

Beyond Low Oil Prices: Issues and Opportunities in Water Treatment and Emissions Control

Plunging oil prices have changed everything for oil and gas companies. Since last June, oil prices have fallen more than 50%, from \$115 a barrel to below \$60 a barrel, oil's lowest level since 2009. The effects of the price plunge are rippling through the industry, squeezing weaker companies and forcing stronger ones to rethink their strategies. The shale boom is on hold, and the industry has entered a period of consolidation.

Against this more competitive landscape, oil and gas companies continue to wrestle with specific pain points. Regulatory pressures have heated up at both the state and federal levels — on greenhouse gas and volatile organic compound (VOC) emissions, as well as on wastewater — while companies have struggled to deal with both concerns.

We believe that how companies deal with these two key issues — regulatory pressures and water management — will contribute to which ones win and which ones falter in the coming years. At the same time, these twin pain points offer opportunities for providers of services and equipment that can help oil and gas players comply with new regulations and improve water resource management.

L.E.K. took a deep look at these issues in our second annual study of the oil and gas sector, surveying approximately 300

decision-makers in North America's onshore and offshore drilling sectors, including CEOs, CFOs, well-site supervisors, procurement advisors and many other industry insiders. We interviewed them to find out how leading companies were repositioning themselves to deal with the increasingly challenging energy environment.

What we found was that the slowdown was pushing companies to search for improved efficiencies. Meanwhile, we saw the industry's consolidation continue, and companies increase their levels of investment in both emissions and water management.

Managing in Tougher Times

In last year's oil and gas report ("After the Shale Rush," *Executive Insights*, Vol. XV, Issue 24), we wrote about how the slowing of the oil and gas boom had begun forcing oilfield suppliers to raise their game. As the sector matured from its boom years marked by newly created wealth and a spate of new companies, leading firms repositioned themselves to succeed in a slower growth environment.

In that 2013 survey, we found that customers for oilfield products and services were altering their purchasing priorities and focusing on managing costs and working capital, rather than on rolling out services and equipment quickly regardless of price.

Beyond Low Oil Prices: Issues and Opportunities in Water Treatment and Emissions Control was written by **Chris Kenney** and **Chris Rule**, managing directors and **Marc Chernoff**, a principal in L.E.K. Consulting's Industrials practice. Research support was provided by **Eric Navales**, a managing director and **Maria Gacek**, an industrials specialist. **Chris K.**, **Chris R.**, **Marc** and **Maria** are based in Chicago and **Eric** is based in Boston. For more information, contact industrials@lek.com.

Figure 1
Water Management and Emissions Regulation Challenges

PAIN POINT	DESCRIPTION	KEY TAKEAWAYS	INVESTMENT IMPLICATIONS
WATER MANAGEMENT	<p>Water management is one of the industry's biggest concerns</p> <p>Current solutions for water delivery and disposal are inefficient</p>	<p>Winning companies will provide an integrated water-management solution (delivery, treatment and disposal)</p>	<p>Companies are investing in water-supply infrastructure and moving beyond water-hauling trucks</p> <p>Fluid-technology products will be a winning category</p>
EMISSIONS REGULATION	<p>More regulations at both the state and federal levels</p> <p>Changes in hydraulic fracking regulations are unlikely to have large negative effects on drilling in the short- or medium-term</p> <p>Some new restrictions (specifically on contamination controls) are likely</p> <p>Increasing pressure on flaring, and emerging anti-flaring regulations</p>	<p>Federal regulations are unlikely to inhibit hydraulic fracking</p> <p>There will be opportunities for service providers to help operators comply with new regulations</p>	<p>Increasing demand for fluid-treatment and emissions-control equipment and services</p>

Source: L.E.K. Consulting analysis

Across the industry, cost control and driving efficiencies had become paramount. Customers had been consolidating their purchases with fewer, larger vendors putting smaller players at a disadvantage. This continued to fuel consolidation.

In 2014, we again surveyed oil and gas companies and found that those trends identified in 2013 had not only continued, but accelerated and sharpened as energy prices have fallen. In November, Brent, the global oil benchmark, dropped to \$78 a barrel as Japan entered a recession, and still the price of oil kept falling. By early 2015, it was below \$60 a barrel. The new low price environment has increased the need to squeeze costs out of the supply chain.

We expect a continuation of this focus on efficiency improvement and supplier consolidation as drilling activity is declining in North America. Over the past 12 months, 168 oilfield equipment and services deals were announced or completed.

What we discovered in our 2014 survey, however, goes beyond the slowdown and consolidation that was apparent previously. Amidst the slowdown and consolidation, the leaders in the oil and gas industry we spoke with indicated that they continued

to struggle with certain long-term issues that strongly affect their businesses. The most significant of these, according to the survey respondents, were emissions and water management.

Water Management and Emissions Regulation Challenges

Our survey showed that two key pain points – water and regulation – were very important to industry leaders. Above are the key takeaways and investment implications (see Figure 1).

Water sourcing transport and flowback treatment remains a major source of pain for operators. While numerous companies promise solutions for water disposal, few have really cracked the code. Meanwhile, with the specter of federal greenhouse gas regulations, companies are beginning to make substantial investments in that area. While we do not believe that federal regulations will inhibit fracking, the potential for increased regulations exists, particularly in new contamination controls. We believe the result will be increasing opportunities for service providers to help oil and gas companies meet these new standards.

In fact, our latest survey found that a majority of both customers and suppliers expected new regulations in freshwater recycling

and wastewater disposal, disclosure of chemicals, and gas flaring within the next three years, while their top two concerns by far were increased regulation of freshwater and wastewater disposal and increased regulation of emissions, including vapor management. We'll look at these two issues in detail below.

Cracking the Water Code

One of the biggest pain points for all upstream oil and gas players is water – water supply, water treatment and everything that goes along with that. The shale boom has led to an increasing volume of water that energy companies need to deal with. Fracking uses huge amounts of water, and as much as 40% of it emerges after a frack job, laced with contaminants. Getting rid of this dirty water isn't easy, and several states have imposed limits on wastewater disposal. What to do with this hazardous waste – which requires treatment, disposal and potentially recycling – is both a focal point of environmentalists and a headache for the industry. Many companies have promised solutions, but to date, none appear to have cracked the code.

Some new technologies may help. One, electrocoagulation, uses an electric current to remove various contaminants from the water. While the technology has been around for years, lately it's been gaining some traction in the oil and gas industry

to treat emulsified oil and other tough-to-remove contaminants. However, the technology is still a work-in-process, and major issues remain unresolved, including how to tailor it for the variety of circumstances companies face and the wide range of potential contaminants that any technology must address.

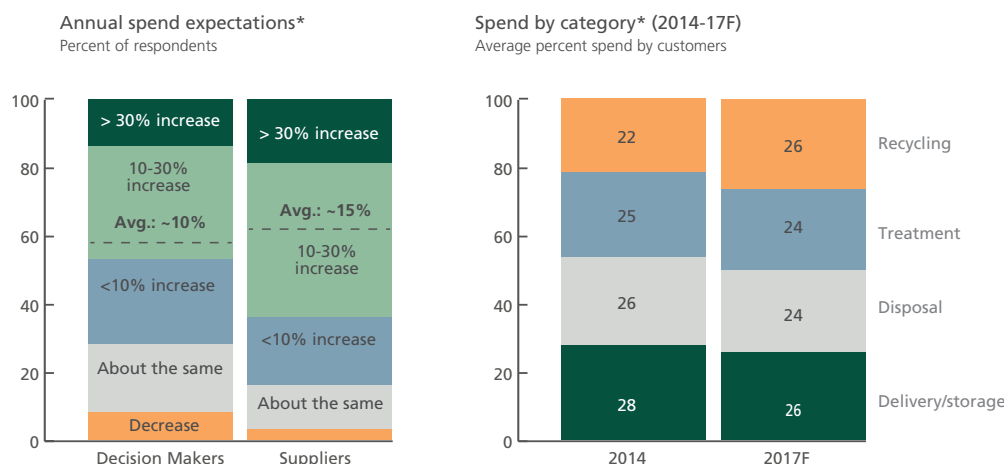
Other technologies also are under development. A good example is new desalination technologies that can treat salt, one of the most damaging pollutants. Meanwhile, waterless fracking, still under development, may alleviate much of fracking's water demands over the long term. While these technologies are still in their early days, we believe they may have long-term potential.

Finally, while mobile water solutions are still dominant — and will continue to be for some time — the industry has shown increasing interest in centralized solutions. These solutions are economical under certain circumstances only; they include when production is five years or longer, and where wells are clustered together and have common ownership.

The move toward recycling of wastewater plays into other water issues, too, such as whether companies use water trucks. The public has long objected to water trucks, due to their impact on traffic and the damage that they cause to roads. Trucking is also

expensive, while pumping water is often both cheaper and easier. This trend is likely to accelerate as the increased use of recycled water makes trucks unnecessary since the piping infrastructure is used to move and clean water. In our recent survey, 51% of respondents said they expected to do oilfield delivery by truck in 2017, a significant drop from the 58% who use trucks for deliveries today.

Figure 2
Increased Spending on Water Management



Note: * How much do you estimate your company will spend annually on products and services associated with oilfield water management in 3 years' time compared to today?

Source: L.E.K. Consulting research

Increased Spending on Water Management

Our survey identified double-digit spending expectations for water management overall, with significant spending on freshwater recycling. In fact, recycling is expected to account for 26% of spending by customers in 2017, up from 22% in 2014 (see Figure 2).

Companies already must comply with regulations at the federal level – the Safe Drinking Water Act and the Clean Water Act – and at the state level, where requirements vary by state. The Clean Water Act, for example, regulates discharge of pollutants into surface waters and requires well-site operators to get permits for discharges of produced water. New, stricter regulations may be in the offing. The Environmental Protection Agency is currently in the middle of a multi-year study on the impacts of fracking on drinking with results expected in 2016; that's when federal regulations could get stricter. However, state-by-state regulations are already changing. In Pennsylvania, for example, stricter regulations have already led to an increase in recycling.

Focus on Emissions Control

One of the biggest question marks for oil and gas players going forward is the specter of added emissions control legislation. EPA regulations limit the emissions of VOC. Now, regulations at the state level are driving substantial changes, and the prospect of broad-based federal regulations has companies searching for solutions.

Expectations for New Regulations

Our survey found that the vast majority of customers and suppliers expect new regulations in many areas. The top area where new regulations are expected — and the top challenge identified by both customers and suppliers in our survey — is freshwater recycling and wastewater disposal (see Figure 3).

The regulatory pressure on emissions has been increasing recently, and affects all players up and down the oil and gas stream. In recent days, for example, the EPA moved to require

Figure 3
Expectations for New Regulations

	PERCENT OF CUSTOMERS EXPECTING INCREASED REGULATION IN THE NEXT THREE YEARS	PERCENT OF SUPPLIERS EXPECTING INCREASED REGULATION IN THE NEXT THREE YEARS
FRESHWATER RECYCLING AND WASTEWATER DISPOSAL	69%	70%
REQUIREMENT TO DISCLOSE CHEMICALS	59%	72%
GAS FLARING	51%	55%
GREENHOUSE GAS EMISSIONS	49%	58%

Source: L.E.K. survey and analysis

oil and gas operators to improve how they measure methane leaks — the second most prevalent greenhouse gas emitted in the United States.

Flaring has been in the spotlight. As both a waste of energy and a source of greenhouse gas, a strong backlash against the practice has emerged. Regulations have begun to crop up at the state level. In North Dakota, for example, where the Bakken fields are located, regulations approved last July aim to reduce the volume of natural gas flared; companies that fail to meet requirements to capture natural gas at the well site will face penalties, including mandatory production limits. Colorado, Wyoming and Ohio have all passed regulations on methane that are stricter than their federal counterparts. At the same time, many companies have begun to take voluntary actions to reduce flaring. The Global Gas Flaring Reduction (GGFR) public-private partnership, for example, has brought together oil-producing countries, state-owned companies and major international oil companies around the reduction of gas flaring.

We suspect that there may be additional moves to address greenhouse gasses soon at both the federal and state levels.

When that happens, there could be a groundswell of companies trying to cash in on the new regulations. Companies that focus on vapor recovery, which limits noxious vapors from the environment, could gain. Vapor recovery units increasingly are being used in the oil and gas industry as a way of recovering natural gas vapor and reducing methane and VOC emissions.

Coming regulations will create other opportunities for nimble companies. Providers of services and equipment that can help oil and gas companies meet the new standards will gain. So, too, will the thorny problem of how to deal with wastewater. Companies that can develop new technologies, or figure out how to take advantage of technologies now under development, will gain.

In a tougher environment, it's more important than ever for companies to develop a long-term strategy. While the shale boom is history and energy prices have plummeted, we believe there will continue to be intriguing and lucrative opportunities in this new, more difficult environment.

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For further information contact:

Boston

75 State Street
19th Floor
Boston, MA 02109
Telephone: 617.951.9500
Facsimile: 617.951.9392

Chicago

One North Wacker Drive
39th Floor
Chicago, IL 60606
Telephone: 312.913.6400
Facsimile: 312.782.4583

Los Angeles

1100 Glendon Avenue
19th Floor
Los Angeles, CA 90024
Telephone: 310.209.9800
Facsimile: 310.209.9125

New York

1133 Sixth Avenue
29th Floor
New York, NY 10036
Telephone: 646.652.1900
Facsimile: 212.582.8505

San Francisco

100 Pine Street
Suite 2000
San Francisco, CA 94111
Telephone: 415.676.5500
Facsimile: 415.627.9071

International Offices:

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