Economics of exploration and production and challenges thereof

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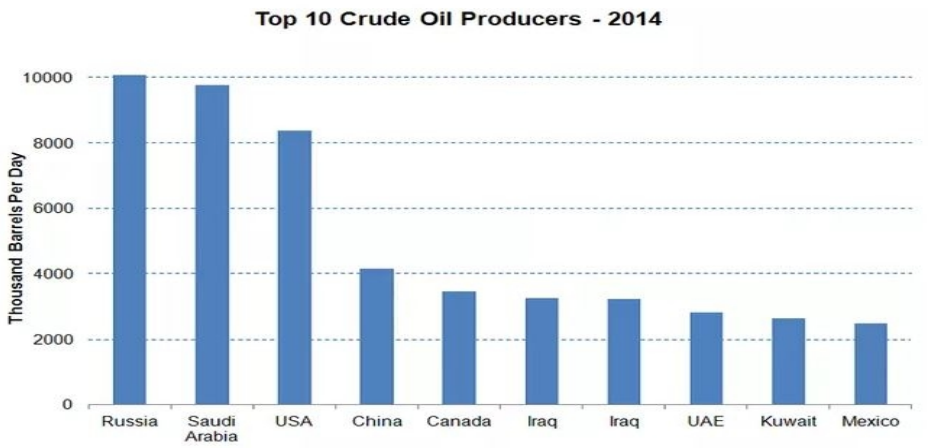
Introduction:
The economic conditions and the E&P sector are massively interrelated. There is a clear indication that oil companies adjust their portfolio of exploration and production activities according to the changes in economic and financial conditions. In times of high oil prices, high cash flows and high risk appetite, companies seem to tilt their exploration and production activities towards risky areas. When oil prices are low, cash flows are constrained and the risk appetite is more modest, exploration strategies are typically more cautious.

Oil price trends in 2015
The rapid fall in the price of crude oil from the 2014 highs of US$100+ to current levels near $50 during July 2015 represents a +50% drop in less than a year. This has had a dramatic impact on the industry's confidence and its 2015 spend programs. Reductions of 20% to 30% in capital spend are expected across the industry value chain. Though many companies and fields remain profitable at $50 prices, the free cash flow and access to capital the industry enjoyed just eight months ago have dried up. The global oil and gas industry's spend for 2014 was approximately $1.1 trillion. This included capital and operating spend across the value chain from upstream to downstream. The CAPEX component of the $1.1 trillion was approximately $950 billion. Therefore, a 30% cut in capital budgets would translate into a spend reduction of about $285 billion. This draconian reduction will not be evenly felt across upstream and downstream sectors, but will disproportionately hit upstream exploration. The brunt of the spend decreases is expected to hit the front end of the value chain, where investments take longer to convert to cash.

During the first six months of 2014, oil prices climbed approximately 9% and energy company stocks gained approximately 20%. In a drastic about-face, however, oil prices dropped approximately 49% to $55 a barrel during the second half of the year and energy company stocks declined 35% as of mid-December. The rapid change in oil prices is having far reaching consequences on the energy industry, as many companies are experiencing declining revenues and are canceling projects that would have expanded their production capabilities.

Supply and Demand
The first economic consideration for price of oil is the question of Supply. The price of oil is based on the supply at the moment and the likely supply in the near future based on projected production. So when companies continue to produce in a period of oversupply, the price of oil continues to weaken and the companies with the most uneconomic deposits start to struggle.

A strong U.S. dollar and continued economic weakness in Europe, China, and other emerging markets have reduced global oil demand and contributed to the price decline. However, the main factor that has been driving down oil prices has been the supply, where oil production has increased, particularly in Libya, Angola, and the U.S. The increased production of oil in the U.S., for example, has kept oil prices much lower because this is additional supply to the market. This combination of weaker demand and higher supply morphed an expected deficit of 100,000 barrels per day into a surplus of 1 million barrels per day in 2014. According to the International Energy Agency (IEA), the surplus grew to 1.4 million barrels per day in 2015. In addition, Iran has now reached a nuclear agreement with the U.S. in July 2015, which has the potential to add up to 500,000 barrels per day of oil to an already oversupplied market.



A move by the Organization of the Petroleum Exporting Countries (OPEC) is the quickest option to eliminate the global oil surplus and stabilize prices; however, the organization's decision to maintain current production levels means other producers will need to reduce supply. This reduction will take time, however, as there is a five-to six-month lag between when exploration and production companies reduce investment in new wells and an impact on production. In this scenario, oil prices are likely to remain under pressure during the 2015-16.

US Shale v/s Saudi oil

Over the past four years, as the price of oil hovered around $110 a barrel, oilmen of North Dakota and Texas have set about extracting oil from shale formations previously considered unviable. By their frenzied drilling, they have completed more than 20,000 new wells since 2010, more than ten times Saudi Arabia's tally—which has boosted America's oil production by a third, to nearly 9m barrels a day (b/d). That is just 1m b/d short of Saudi Arabia's output. The contest between the US shale and the Saudi oil has tipped the world from a shortage of oil to a surplus.

This is now the subject of a continuing tussle between OPEC and the shale-drillers. Several members of the OPEC want it to cut its output, in the hope of pushing the price back up again. But Saudi Arabia, in particular, seems mindful of the experience of the 1970s, when a big leap in the price prompted huge investments in new fields, leading to a decade-long glut. Instead, the Saudis seem to be pushing a different tactic: let the price fall and put high-cost producers out of business. That should soon reduce supply, causing prices to rise.

There are signs that such a shake-out is already under way. The share prices of firms that specialize in shale oil have been decreasing. Many of them are now in debt. Even before the oil price started falling, most were investing more in new wells than they were making from their existing ones. With their revenues now dropping fast, they will find themselves overstretched. A rash of bankruptcies is likely. That, in turn, would diminish shale oil's reputation among investors. Even survivors may find the markets closed for some time, forcing them to rein in their expenditure to match the cash they generate from selling oil. Since life of shale-oil wells are short-lived (output can fall by 60-70% in the first year), any slowdown in investment will quickly translate into falling production.

This shake-out will be painful. But in the long run the shale industry's future seems assured. Fracking in which a mixture of water, sand and chemicals are injected into shale formations to release oil, is a relatively young technology, and it is still making big gains in efficiency. According to a research firm, IHS, the cost of a typical project has fallen from $70 per barrel produced to $57 in the past year, as oilmen have learned how to drill wells faster and to extract more oil from each one.

The firms that weather the current storm will have more shale to exploit. Drilling is just beginning (and may now be cut back) in the Niobrara formation in Colorado, for example, and the Mississippian Lime along the border between Oklahoma and Kansas. Further shale oil need not be a uniquely American phenomenon: there is similar geology all around the world. Although no other country has quite the same combination of eager investors, experienced oilmen and pliable bureaucrats, the riches on offer must eventually induce shale-oil exploration elsewhere.

Most important of all, investments in shale oil come in conveniently small increments. The big conventional oilfields that have not yet been tapped tend to be in inaccessible spots, deep below the ocean, high in the Arctic, or both. America's Exxon Mobil and Russia's Rosneft recently spent two months and $700m drilling a single well in the Kara Sea, north of Siberia. Although they found oil, developing it will take years and cost billions. By contrast, a shale-oil well can be drilled in as little as a week, at a cost of $1.5m. The shale firms know where the shale deposits are and it is pretty easy to hire new rigs; the only question is how many wells to drill.

Impact of Low Prices on Oil Industry

Oil companies are experiencing pressure on their revenues and profits due to the decline in oil prices to $55 a barrel. To offset the decline in revenues, oil companies reduce capital expenditures by canceling the development of new wells that are no longer economically feasible at $55 a barrel. Broadly speaking, investing in new wells is only profitable when oil is trading at a minimum price of $80 a barrel. As such, oil companies will slash capital expenditures by 20 to 30 % in 2015. Cuts could be even higher among small cap stocks where some companies have already announced 50% reductions in spending. The cuts may even wipe out production growth or cause production to decline in the U.S. by late 2015 or early 2016. The decrease in capital expenditures globally will also be particularly hard on oilfield services companies.

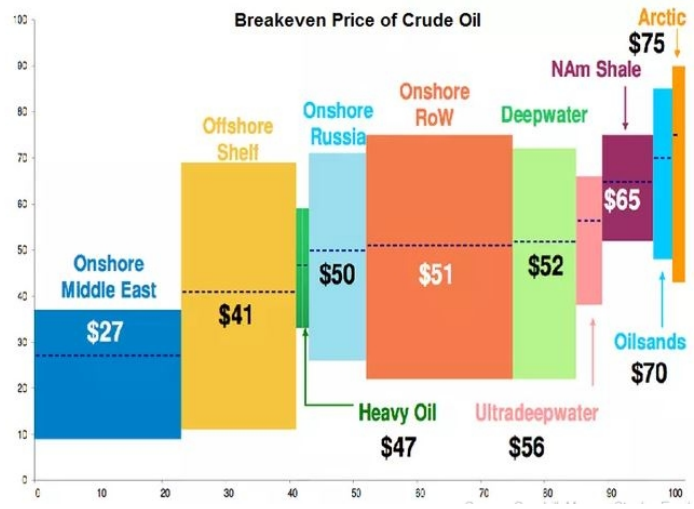
Oil-producing countries whose budgets depend on high prices are in particular trouble. The Rouble tumbled this week as Russia's prospects darkened further. Nigeria has been forced to raise interest rates and devalue the naira. Venezuela looks ever closer to defaulting on its debt. The spectra of defaults and the speed and scale of the price plunge have unnerved financial markets.

Longer Term Outlook for Oil Prices

Low oil prices will reduce production and increase demand, which will eventually rebalance the market and enable oil prices to recover, but the process could take two to three years. At the same time, once supply and demand equilibrium is reached, a snapback in prices could be dramatic. In the U.S., shale fields contribute substantially to domestic oil production. The production of individual wells in shale fields tends to drop off quicker as these wells age than with traditional oil wells. After capital expenditure cuts eventually cause production to decline, prices will need to rise to $80 per barrel to incentivize investment in new wells. Moreover, the longer prices stay at low levels, the longer the amount of time will be needed before companies fund new investment in developing wells.

Variation in Breakeven around the world

There is a great amount of variation in the costs of extraction of a barrel of oil by various companies and in various countries. At a Brent crude price of $80, for example, there will be companies that are extremely profitable because their cost per barrel might be $20. There will also be companies that are losing money because it costs them $83 a barrel to extract. In a perfectly rational economy, all the companies losing money would cease or hold back production as the price fall closer to their breakeven point, but this doesn't happen always.



Uneconomic Production

Because holding land for exploration is expensive and drilling is sometimes a condition of the contract, companies will drill on deposits and keep wells going even if prices are depressed. As with any resource extraction industry, production depends upon labor costs, equipment costs, leases and many other expenses that don't disappear when production is scaled down. Even if some of the costs can be eliminated some costs such as labor become a greater expense in the long run when the company must rehire everyone when prices recover and every other company is also hiring in the suddenly competitive labor market.
Instead, oil companies often look to higher prices in the future and will aim for a well to pay off over a period of years, so the month to month fluctuations in price are not the primary consideration. Large oil companies have strong balance sheets that help them ride out down years. They also have a variety of wells with conventional and unconventional deposits. Smaller companies tend to be regionally concentrated and have much less variety in their portfolio. These are the companies that struggle with a

prolonged drop in oil prices. Similarly countries like Canada with largely heavy oil deposits see the profits disappear with low oil prices because their cost per barrel requires a higher price per barrel than OPEC and other competing nations need to keep producing.

From the exploration phase with its seismic and land costs right to the extraction phase with rig and labor costs, there are only a few ways to control costs for the oil industry. One is to integrate upstream, midstream and downstream production. This means one company has the ability to do everything from exploration to extraction to refining. This can help control costs on some aspects, but it means the company is not specialized or focused at being good at one thing. The other method is to encourage more technological advancement so that challenging deposits become cheaper to tap. The latter looks to have the most potential in the long run, although companies will still look at vertical acquisitions while they wait for further technological breakthroughs.

Challenges

1. A big challenge is to ensure that both new and discovered recourses can be produced in an economically and environmentally sound manner to meet the demand and offset natural field decline.
2. Environmental fears such as Climate Changes may lead to tougher restrictions to explore in some parts of the world with good prospects which may impede ability to produce adequate amounts of energy.
3. Finding economic ways to solve the problem of location of new supplies at increasing distances from consuming markets, especially in case of gas.
4. To maintain vigorous programmes of research and development to expand capabilities, lower costs and increase operational efficiency.
5. Developing and maintaining partnerships with Governments, constructive relations with producing countries, consuming nations and energy companies to work out reasonable tax and fiscal regimes during opening and reopening of large areas for international exploration and production.
6. Fragility of supplies from areas of political instability in key energy producing regions.
7. Continuance of technological advances in exploration, development and production
8. Possibility of many of future discoveries coming from not only new frontier areas but also from proven areas as evolving technology improves ability of the industry to virtually see and distinguish the oil and gas before drilling.
9. Responding to change has been and will continue to be the biggest strength of oil and gas industry.

Future of Oil and Gas Industry

Success in the future of Oil and Gas will require continued adaptation of a complex business model to unforeseen challenges. Demand for oil and gas will continue to increase, as they are expected to remain the leading sources of energy for some time to come. We hope to see a continued increase in exploration and production success as additional areas are opened for exploration and as technologies evolve.

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