



# SHALE 2.0

WHY NORTH AMERICAN SHALE DRILLERS ARE ABOUT TO BECOME EVEN MORE COMPETITIVE

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In the first phase of the shale revolution, North American shale drillers catapulted the United States to one of the top oil producing positions in the world, upsetting a global balance of power in oil that had prevailed for decades. (See “The New Balance of Power in Oil”.) But by the end of 2015, most were struggling to make ends meet. Falling oil prices left North American shale producers burdened by an estimated \$32 billion operating cash shortfall in the first half of 2015 and a gap of about \$20 per barrel in “life cycle” cash flows, after tallying up total investments involving land acquisition, field development and production operations. (See Exhibit 1.)

So is the shale revolution over? No. Instead, shale drillers are entering a second phase that will make many even more competitive and resilient. Although some drillers are merely slashing costs to survive hardships, the more savvy ones are redesigning their operations to thrive in a future of highly volatile, low oil prices. Industry leaders such as EOG Resources, Hess and Encana are challenging conventional practices regarding technology integration, organizational decision making, management of complex operations and infrastructure ownership to achieve significant improvements in efficiencies. We estimate that by differentiating their operations even more from those of conventional oil and gas companies, these players will reduce their life cycle costs by as much as 25 percent, or \$15 per barrel.

To remain at the forefront of this next major turning point in the evolution of shale drilling, producers will need to revamp their operations on four fronts. First, leading shale producers must develop focused technology strategies that enable the rapid application of new technology in the next well, not in the next year’s drilling program. At the same time, they have to create more agile organizations and utilize predictive analytics to better optimize a highly complex set of daily operations supporting thousands of wells.

Finally, they must restructure partnerships to lower their cost base and to enable more efficient use of investment capital.

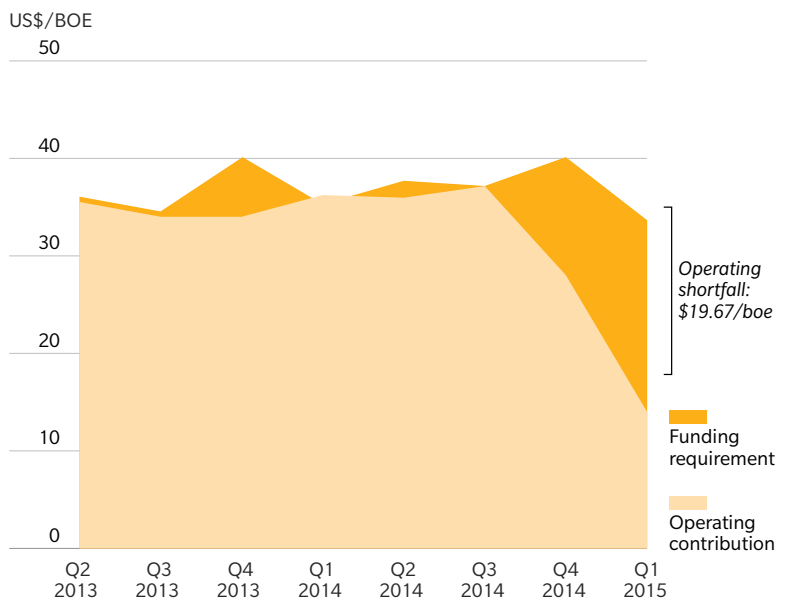
## FOCUSED TECHNOLOGY

Until now, successful shale operators have followed one of two key technology strategies: They either rapidly integrated off-the-shelf proven technologies into existing and future operations or developed a differentiated core competency internally. Niche operator Trilog, for example, has achieved tremendous success by efficiently deploying proven technologies across its operations faster and more effectively than its competitors. At the other end of the spectrum, EOG Resources is the industry’s leader in efficient well designs because of its ability to develop incremental innovations that

### EXHIBIT 1: SHALE FUNDING SHORTFALLS

North American shale producers are struggling to close operating cash shortfalls

ESTIMATED PRE-TAX OPERATING CASH BALANCE ACROSS THE TOP 10 SHALE PLAYERS



Source: Oliver Wyman analysis, company reports

are difficult for other firms to comprehend, much less replicate. EOG Resources' production rates now equal their peers' for about 20 percent less investment per well.

But neither of these approaches will continue to suffice on their own. To run profitably in a lower price environment, shale drillers must make a quantum jump in operational efficiency. Despite recent advances, 80 percent of a shale field's production is still delivered from only about 30 percent of the wells drilled, at extremely low recovery rates of 4 to 7 percent. The contrast with conventional reservoirs is striking: Conventional reservoirs produce 30 to 40 percent of the oil in place, with the majority of wells being economic. In order to close this gap and improve shale economics, shale drillers must accelerate the pace of technological innovation. Systems made up of new technologies must be tested, deployed and upgraded rapidly in the span of months – not years, as is currently the practice. At the same time, drillers must “reinvent geophysics” and improve fracking efficiency to better understand rock characteristics and to significantly increase the recovery of the trapped hydrocarbons.

## AGILE ORGANIZATIONS

Today's shale organizations struggle with finding the optimal balance between centralization and local control. Operators with more centralized organizations are some of the industry's worst performers. Plagued by bureaucracy, many of them are slow moving. On the other hand, operators with decentralized organizations have been among some of the best performers, thanks to their ability to make quick decisions. However, decentralized operators have discovered that regional silos inhibit knowledge sharing of best practices. This leads to inconsistent operational practices in areas such as safety and limits the ability of the organization to efficiently scale resources across multiple shale basins.

The most agile producers will adopt a balanced approach toward centralized control and local decision making: decision rights will be decentralized, but there will be accountability through transparent performance metrics to senior operations and corporate management. This will allow for communal visibility and the self-policing of unhelpful organizational silos, making them easier to correct.

## DYNAMIC OPERATIONS

To deliver higher returns, shale operators will need to be more disciplined about high-grading their drilling portfolio to respond in real-time to operations and market volatility. To achieve discipline, they must incorporate predictive analytics into daily operations to anticipate and maximize well and reservoir performance. Operators must stand ready to reconstitute drilling and completion programs on the fly, based on real-time market-adjusted profitability of individual wells and the associated logistical costs. Drilling plans and completion designs must be flexible to incorporate knowledge based on experience gained from prior wells.

By applying these techniques, operators like Hess could more than double oil and gas recovery factors, from 4 to 8 percent, and improve the 'hit' rate of economic wells to over 60 percent, up from the current rate of 30 percent or less.

## RESTRUCTURE PARTNERSHIPS

Finally, savvy shale operators are taking advantage of the industry's distress by exploring and implementing lower cost business models. For example, as shale basins have matured and ownership of infrastructure has become less strategic, operators such as Devon and Shell have 'dropped down' pipeline systems into separate, arms-length companies, thus lowering the rent they now pay for

these services. Further drop-downs of other infrastructure such as oil and gas processing, water management and field power systems are now under consideration. What was once strategic is now considered a commodity.

Others are reconfiguring existing partnerships with suppliers, beyond just simple across-the-board reductions of service costs. For example, two of the biggest oil field services companies, Schlumberger and Halliburton, have recently announced they will now partner with customers to finance upfront fracking costs in exchange for a percentage of revenue. (See “The Big Squeeze in Oil Field Services”.)

At the same time, many shale operators are forging new connections and partnerships with midstream and refining customers to gain direct and reliable access to the final crude sales market. By doing so, these drillers will not only increase their sales volume, but also maintain some price protection during the supply glut.

## A NEW PHASE

A new phase of the shale revolution is rapidly forming behind the scenes of shale producers’ current distress. In the next several years, leading drillers will drive down their life cycle costs significantly by revamping their operations along the four foundational pillars: focused technology; agile organizations; dynamic and flexible processes; and restructured, lower-cost business models. These players will not just pioneer but establish a platform for sustained profitability in the more volatile and uncertain world of Shale 2.0.

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