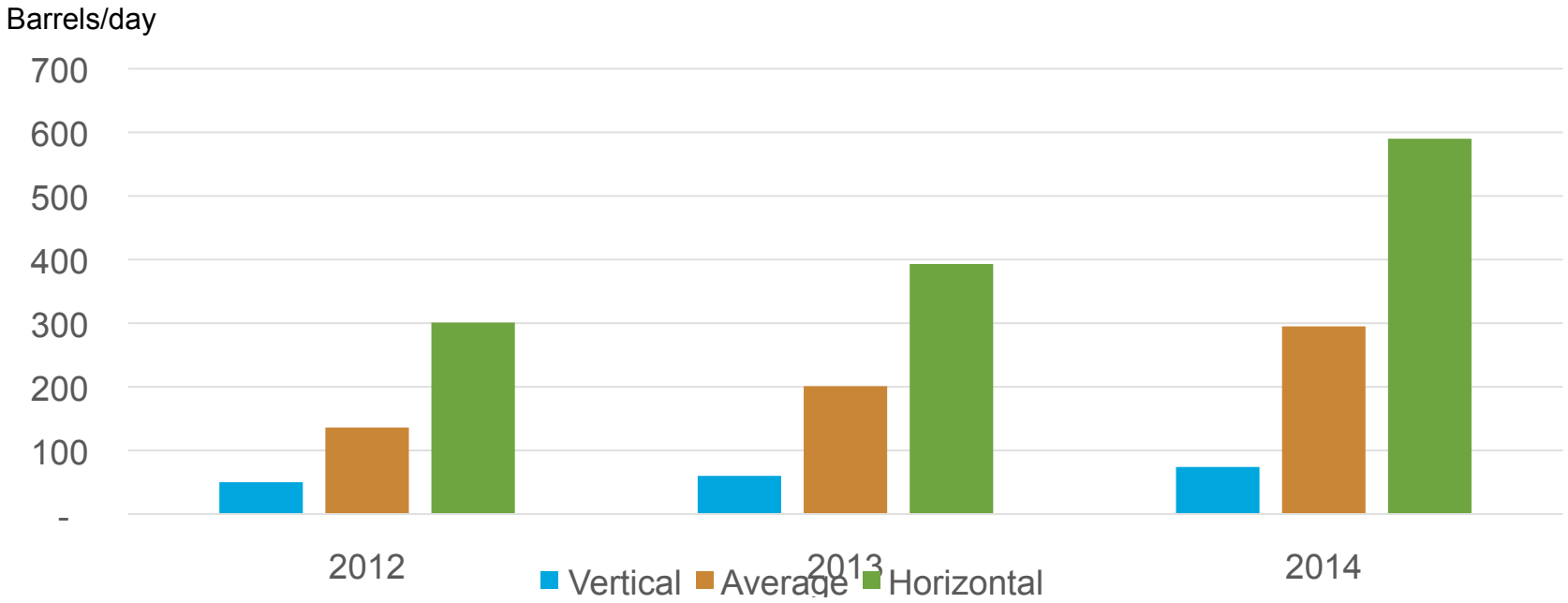
Source: Baker Hughes

Eagle Ford shows slower 30-day IP growth as share of horizontal wells annually comprise 9 of every 10 wells drilled



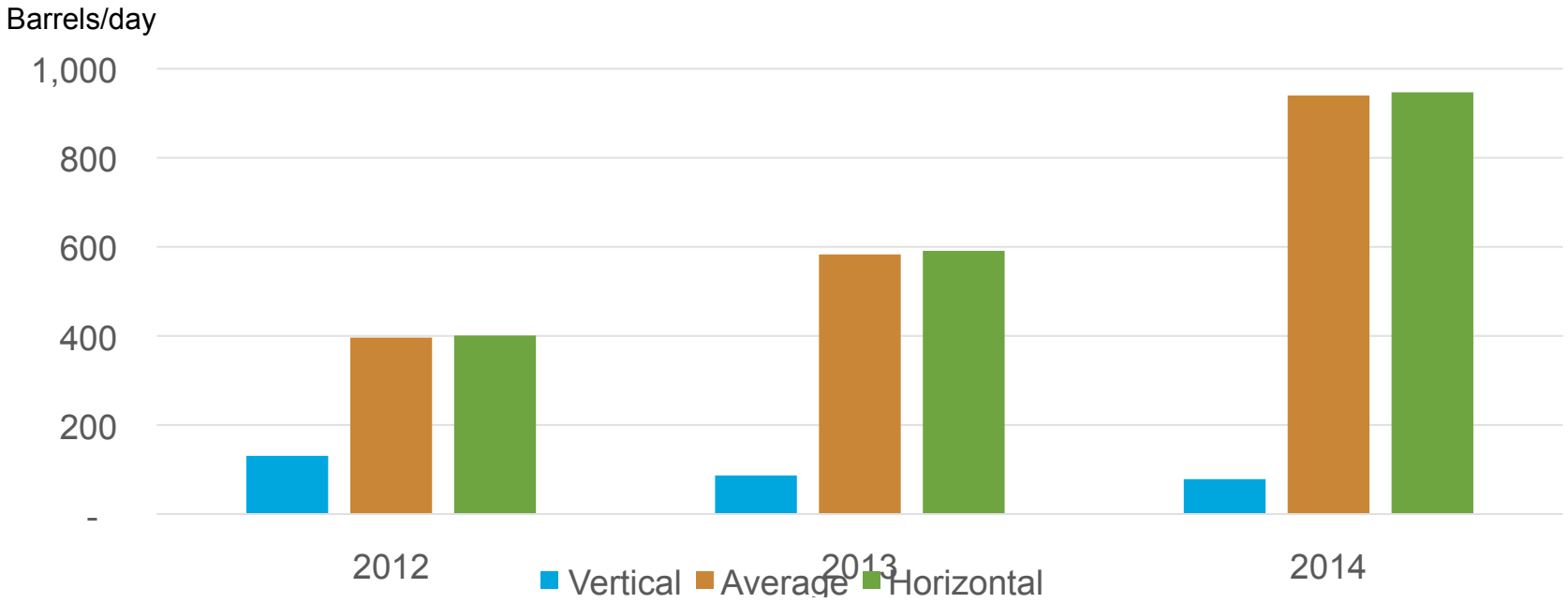
Source: EIA Estimates, DrillingInfo Data

All other regions shows steady IP increases as share of horizontal wells grows from 34% in 2012 to 42% of wells drilled in 2014



Source: EIA Estimates, DrillingInfo Data

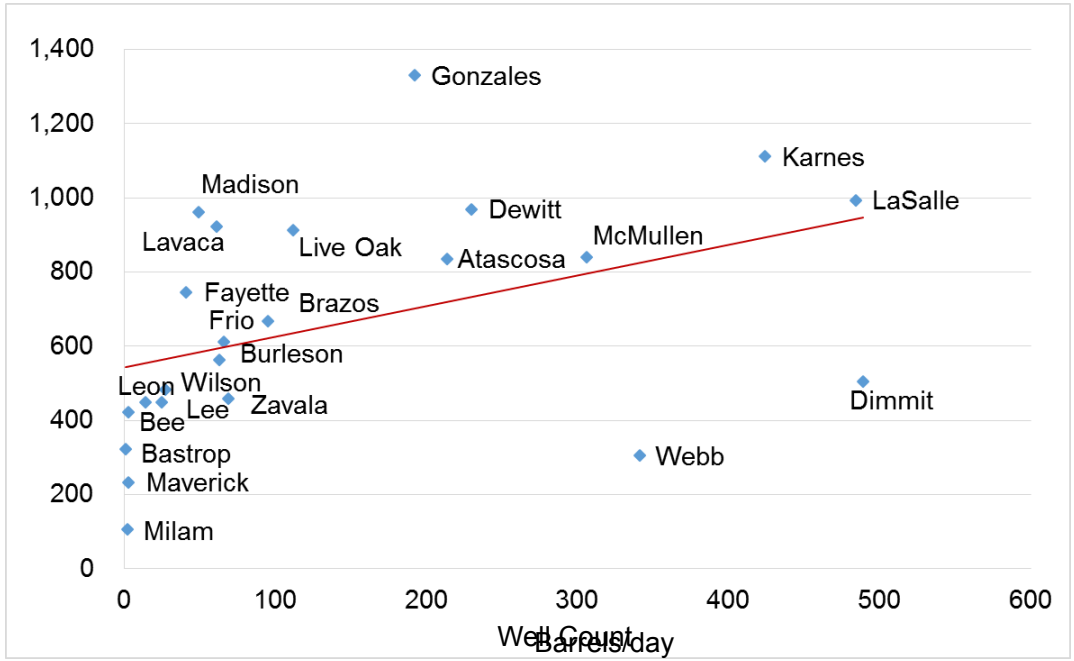
Virtually all wells in Bakken are horizontally drilled, with average 30-day IP rate more than doubling since 2012



Source: EIA Estimates, DrillingInfo Data

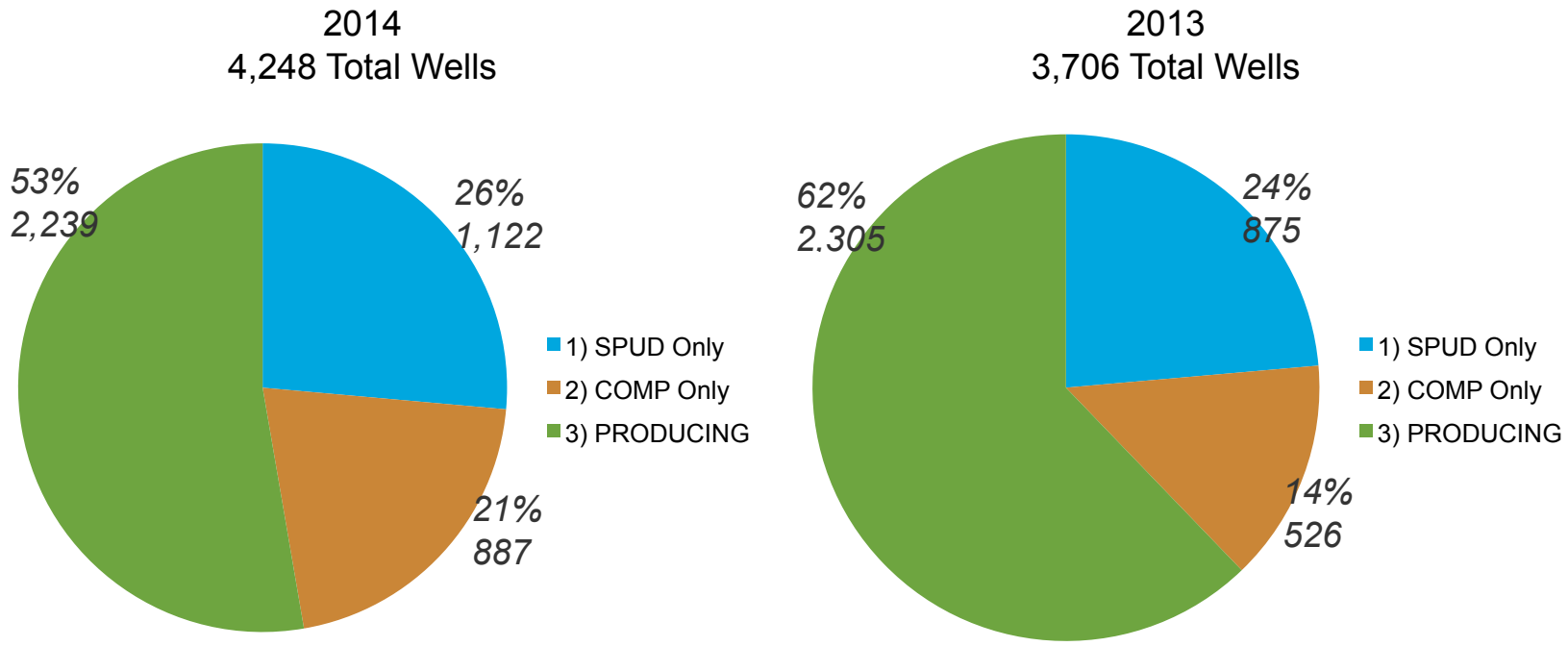
Eagle Ford IP rates indicate greater heterogeneity across counties

Barrels per day



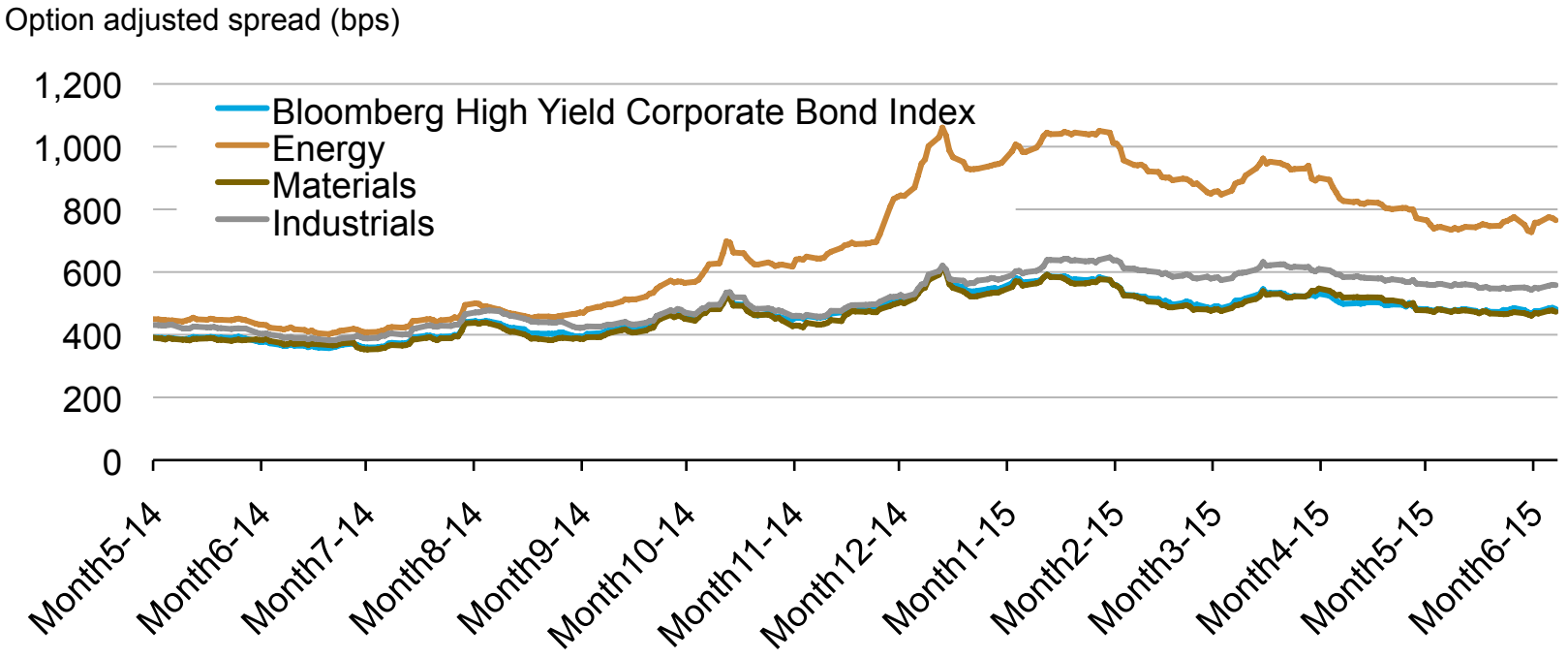
Source: EIA Estimates, DrillingInfo Data

Analysis of Eagle Ford well activity shows increasing proportion of wells drilled or completed but yet to produce



Source: DrillingInfo April 2014 and 2015

Risk premiums have declined since crude prices stabilized, but remain higher than other sectors



Source: Bloomberg

Contributing Factors to U.S. Tight Oil Production

- Technical expertise and experience
- Extensive transportation capacity
- Price responsiveness of producers
- Availability of capital
- Regulatory stability
- Learning-by-doing efficiencies gained by drilling thousands of tight oil wells