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Energizing worldwide oil and gas deepwater developments

Oil and Gas June 2016

Deepwater is under the microscope in today's environment. Oil executives discuss tactics to close the gap between development cost and commodity prices.

The precipitous drop in oil prices is putting higher-cost plays such as deepwater under the microscope. Key questions include: How will the industry energize deepwater developments to close the gap between cost and current commodity prices? What oil price is required to keep deepwater viable over the long term? These topics will undoubtedly be top of the mind for oil company executives over the months to come and were the focus of a panel discussion at the Offshore Technology Conference titled "Energizing Worldwide Oil and Gas Developments." Also participating was Kassia Yanosek of McKinsey & Company, which provided break-even cost analyses and historical data on deepwater developments.

By reflecting on the past and looking at the current situation, the panelists explored scenarios on how deepwater break-even prices can be brought down significantly.

The past and present

In the run-up to the oil price drop in late 2014, deepwater had spectacular investment and production growth. However, even then there were signs of increasingly challenging project economics. Global deepwater investment increased from $16 billion in 2003 to more than $70 billion in 2013, with production more than doubling in that time period to almost six million barrels per day, or 7 percent of the world's total oil supply. However, toward the end of this period, there were buildups in costs and cycle times. In the $100 per barrel price environment of 2012–13, deepwater break-even costs for greenfield projects ranged from $70 per barrel in the US Gulf of Mexico (GOM) to $75 per barrel in West Africa, two to three times the costs in the previous decade. This was due primarily to three factors: increased geologic complexity (for example, the Paleogene in the GOM, and the presalt in Brazil and Angola), increased government take and local content requirements, and project-cost escalations beyond supplier margin/commodity costs (such as increased design complexity).

In today's "lower-for-longer" price environment, deepwater greenfield project economics are challenged, yielding dramatic cuts in investment. As of early 2016, approximately 35 billion barrels of oil equivalent (BOE) or approximately 6 million barrels of oil equivalent per day (BOEPD) of deepwater reserves and production, respectively, has been deferred. The good news is that in today's price environment, project costs have been reduced across the board, primarily driven by supply-chain margin compression. In regions with competitive supply chains, such as the GOM, break-even costs for greenfield developments have decreased 20 percent on average to $50–60 per barrel and ultradeepwater rig day rates have fallen 40 percent from the first quarter of 2014 to the first quarter of 2016.

Scenario for the future

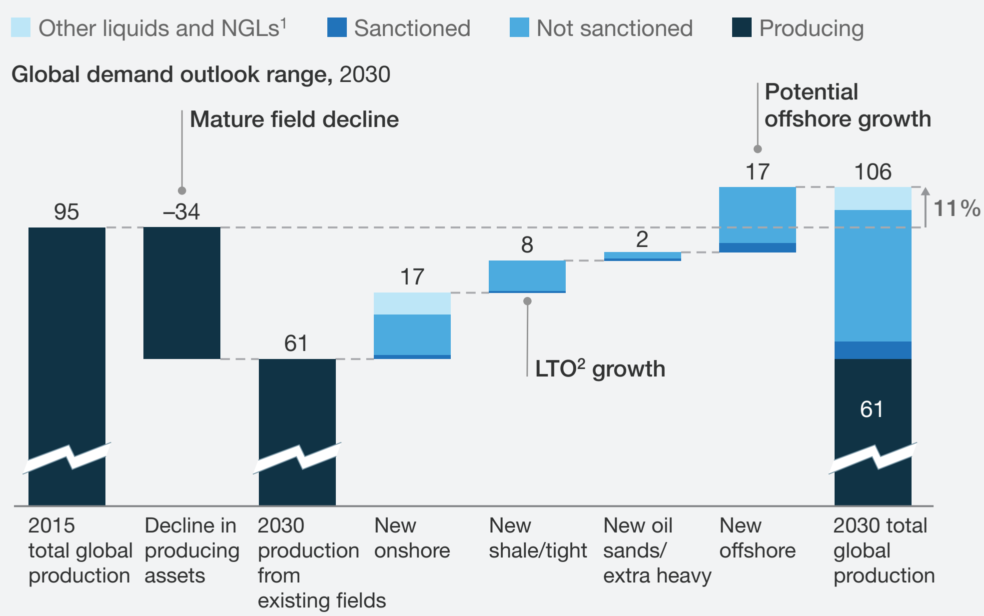
Despite the current pullback, a potential long-term supply scenario indicates that offshore production could account for up to 50 percent of new supply requirements in 2025 to make up for mature asset decline curves and the decreasing likelihood of oil sands as a competitive source of supply. In a scenario where global 2030 demand reaches approximately $106 million barrels per day, new offshore production may need to reach approximately 17 million barrels per day to close the projected supply/demand gap (Exhibit 1). This scenario assumes

Exhibit 1

Despite potential scenarios for growth, activity reductions and questionable economics put into question the role that deepwater will play.

2030 production, million barrels/day

SLOW RECOVERY



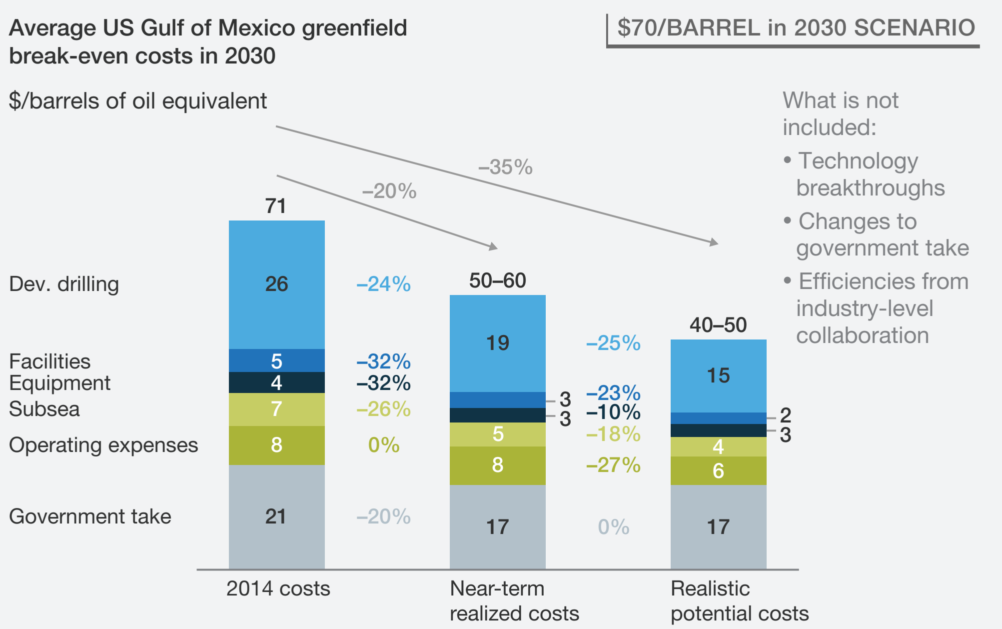
[1]Natural gas liquids.
[2]Light tight oil.

McKinsey&Company | Source: McKinsey Energy Insights; Rystad Energy that oil prices recover to $60–70 per barrel in 2018, Organization of Petroleum Exporting Countries (OPEC) market share remains constant, and unconventionals outside of North America grow at a slow pace. Growth in any of these other resource types would potentially reduce the call for deepwater.

For this deepwater supply growth to be achievable, it is essential to improve deepwater competitiveness not only in the $50–70 per barrel world but also in a scenario in which sub-$50 per barrel prices persist. McKinsey developed a "realistic potential" (that is, assuming current best-in-class practices) break-even economics case for an average project in the GOM, finding that cost reductions through best-in-class practices across a range of levers could reduce costs to $40–50 per barrel (Exhibit 2). Some of the themes of opportunities that are within industry control include supply-chain efficiencies, common standard project-design solutions, innovations in field developments, and supply-chain alliances.

Exhibit 2

The projected average Gulf of Mexico greenfield deepwater costs in 2030 have the potential to drop 35–40% from 2014 levels.



[1]Natural gas liquids.
[2]Light tight oil.

McKinsey&Company | Source: McKinsey Energy Insights; Rystad Energy

Supply-chain efficiencies

When oil prices were around $100 per barrel, the industry was already starting to address capital efficiency by looking at opportunities to transform the supply chain. With the drop in oil prices, this work has been accelerated. Key cost-saving opportunities include demand management of services, standardization of equipment, and price management.

Typical examples include the optimization of offshore logistics; standardizing and simplifying specifications for scope, material, and equipment at the operator and contractor level; and strategic vendor relationships. The largest opportunity for operators may be to rigorously drive down scope to a minimal level to meet functional requirements and regulations.

There is substantial potential for additional cost savings through common design innovations at the project level. The standardization of equipment, design, and installation will improve project economics through enhanced delivery schedules, reduction in engineering, manufacturing and installation costs, and reduction of risk in the project execution. These improvements can be at the equipment level, such as the gains from using a standard subsea tree design or at the full platform design. For example, Anadarko utilized a “design one, build two” philosophy for the Lucius and Heidelberg projects in the GOM. The benefits for the project-development cycle can come from a streamlined specification/tendering/evaluation process, limited delays due to unknown unknowns, and avoiding trouble time.

The deepwater industry can make great strides in reducing development costs through a strategy of standardization. Standardization has been successfully demonstrated in subsea and topsides equipment as well as full platform designs, and can be implemented more broadly across the industry. Similar techniques can be applied to many other areas of the supply chain.

The supply-chain efficiencies and common-standard project-design solutions are great opportunities when applied on an individual company level. However, innovations and deeper collaborations across industry players are required to significantly transform the deepwater-project cost structure. One example is to further reduce project complexity and capital costs through industry-level agreements that harmonize equipment specifications and standard development solutions.

At the field and basin levels, operators can further improve cost structures through commercial innovations. This could take the form of the financing of topside and subsea hubs through a third party; sharing services with other industry participants, such as through rig pools; and development phasing or increasing the reserve size with codevelopments and partnerships. Examples of the latter are Anadarko’s Independence Hub project, BP, and Chevron’s coinvestment in western GOM properties (such as Keathley Canyon), and LLOG’s Delta House codevelopment project.

Supplier alliances and new contractor offerings

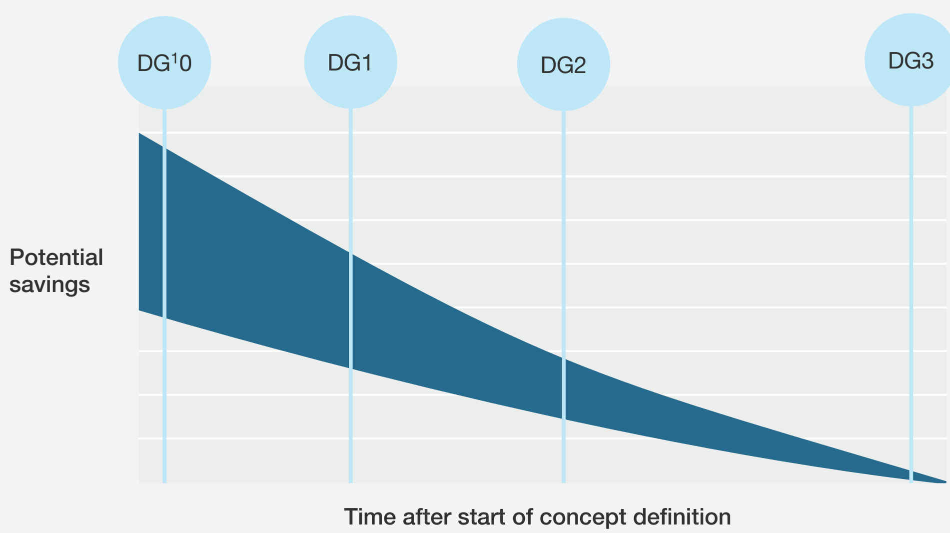
One of the most effective themes to enhance project performance and reduce cost is early engagement with the engineering, procurement, construction, and installation (EPCI) contractor, paired with continuity and consistency of project-management personnel, which provides the best opportunity for execution excellence. Gaps in project planning and front-end engineering design typically result in costly change to the overall project later.

The key to success at the early-engagement stage and throughout the execution process is trust built in the context of a true operator/contractor partnership. Building this trust often works best in a small, integrated team over a number of months and years, and requires commitment to the relationship. The historical contractual relationships, particularly in the GOM, have typically been tactical—based on a work-package-by-work-package basis with reimbursable or lump-sum contracts. In many cases, operator companies have not opened the door for early engagement with contractors until later in the process (Exhibit 3). By this time, effectively 90 percent of the cost has been determined, with savings opportunities potentially left unidentified.

Working together during the field-development design process offers proven benefits for both the operator and the contractor. In recent years, contracting has in some cases evolved

Exhibit 3

The value of early contractor involvement includes the ability to rationalize the overall field layout and to drive standards, project development, and integration of technology.



[1]Decision gate.

McKinsey&Company | Source: FORSYS Subsea into frame agreements and project-management contracts, targeting reduced cost through increased collaboration. Frame agreements establish common protocols and standards—such as commercial base rates and the contractual framework—that operators can use on future projects with a preapproved set of potential contractors. These contracting models coupled with advanced design approaches can open the door to streamlining the design process while at the same time reducing risk.

New alliances and partnership models underway in the industry have the potential to improve cost savings and project performance even further. Strategic alliances between EPCI and equipment companies, such as OneSubsea (formed by Cameron, Schlumberger, and Subsea 7) and the alliance between FMC Technologies and Technip, have formed recently to better address operator challenges and reduce costs, with the aim to drive greater value in project delivery. For example, by rationalizing and simplifying the overall field layout and integrating subsea umbilicals, risers, flowlines, and subsea production and processing systems, costs can be dramatically reduced by eliminating redundant subsea hardware, optimizing and derisking the offshore construction campaign, integrating across all infrastructures, and streamlining project teams.

New strategies

Today's price environment also provides an opportunity for changes in how international oil companies and suppliers think about their deepwater strategies. With competitive advantage in deepwater originally based on mastering the technology related to water depth, deepwater has matured considerably since the industry stepped into water depths of more than 1,000 feet in the 1980s. Therefore it would be appropriate to reassess what drives competitive advantage in deepwater.

Admittedly, deepwater is still one of the most technology-intensive oil and gas plays. However, for water depths of less than 7,000 feet and pressure and temperature under 15,000 pounds per square inch and 300 degrees Fahrenheit, respectively, hardware technology is becoming more commoditized. Gaining a competitive edge today may require a focused strategy more related to world-class exploration success, efficiencies in deploying the deepwater technology, or optimization of recovery from deepwater reservoirs. Such strategies could entail a geographic focus (for example, GOM), geology focus (such as Atlantic conjugate margin presalt plays), life-cycle focus (for example, explore and sell), or technology focus (such as technology-enabled improved productivity).

Combining these strategies may make them more impactful by building on each other. For example, a strategy combining a focus on a particular geologic play in one or two basins can be further enhanced by developing a technology tailored to that geology/geography that drives down development costs even further.

Optimizing costs through the supply chain and development scope will only get companies so far in closing the gap between today's cost structure and what is required to reenergize deepwater in today's oil-price environment. New strategies and approaches are required, in addition to a minimum-level crude oil price.

Summary

A subset of ideas and concepts highlighted in this article are being tested and implemented across the industry to some extent. However, more is required to accelerate the competitiveness of deepwater in the global energy mix. In addition to addressing value levers that are within companies' control, step changes in technology innovation and improvements in the fiscal and regulatory environment are necessary to achieve transformative economics. □

This article appeared in the June 2016 edition of *JPT* and is reprinted here by permission. The article builds on OTC 27317, prepared for presentation at the 2016 Offshore Technology Conference in Houston. The full-length paper can be found at onepetro.org.