

## Overcoming the oil price decline

**By Emma Hughes and Vasili Nicoletopoulos**

A so-called shale gale has swept across the US in recent years, driving growth in domestic natural oil and gas generation and increasing the demand for oilfield minerals.

The following seven factors, combined, have been widely acknowledged as being instrumental in the success of hydraulic fracturing (fracking) in the US and Canada. These factors are still in play:

1. Technological developments, including horizontal drilling and, later, multiple-pad and two-stage drilling;
2. Favourable geology for shale;
3. Private individuals' ownership of minerals underneath their land;
4. Low population density in resource-rich areas;
5. A prevailing entrepreneurial ("can do") spirit;
6. The existence of specialised service companies with know-how and machinery;
7. The availability of high-quality frac sand.

Two additional factors have been of great importance, but were not historically discussed because until mid-2014, they were taken for granted. These factors are high oil prices and accessible finance.

In the early days of shale, the investment community provided a significant amount of funding for shale exploration. The stage was set by low interest rates instituted by the Federal Reserve during the period 2007-2009.

Banks often used their sell-side equity analysts to promote the stocks of shale companies, rating them a 'buy'. This turned out to be convenient for both the operators and some of the banks. The oil and gas industry engaged in a public relations exercise and operators claimed shale was a game changer, and proclaimed energy independence for all. As a result, share prices and natural gas prices soared.

While the seven factors listed above are still in play, [oil prices](#) and financing conditions have changed dramatically (and unexpectedly), beginning in June 2014. Since then, the oil price has dropped from \$120/bbl – by 40% from June to December 2014 – to below \$70/bbl. It then dropped further to \$45-60/bbl in the first months of 2015.

As a result, the US and Canadian shale industry was hit hard and in February 2015, Baker Hughes' rig count reached its lowest point since January 2010.

As a natural consequence, financing options for fracking operations became much less accessible.

**Figure 1: Effect of falling oil prices on frac sand producer shares**



**The fall in the price of gas, and then oil**

Both oil and natural-gas prices have fallen in part because of soaring US production.

**Source: The Motley Fool**

The oversupply from the shale drilling bonanza meant that December 2014 was another record-setting month for US natural gas production from the Lower 48 states.

As a result, natural gas prices fell from a peak of about \$13.50/m British thermal units (Btu) in 2008 to below \$3/m Btu in the first quarter of 2015 – sinking in between to a 10-year low of under \$2/m Btu in 2012. The plummeting value of natural gas represented a decline of around 80% over seven years.

However, while some have blamed OPEC for this drop, others have placed the onus on restoring the oil price back to an equilibrium on the shoulders of non-OPEC producers.

According to Michele Della Vigna, head of European energy research at Goldman Sachs, it was non-OPEC producers that created the oversupply situation that has weighed on prices.

"I think the market has realised that where we need to find the adjustment is onshore US and that's where the market is focused," Della Vigna told *CNBC*.

"The adjustment is starting to happen there. Clearly an OPEC cut would help getting to the equilibrium faster, but at the end of the day, it is non-OPEC that needs to sort out the oversupply it has created," he added.

Unlike oil, natural-gas prices are tightly linked to weather, making winter the peak for demand. Not only does it heat homes, but it also increasingly fires power plants, which run at higher rates when people stay inside.

Wholesale natural gas prices have dropped from about \$13.42/m Btu in 2005 to about \$2.85/m Btu in February 2015. Prices were still dropping thanks to milder than normal weather in the northeast US. At those prices, the incentive to justify further investment in fracking operations in locations such as the Marcellus Shale is fast deteriorating.

As a result, for the first time in several decades, the majority of rigs in the US – three quarters – are drilling for oil. Just three years ago, that scenario was the exact reverse.



Logistics plays a large role in the US fracking market.  
ExxonMobil

### **Falling prices affect financing**

Recent oil price declines have, of course, given consumers considerably more purchasing power. Global consumer outlays were up markedly in Q1 2015, but this will be partially offset by slowed capital investment in oil-producing countries this year and next. On balance, the impact of the oil price decline on global gross domestic product appears marginally positive.

India and Turkey, both large crude importers, are among the countries to gain most from falling prices. As is Japan, which has been importing oil to replace the nuclear power capacity that was switched off after the Fukushima disaster in March 2011. China, the US and Europe have also benefited, but to a lesser degree.

On the other hand, low prices lead to an investment drought. OPEC's decisions shape expectations: if it curbs supply sharply, it can send prices spiking. Saudi Arabia produces nearly 10m barrels of oil per day (bbls/d) – a third of the OPEC total.

Great pain is inflicted upon countries where regimes are dependent on a high oil price to pay for costly foreign ventures and expensive social programmes. These include Russia, which has already been hit by Western sanctions following events in the Ukraine; Venezuela; Iran; Nigeria; and Azerbaijan, which saw its currency devalued by one third as a result of the plummeting prices.

Low prices can also have an impact on the riskiest and most vulnerable sections of the oil industry, including Western oil companies with high-cost projects involving drilling in deep water or in the Arctic, or those who are dealing with maturing and increasingly expensive fields. Low prices can also affect those working in the US fracking industry, who have borrowed heavily on the expectation of continuing high prices.

It is also worth mentioning that these oil and gas companies comprise approximately 17% of the overall high-yield debt market. This is a debt market for businesses with shorter track records of debt service and lower credit ratings, and offers slightly higher interest rates than standard investment-grade corporate bond markets in order to compensate the investor for heightened risk of default.

Some shale oil companies are facing a credit crunch, as lenders are preparing to cut the credit lines to a group of junk-rated US shale oil companies by as much as 30%, dealing another blow as they struggle with a slump in crude prices. As an example, Sabine Oil & Gas Corp. became one of the first companies to warn investors that it faces a cash shortage from a reduced credit line.

### **Consequences for oil exploration, production and development**

Oil-price slumps usually lead to cuts in energy firms' investments. Production eventually falls, helping prices to stabilise. In 1999, after the Asian financial crisis,

which began in 1997, global investment in oil and gas production dropped by 20%. A decade later, after the financial crisis, investment fell by 10%, then recovered.

In 2014-15 some of the pain has been taken by the big integrated energy firms, such as Exxon Mobil and Shell. After a decade of investing in prospects in the Arctic and deep tropical waters with little effect, they began cutting budgets in 2013. Long-term projects equivalent to about 3% of global output have been deferred or cancelled, says Oswald Clint of Sanford C. Bernstein, a research firm. Most "majors" assume an oil price of \$80/bbl when making plans, so deeper cuts are likely when prices fall below that level.

Much of the burden of adjustment will fall on America's shale industry. It has been a big swing factor in supply, with output rising from 0.5% of the global total in 2008 to 3.7% today. That has required hefty spending: shale accounted for at least 20% of global investment in oil production during 2014. Saudi Arabia, the leading member of OPEC, has made clear it will tolerate lower prices in order to negatively impact shale firms' finances.

Crashing oil prices are also likely to cut exploration and production (E&P) spending by US unconventional oil and gas companies, which will impact frac sand demand in the coming months, according to a report by rating agency Moody's. Over the last six months, Halliburton has axed 9,000 workers as the company copes with the soft oil market. Similarly, Schlumberger is to cut 11,000 jobs in addition to its previously announced 9,000 layoffs, as lower activity in the oil and gas drilling sector resulted in a 15% drop in net income for the company year-on-year (y-o-y) in Q1 2015.

### **Impact on US proppant supply and demand**

Although drilling equipment and the people who operate it are vital to the US fracking industry, so too is frac sand. If there are fewer wells being drilled, there will be less demand for sand.

The share prices of frac sand producers like Hi-Crush Partners LP and US Silica Holdings have plummeted along with oil (*Fig.1*), but from a peak as recent as September 2014. In fact, demand for the product only recently started to take off with the growth of fracking and has only really experienced oil prices moving generally higher.

The Department of Natural Resources in Wisconsin, US, said in January 2015 that "there has not yet been any indication of a slowdown in frac sand demand despite concerns that low oil prices could impact consumption of the mineral."

State officials from the agency told local news service *The Capital Times* that companies were continuing to press forward, saying it had "not seen any reduction at this time and from recent conversations with industry there are still a number of new operations which are working toward being able to begin production as quickly as possible."

However, in early April 2015, some frac sand companies were beginning to feel the pinch. Superior Silica Sand, a wholly-owned subsidiary of Emerge Energy Services, announced on 7 April that it had cancelled plans for a new Wisconsin-based frac sand processing facility as a result of tough market conditions. The company's CEO, Rick Shearer, said that this was a "difficult but necessary decision" that was made owing to the project being no longer "economically viable".

In addition, a report by the *Star Tribune*, published in April, found that US sand mines, including 63 in Wisconsin and six in Minnesota, are projected to ship significantly less sand to oil drillers in 2015, compared to numbers seen in 2014. Furthermore, on 14 April 2015, frac sand producer Victory Silica temporarily suspended production at its Seven Persons (7P) plant in Alberta, Canada, in response to slower than anticipated frac sand sales.

On a more positive note, Laird Tomalty, deputy project director at Victory Silica, told **IM** at the Prospectors and Developers Association of Canada (PDAC) 2015 conference in Toronto, Canada, in early March, that fracking-grade silica sand demand is unlikely to suffer as much from lower oil prices as many in the industry fear.

In addition, Fairmount Santrol reported record 2014 revenue as proppant sales continued to grow. "The volume growth was driven by continued proppant demand across all basins," the company said.

### **Ceramic proppants**

While the impact of low oil prices was just beginning to hit frac sand producers in April 2015, the effects were felt by ceramic proppant producers much earlier in the year.

The world's largest industrial minerals company, Imerys SA, announced in February that its Oilfield Solutions business was to close two of its proppants manufacturing plants in the US and reduce output at another after orders for its oilfield products were slashed in response to falling oil prices.

The mothballed facilities are the Andersonville and Gemini plants, both located in the southern US state of Georgia. Production will also be cut at its Wrens plant, in Georgia.

Imerys said it would be shutting the Andersonville facility for "an undetermined period", but did not say how long the other plants would be affected and declined to disclose the precise reduction in its orders for competitive reasons.

On 18 March 2015, US-based proppants producer Carbo Ceramics said it will reduce its workforce and cut its quarterly dividend following "severe market deterioration" as a direct result of tumbling oil prices since the end of 2014.

The news came just weeks after the company revealed that it will mothball its proppant manufacturing facility in McIntyre, Georgia, until market conditions recover.

### **What next?**

On 10 February 2015, the International Energy Agency (IEA), the world's leading energy forecaster, published its five-year oil market outlook report. This predicts non-OPEC oil supply will grow by 3.4m bbls/d to 6m bbls/d by 2020, although this growth is reduced compared to the average annual addition of 1m bbls/d and significantly lower than the record 1.9m bbls/d added in 2014.

Oil from the US and Canada is expected to continue to remain the key resource area for non-OPEC supply. However, the IEA predicts that the battle for OPEC's market share "may only just be starting" and that the expanding oil market in Iraq and the

possible lifting of Iranian international sanctions are set to challenge Saudi Arabian dominance of the OPEC market.

Investment in the exploration and development of oil and gas fields could fall by 20%, or \$28bn, by 2017 from 2014, according to analysts at Morgan Stanley, as the industry protects dividend payouts as cash flows are squeezed. Nevertheless, the ability of the integrated groups to divest assets to raise capital and borrow cheaply means they could withstand the contraction in operating cash flow.

Assume that after the great plummet of 2014 prices travel sideways, moving in a band between \$45-65/bbl for five years. The relative winners over the sideways years are likely to be the integrated international oil companies such as Exxon and Shell. These companies have been under investor pressure to increase return on capital employed since 2013 and as a result had begun to cut costs and postpone spending before the oil price drop. Exxon, Shell and Chevron, three of the largest listed integrated companies, have strong balance sheets, with net debt near or just below one times EBITDA\*\*.

In the latest sign that a selloff in crude-oil prices may be nearing a bottom, the IEA said on 9 February 2015 that a recovery seems "inevitable" and the glut could start to ease as soon as the second half of 2015. A wave of spending cuts by oil producers (companies like Royal Dutch Shell, Chevron, BP and Statoil have slashed their investment programmes by billions of dollars, moves that analysts say eventually will dampen production growth) and a sharp decline in the number of rigs drilling for crude in the US will likely slow the nation's oil-output growth, spurring a rebound in prices, according to the IEA.

The IEA, which coordinates energy policy among industrialised countries, is adding its voice to the chorus of experts who say that the global glut is abating. In a separate report, also released on 9 February 2015, OPEC said demand for the group's oil would rise in 2015, reversing an earlier estimate that predicted a decline.

The conclusions drawn from the IEA and the OPEC reports indicate that OPEC's strategy to protect market share by keeping the spigots open is showing early signs of success. Led by Saudi Arabia, OPEC surprised markets in November when it maintained its production levels, a move that some observers said was aimed at weakening US shale-oil producers.

US oil production will increase both in 2015 and 2016 despite the 60% slide in oil prices since mid-June and an OPEC policy designed to rein in the North American shale boom, the US government said. The forecast came as a leading OPEC producer said the cartel was sticking to its strategy of maintaining output and testing the mettle of high-cost producers around the world. The US Energy Department said output would rise by 600,000 bbls/d in 2015 to 9.3m bbls/d and by 200,000 bbls/d to 9.5m bbls/d in 2016.

In January 2015, OPEC's Secretary General, Abdulla al-Badri, said: "We've already hit bottom – now the prices are around \$45-55[/b], and I think maybe they have reached the bottom and we will see some rebound very soon (...) If you don't invest in oil and gas, you will see more than \$200[/bbl]," when it comes to future oil prices.

While he did not give a timeframe, al-Badri did note the correlation between investment and future production. Further, the rig count in the US is plunging, which is usually key to reaching a bottom in oil prices. However, in the midst of cutting back

as the industry works through the current oversupply, the Secretary-General is now warning that the industry is putting future oil supplies at risk by under-investing today.

### **The fracklog**

Another interesting phenomenon is that some oil drillers, expecting prices to rebound after the biggest drop in six years, have come up with an alternative to storing their crude in tanks: keeping it in the ground.

This is a new twist on an old oil trading technique, known as a 'contango storage play', in which a trader buys cheap crude in an oversupplied market and saves it to lock in profits at higher future prices. Drillers who have spent millions boring holes through petroleum-rich shale rock are just waiting for prices to go up before turning on the spigot.

"Effectively, the rock is the storage," said Troy Cook, an analyst with the EIA in Washington DC.

Continental Resources Inc. CEO, Harold Hamm, said in a 2 March 2015 interview that, "This backlog of un-fracked wells – call it a fracklog – is one reason that US crude output is poised to climb even as companies have idled more than a third of the rigs that were drilling for oil in October. About 85% of US wells aren't being completed right now."

### **The future of proppants**

Rick Shearer, CEO of frac sand supplier Superior Silica Sands, explained in January 2015 to the *Cap City Times* that, "We certainly expect things will be softer in 2015 than they were in 2014." But he added that, "The good news is that those who are still drilling are using more sand per well." The CEO of US Silica shares this perspective. This view on "sand intensity" is also echoed by Victory Silica, as Laird Tomalty, the company's deputy project director, told **IM** at the PDAC 2015 conference. Victory Silica said that "sand intensity" per well has risen by 80% when old completion wells are compared to new completion wells.

Oil and gas wells typically need four times the amount of proppants that they used to, thanks to a two-stage drilling process, with each stage needing double the volume of proppants, US Silica explained in a presentation in October 2014. Thanks to this new technique, demand for proppants in oil and gas wells is set to double between 2013 and 2018.

However, according to consultancy and research firm PacWest, proppant consumption had already seen a decrease between the second and third quarters of 2014, driven by a decrease in oil prices, which the company said could depress the number of wells fracked in North America. Resin-coated sand and ceramic proppant markets are both expected to decline at 5% and 17% per year, respectively, to 2016, but supply of all proppant types is expected to increase moderately over the next two years.

"North America proppant consumption is expected to slightly increase at 2% per annum through 2016, from 80bn lbs (3.6m tonnes) in 2013 to 111bn lbs (5m tonnes) in 2016, with much of the growth occurring in frac sand consumption," PacWest said.

Prices for frac sand could flatten at rates below those agreed between sand producers and oilfield services companies for 2015 as oil and gas prices continue to tank, market insiders have suggested to **IM**.

"Many companies which have tied themselves into [frac sand supply] contracts for 2015 may come to regret being so hasty," one US source, who preferred not to be named, said. They added that while oilfield companies will need the pre-purchased sand to service existing operations for the foreseeable future, they may find that they could have got better deals on the spot market come the middle of this year.

In summary, factors that could negatively affect the demand for and the price of proppants, directly or indirectly, include:

- *Fracking bans*: in December 2014, the first ban on new fracking came into effect in the city of Denton, Texas; Governor Andrew Cuomo announced that fracking would be banned in New York state; and in Canada, the New Brunswick government was discussing a moratorium on fracking "unless five specific conditions are met." Further, in 2015, Houston County discussed a frac sand mining ban; Litchfield County town, Washington, proposed the state's first fracking ban; and the Maryland House of Delegates approved a three-year fracking moratorium. On the contrary, Ontario rejected a fracking moratorium on 26 March 2015
- *Lifting of sanctions against Iran*: with large amounts of Iranian oil already in storage, an injection of hundreds of thousands of barrels a day into the oil market already struggling with a crude overhang could depress prices further.

The demand for and the price of proppants could be positively affected, directly or indirectly, by:

- *Intensity*: proppant mass per well has increased in many US plays, lifting proppant intensity, a key driver of demand. The increase in average proppant mass per well is driven by increasing well sizes in the Appalachia, Bakken, Eagle Ford and Permian basins. A further increase in specific proppant consumption would offer a lifesaving outlet for proppant producers.
- *Lifting of the US oil export ban*: shale oil producers blame the export ban for low US crude prices, while ConocoPhillips CEO Ryan Lance told a senate energy committee that the discount for US oil magnified the impact of the fall in crude prices. Lisa Murkowski, senator from oil-rich Alaska and chair of the energy committee, said that 2015 should be "the year of legislation" to lift the 40 year-old ban on exporting most domestic US crude.

## **Outlook for the world economy**

Throughout **IM**'s *US Proppants* report, the implicit assumption was made that there would be no major changes in the world economy as a result of the plummeting oil price.

This is a somewhat brave assumption, given that the performance of the economies of the US, China and more recently the European Union, are all under stimulus packages in the form of record low interest rates coupled with quantitative easing programmes. It is not easy to predict what will happen when these programmes lapse.

Furthermore, there is a giant asynchronism: the US, the Eurozone and China are in very different phases of the economic cycle and, as a result, their policies are different



(with the *Financial Times* reporting on 4 March 2015 that "the euro hit an 11-year low on policy divergence"). Divergences can also be noticed inside the Eurozone itself. However, there is also the view (shared by Nobel laureate Paul Krugman and others), that it is the other way round: it is differences in policies that cause differences in economic outcomes.

The single biggest unknown is China, as many ask whether this driving force of the last decades will slow down – or even experience a landing (of the soft or the hard variety). And, if that happens, whether India could take over the role of China as the world's growth engine.

One thing is certain, however. If, despite QEs, the world economy slows down, energy demand will continue falling and this could be exacerbated by energy-saving measures and by greenhouse gas emissions controls.

It is often said that "when the going gets tough, only the tough get going". In the case of energy, survivors will be Saudi Arabia and their Gulf allies due to cheap oil and gas; China and India because of coal and possibly a boost in nuclear energy; and some major hydropower producers. As for shale, the most competitive US producers will continue their strong performance, especially if large-scale exports are allowed.

### **Three drivers for the drop in oil prices**

**Changes in world supply and demand:** The call for energy products, as for most commodities, has slowed because of Europe's major economic problems, Japan's stagnation, China's slow down and serious problems in the rest of the BRICs (Brazil, Russia, India) and South Africa. In addition, US oil production has significantly reduced the US imports of crude oil, increased US exports of petroleum products and changed trade flows globally.

Note: rising oil prices help the US petrochemicals industry as long as natural gas prices remain low. If enough domestic natural gas was exported such that US natural gas prices again moved with oil prices, the US petrochemicals industry would no longer benefit.

**Oversupply from shale drilling:** Since 2008 the US has increased domestic supply by 50% and has become the world's number one producer of natural gas, overtaking Russia in 2011. Oil production in Oklahoma, Texas and North Dakota has also doubled in six years. Owing to the fact that the US lacks sufficient facilities to liquefy and ship natural gas, most of its production enters the domestic market, meaning that in 2011, it had the largest increase in oil production of any nation outside of OPEC. As former Federal Reserve Chairman Alan Greenspan said on 13 March 2015, oil production has not eased despite low prices and America's major storage facility is running out of room.

**OPEC:** After nearly five years of stability, on 27 November 2014, OPEC failed to reach an agreement on production curbs, sending the oil price tumbling. In turn, the Saudis and their Gulf allies decided not to sacrifice their own market share to restore the price. They could curb production sharply, but as the main benefits from a price increase would go to countries such as Iran and Russia, as well as to the US fracking industry, Saudi Arabia decided to tolerate lower oil prices, especially considering it has \$900bn in reserves and its own oil costs are only around \$5-6/bbl to get out of the ground.

It should be noted, however, that the appreciation of the US dollar causes different economies to see different percentage drops in oil prices. The fall in the US was the well-publicised figure of 44% from \$108.11 in June 2014 to \$61.05 in March 2015, but in other countries it was less (in local currencies), with Russia seeing only a 19% drop.

*\*This article is an edited version of Chapter 9, taken from IM Research's latest report: US Proppants Market: Raw Material, Supply & Consumption. For more information on the report contact Emma Hughes, Special Projects Editor (ehughes@indmin.com).*

*\*\*earnings before interest, tax, depreciation and amortisation*

<http://www.indmin.com/Article/3457644/Issue/94129/Overcoming-the-oil-price-decline.html>