

Inside the Energy Technology Revolution

An executive summary of the Privcap thought leadership series on the ways technology is fundamentally changing energy investing

The Panelists

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Key Findings

1. Technology is creating efficiencies up and down the energy industry
2. Energy is achieving 'revolution by evolution'
3. Technology requires labor with new skills
4. Oilfield services can still see valuable productivity gains
5. Low oil prices are likely to persist—the search for efficiency is here to stay

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1 Technology is creating efficiencies up and down the energy industry

The energy industry, particularly oil and gas, has changed significantly in the last few years. Low oil prices have spurred energy firms in all sectors—upstream, midstream, and downstream—to re-engineer their businesses to operate as lean as possible and increase profit. One of their primary strategies thus far has been technology. However, while the oil and gas industry is one of the world's most advanced users of technologies, to-date those technologies have been primarily focused on extraction versus total operational performance.

“As the industry increasingly adjusts to the prospect of sustained low oil prices, companies are extending their emphasis on cost efficiency and strategic performance,” said Rachel Everaard, US Oil & Gas People Advisory Services Principal, Ernst & Young LLP. “More and more, we’re seeing companies look beyond the well-head to digital technologies like robotic process automation, or digital labor, that will unlock value across the entire organization.”

The concept of the digital oilfield is not new, but low prices coupled with the rapidly falling cost of digital technology has created a unique window for adoption, Everaard explained.

On the exploration and production side, there has been a significant increase in new fracking technology. While on the services side, which tends to be more labor-intensive, “we’re seeing automation technologies that will, at the end of the day, improve margins and perhaps displace the need to rehire folks in an upswing,” added Glenn Jacobson, a partner at Trilantic Capital Partners.

Out in the field, E&P end-service companies are accelerating the trend toward more intensive and complex well completions. Where three or four years ago, in some leading-edge basins, lateral lengths were 4,000 to 5,000 feet and 10 concentrations of 600 to 1,000 pounds per foot in terms of fracks, they are now 8,000-to-10,000-foot laterals and anywhere from 1,500 pounds to 3,000 pounds per foot of profit concentration.

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–Rachel Everaard, Ernst & Young LLP

“We’ve seen a huge move in continued improvement of technology with a big focus on the completion of a well,” said Brian Hansen, a principal at Vortus. “Think about how technology has been applied in many of the shale basins. It tends to improve the economics of each shale play across the board. So a technology like a longer lateral may be proven in the Barnett Shale, for example, and it tends to have an impact across the United States. It will be applied later in the Bakken Formation to improve economics there.”

2 Energy is achieving ‘revolution by evolution’

The days of the derrick, the drill, and the gusher are over. Now energy companies rely on technology to squeeze oil from rock—and squeeze efficiencies from operations.

“Everything from better drill bit selection to better seismic imaging to better rotary-steerable tools to help you get through your curve and your lateral section faster,” Jacobson said. “These are the things that have taken us, in some of the leading basins, from 30 days to drill a well three or four years ago down to 15 days today. If you look at the history of onshore drilling in the U.S., we’ve continually improved recovery factors, and these evolutionary changes have been coming faster by way of necessity for survival in this downturn.”

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“And not only are we getting the wells cheaper and faster, but we’re getting higher-quality wells,” Hansen added. Improved drilling technologies like rotatable steerable enable companies to place wells exactly where they want them. Geologists can give drilling engineers a 50-foot window and expect to have 100 percent of the well landed in that interval.

Geologists are able to deliver that sort of accuracy, in part, by using big data. They can build very robust data sets using publicly available information, complementing it with privately available well logs and cores and putting all of it into sophisticated software programs like Petra and GeoGraphix. These tools are so effective that companies as small as five people invest hundreds of thousands of dollars per year in them.

“You’re able to crunch this data so that you can go from ‘Hey, hit the thousand-foot Wolfcamp’ to ‘Hit this 10-foot-thick porosity streak in the Wolfcamp,’” Jacobson said.

How is technology changing the oil industry? “You’re no longer strapping the tank to determine how good the well is,” said Hansen. “Now you’re looking at a terabyte of data.”

3 Technology requires labor with new skills

Obviously, analyzing a terabyte of data requires a far different skill set than strapping a tank, which is why energy companies are rapidly changing their hiring practices. Technology is transforming the capabilities required in the industry.

“As activity ramps up in the services sector, the industry will increasingly need a technology-oriented workforce, particularly among their drilling workers,” Everaard said. “Already, we are seeing growth in hiring of engineers with IT backgrounds. Looking forward, it will be interesting to see, over the next year or two, if and how the industry changes its hiring strategies.”

The ideal workforce today is a hybrid, because while technology enables companies to implement solutions faster, it also opens up the risk of

implementing mistakes faster. “We still believe in a mix of core and multidiscipline experience combined with people who have a more tech background,” Jacobson said. “We see a lot of value in having both the old draw-map-by-hand approach and the terabytes-of-data approach.”

4 Oilfield services can still see valuable productivity gains

There are immense logistical hurdles in the industry today. Jacobson predicted that, on the services side, the companies that succeed will be those that deploy technology to tackle logistical issues.

“Things like managing supply chain, managing logistics of water and sand and other inputs, and by products of the oil and gas process,” he said. “And being able to cut costs out of their P&L to retain their customers, maintain their margins, and keep existing and growing. Those are going to be the winners.”

Water is one large logistical challenge. Ten years ago, drilling and completing a well required 10,000 or 15,000 barrels of water. Today it’s 500,000. In the next 10 years, the need may increase twofold or threefold more. Companies need infrastructure to move it around, and they need technology to manage the water and integrate it seamlessly with all the other moving parts of an oilfield.

5 Low oil prices are likely to persist—the search for efficiency is here to stay

As oil prices are expected to stay between \$50 to \$60 per barrel for the foreseeable future, the focus on efficiency will continue.

“Margin improvements will drive success and competitiveness for US oil and gas companies especially since quickly rising US shale supply is expected to cap price,” Everaard said. “The companies that get out in front and use digital technology to stay lean and lower their marginal cost curve across the value chain will be ahead of the game.” ■

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