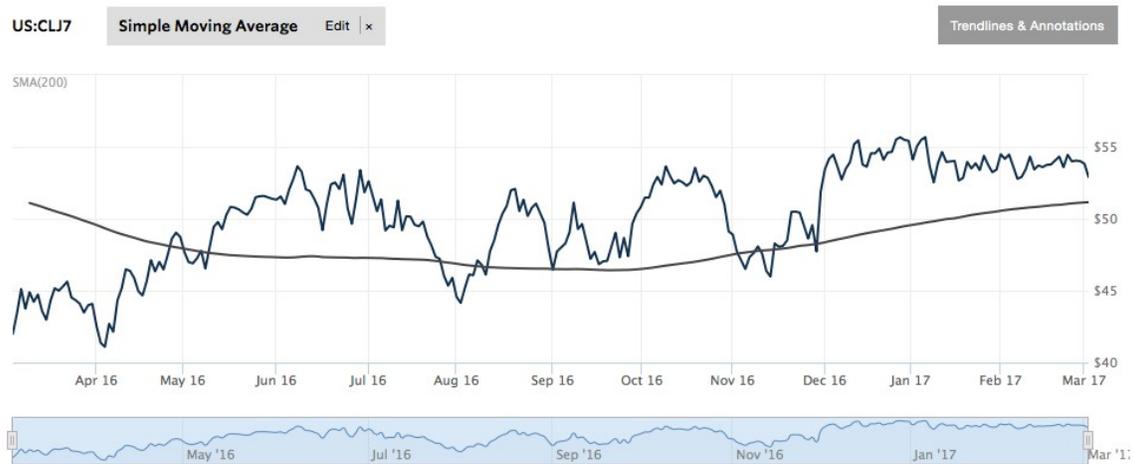


Drilling into the Data: Crude Production and "Manufacturing" Trends

by Jennifer Warren

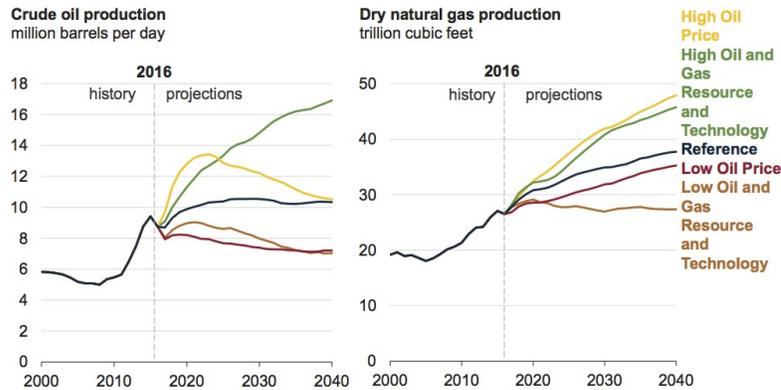
The secrets of success in U.S. oil and gas production are contained in the ideas behind innovation. In the Energy Information Administration's 2017 Outlook, the EIA state that the future of U.S. oil and gas production depends on price. They add that resource availability and technology improvements will also drive production. In their scenario where oil production is at its highest—the high resource and technology case—the U.S. is pumping out about 16 million barrels of crude oil per day around 2040, versus a 10 million b/d reference case across the next two decades. In 2013, the EIA projected that U.S. production would top out around the 1970 high of 9.6 million b/d.¹ What a difference four years makes —much of the difference is technological advances but determination counts for a lot too.

In the first week of March, from today's vantage point, West Texas Intermediate crude oil futures prices nearly reached \$55. The trend lines suggest above the \$50 watermark for now. The market sentiment related to price appears to be tied to OPEC's compliance with their production quotas.



Source: Wall Street Journal, mid-morning, March 2, 2017

Dallas Federal Reserve President Robert Kaplan [noted](#), "U.S. production bottomed out at approximately 8.6 million barrels per day in the fall of 2016 and is now closer to 8.9 million barrels per day," with steady increases expected.



Source: EIA, 2017

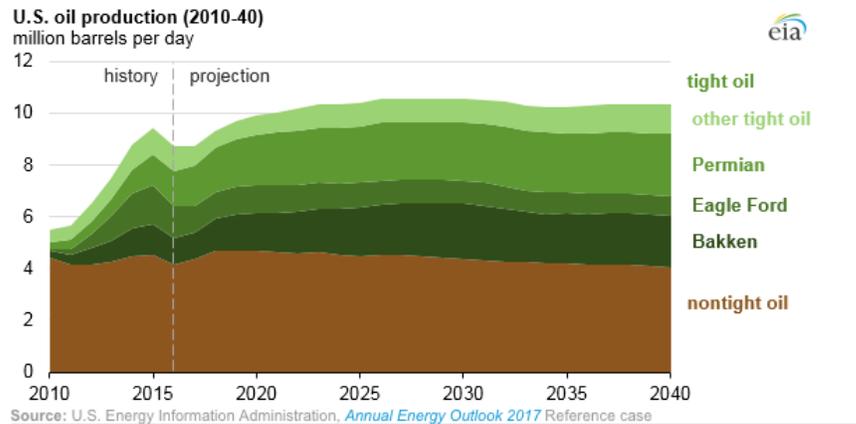
In the high resource case by the EIA, oil and gas producers "manufacturing the shales" would need to continue. I first began using the term manufacturing with oil and gas production in [early 2014](#), and I was not the only one. Producers began describing this type of production methodology in comparison to conventional oil and gas production. It is increasingly relevant in terms of the way in which oil is produced in the future.

Two leading Permian Basin-focused firms, Pioneer Natural Resources and RSP Permian, are my examples that illustrate how things have changed and where trends may be heading. These trends could support the lines moving between a reference case and a high production case. My caveat, of course, is price (which implies demand), the influencer of equilibrium of production upward or down.

In mid-2013, Pioneer Natural Resources' chief executive Scott Sheffield relayed to the industry and the public that the Midland Basin held a prospective 50 billion barrels of crude oil. That figure has risen since then, and in combination with the Delaware Basin, boasts more than 150 billion of recoverable resource.ⁱⁱ For reference, Texas produced 500,000 total barrels of crude in 2011, and doubled production to over one billion barrels in 2016.ⁱⁱⁱ More recently, Pioneer [stated](#) they expect to be producing one million barrels per day (barrels of oil equivalent) from average daily production of 234,000 boepd in 2016. That is nearly a four-fold increase, a million barrels per day by 2026. Incidentally, shale or tight oil production exceeded 50% of U.S. production in 2015.^{iv}

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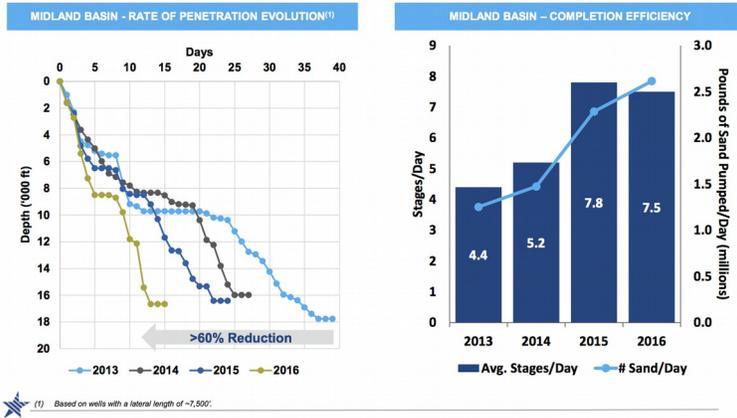
Tight oil expected to make up most of U.S. oil production increase through 2040



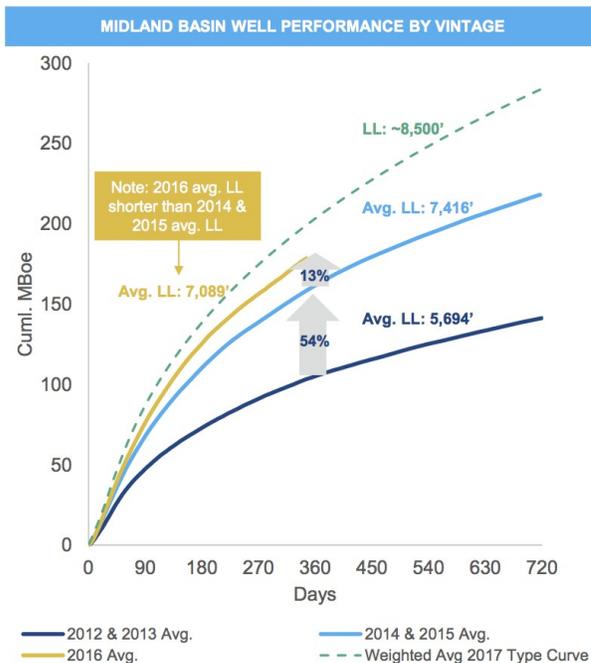
The staying power of shale resources is largely due to how producers adapted their operations, adopting the concepts of manufacturing within the framework of hydrocarbon production. Part of the story involves how efficient producers have become through the use of technology and increasingly refined practices in the process. It has changed the calculus of oil and gas production globally.

Pioneer's production prowess in producing oil is similarly repeated on a smaller scale with RSP Permian. Initially, a small-cap producer, RSP Permian has arrived at a middle-weight class. From its initial public offering in early January 2014, RSP Permian production levels were 12,000 boepd at year-end. Fast forward to today, in a recent earnings call, the firm provided guidance to investors of a 67% increase in production from 2013 to 2018. This equated to production increases from 29,000 boepd in 2016 to potentially 57,000 in 2107, a near two-fold increase. They project 30% increases from 2017-2018 and then repeating this growth in 2018-2019.

RSP Permian's metrics of operations and efficiency reveal decreased time spent drilling horizontal wells from 40 days to 15; increasing frac stages thus covering more resource surface area; and refinements to overall efficiency in production. These are the variables manufacturers consider to make operations leaner, faster, cheaper.



In addition to the efficiencies noted above, significant increases to well performance are depicted below. Note that the green line is the expected continued performance in 2017, given improvements.



Both Pioneer and RSP Permian are categorized as low-cost producers in the Permian. Much of their acreage is in the core of the northern Midland Basin, "where horizontal drilling activity has increased by 300% since January 2012," [according](#) to RSP Permian. Given that Texas is the majority-producing state of the nation's oil, they serve as proxies to potential shifts.

These Permian producers are leading firms, but many others are following in their footsteps throughout the U.S. and according to the firm-specific factors that lead to production decisions. According to Dallas Fed Chief Kaplan, the steady increase in U.S. oil production continues in a world of \$55-60 oil.

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i See EIA chart: <http://seekingalpha.com/article/1901321-shale-oil-developments-pioneer-and-the-permian>

ii Pioneer, URTEC plenary presentation, Aug. 1, 2016

iii <http://www.rrc.state.tx.us/oil-gas/research-and-statistics/production-data/texas-monthly-oil-gas-production/>

iv <https://www.eia.gov/todayinenergy/detail.php?id=29932>