Q&A: The Future of Fuel

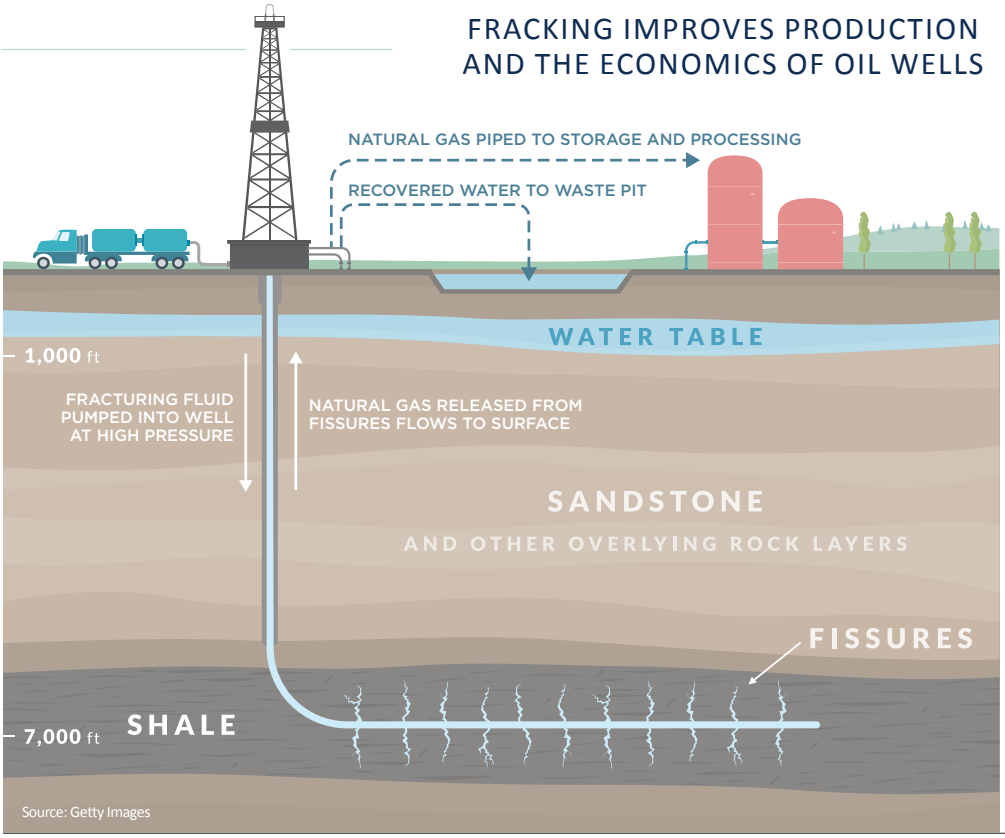
Pavel Molchanov, *Senior Vice President, Energy Analyst, Equity Research,* shares his thoughts on how the connection between technology and oil is shaping what's to come in the energy sector.

Q. HOW HAS TECHNOLOGY CHANGED THE OIL INDUSTRY OVER THE PAST DECADE?

A. As global oil supply has grown over the past century, currently reaching production levels of 100 million barrels per day, new technology has enabled production to take place in geographic locations that had not previously been accessible or economical. Significant developments include enhanced oil recovery and deep-water drilling.

Over the past decade, the most impactful new technology for extracting oil (and natural gas) has been hydraulic fracturing ("fracking") alongside horizontal drilling. This, more than anything, has enabled U.S. oil production to reverse three decades of declines since 2010. In the Bakken (North Dakota), Eagle Ford (South Texas) and Permian Basin (West Texas and New Mexico), fracking is a critical tool for the industry in improving the productivity, and thus the economics, of oil wells. Fracking is also being employed to a lesser extent in parts of Canada, and is in the early stages of implementation overseas, in places like China and Argentina.

As technology is helping make the oil supply more plentiful and cheaper, it is also contributing to slowing the growth rate of demand for oil. Strictly speaking, this isn't an oil industry issue, but more a



GLOBAL OIL SUPPLY

100 MILLION
BARRELS PER DAY IN PRODUCTION

U.S. OIL PRODUCTION

FRACKING HAS HELPED REVERSE **30** YEARS OF DECLINES SINCE 2010.

AIRCRAFT WINGLETS

Winglets reduce drag by altering the flow of the vortices created by the wing. They also increase the area of the wing, which creates lift.

4% SAVINGS IN FUEL BURNED

130,000 GALLONS OF FUEL SAVED PER AIRCRAFT PER YEAR

4% CO2 EMISSIONS REDUCED

Source: Boeing

matter of transportation engineering. It is hardly a secret that modern car engines are more efficient than those from 10 or 20 years ago, enabling the same distance to be traveled using less fuel (all else being equal). An example of a technology that's not as well-known would be "winglets" on aircraft. Next time you fly, check out the tips of the wings. Those add-ons make planes more aerodynamic, shaving as much as 5% off fuel consumption.

Electric vehicles ("EV") are probably the highest-profile example of new technology that can reduce oil demand, even though they will not become needle-moving for oil demand for a long time. Despite some of the EV-related hype in the media, EV adoption has actually been running more slowly than the industry had originally expected. We project that all EVs sold globally, on a cumulative basis through 2020, will displace only about 0.25% of global oil demand in that year. The earliest that EVs could single-handedly prevent global oil demand from growing would be after 2025. This is also the timeframe that self-driving/autonomous vehicles will come on the market.

Q. THE PRICE OF OIL FELL AFTER OPEC ANNOUNCED A RECENT CUT IN PRODUCTION. HAS THE CARTEL LOST ITS FORMER INFLUENCE?

A. Even without the recent decision by OPEC and Russia to extend their production curtailments, it is important to point out that global oil inventories were already heading substantially lower in 2017. The extension, all else being equal, should provide a 1.1 million barrel per day average benefit (versus our pre-extension oil model) from Q3 2017 to Q1 2018, and this is a big deal. There is nothing in the OPEC decision, as telegraphed as it had been, that should have logically resulted in a 5% oil sell-off that day. All we can say is that markets are not rational 100% of the time, and, ultimately, fundamentals are what matter. The fundamental picture for oil inventories is that they are on track to drop below normalized levels later this year. This is inherently bullish for oil prices, which is why we expect prices to reach cyclical highs over the next six to nine months.

Growth of non-OPEC oil supply has certainly made OPEC's position in the oil market less central than it had been for much of the past

Q&A: The Future of Fuel (cont.)

OIL INVENTORIES

OPEC AND RUSSIA

PRODUCTION CURTAILMENTS EXTENDED

1.1 MILLION BARRELS PER DAY

AVERAGE BENEFIT FROM Q3 2017 TO Q1 2018

half-century. However, Saudi Arabia individually remains an important swing producer. Some of the smaller OPEC members have shown very little willingness to comply with their pledged production cuts, but Saudi Arabia has actually cut more than it was supposed to. The fact that they continue to play a cooperative role in helping rebalance the global oil market is bullish.

Q. HAS SAUDI ARABIA ATTEMPTED TO DIVERSIFY ITS ECONOMY IN THE WAKE OF LOW OIL PRICES?

A. The question of what is motivating the Saudi Arabian production discipline is a matter of speculation: we can see what's happening, but not why. One popular theory these days is the notion that the state is deliberately propping up oil prices in order to improve market conditions for the long-anticipated Initial Public Offering (IPO) of its national oil company, Saudi Aramco. That would suggest that the state will revert to a less cooperative stance if and when the IPO occurs, potentially sometime in 2018. Other variables can also be at work, however. For example, the Saudi budget – particularly given the ongoing war in Yemen – clearly cannot sustain sub-$50 oil forever. Those $110 billion arms deals don't pay for themselves! Additionally, the royal family is well aware that permanent fiscal austerity is hardly a recipe for maintaining social cohesion (i.e., keeping themselves on the throne).

Saudi and the smaller Persian Gulf states have an advantage in that they have relatively small populations and, therefore, high oil revenue per capita. The same goes for Norway and Canada. Also, Saudi has a sizable "rainy day fund" in the form of its currency reserves. The oil down cycle of the past three years has been much more damaging for the lower-income oil exporters, such as Venezuela and Iran. These countries, and to a lesser extent Russia, have struggled economically amid the austerity that the reduced export earnings have caused. On the other hand, let's not overlook the fact that cheap oil is positive for most of the world's emerging markets, which tend to be oil importers, with China and India being the most obvious examples.

KEY TAKEAWAYS:

- Over the past decade, the most impactful new technology for extracting oil (and natural gas) has been hydraulic fracturing ("fracking") alongside horizontal drilling. This, more than anything, has enabled U.S. oil production to reverse three decades of declines since 2010.
- As technology is helping make the oil supply more plentiful and cheaper, it is also contributing to slowing the growth rate of demand for oil.
- The fundamental picture for oil inventories is that they are on track to drop below normalised levels later this year. This is inherently bullish for oil prices, which is why we expect prices to reach cyclical highs over the next six to nine months.
- Let's not overlook the fact that cheap oil is positive for most of the world's emerging markets, which tend to be oil importers, with China and India being the most obvious examples.

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