

# A brief history of the oil crash

**John Kemp**

**Reuters**

**16 January 2015**

On Sunday June 22, 2014, two tankers loaded 1.3 million barrels of crude at the port of Tobruk in eastern Libya and signalled the end of the decade-long boom in oil markets.

Just three days earlier, the price for benchmark Brent peaked at almost \$116 per barrel, the highest level for the year, before beginning a relentless slide that would see prices cut more than 60 percent over the next seven months.

In retrospect, the re-opening of Libya's ports and oilfields, which had been closed for months by unrest, marked the oil market's tipping point.

Libya's production, which had dropped to 250,000 barrels per day (b/d) in April, May and June, from around 1.8 million b/d before the civil war, rebounded to almost 900,000 b/d over the next three months.

The increase was significant not because of the volume involved. World production and consumption of oil is around 93 million b/d so the extra 600,000 b/d amounted to less than 1 percent of daily consumption. The resumption of Libyan exports mattered because it was so unexpected.

Two weeks earlier, Reuters had warned Libya's crude exports "could fall to zero" within days as the authorities struggled to contain a wave of protests paralysing oil fields and ports across the country.

Expecting more unrest, hedge funds and other financial investors had amassed a record long position in crude-linked futures and options positions equivalent to 650 million barrels of oil in order to bet on a further rise in oil prices.

With Libya descending into chaos, Syria locked in civil war and Islamist fighters racing across northern Iraq to threaten the country's oil fields, fund managers were anticipating a further loss of oil supplies, and it seemed the nearest thing to a sure bet.

Instead, the Islamists failed to capture Iraq's key producing areas and Libya's output began rising, catching investors long and wrong in the paper markets, and scrambling to turn their positions around.

By the beginning of September, fund managers had slashed their net position in Brent and WTI-linked derivatives by 60 percent, the equivalent of more than 400 million barrels, in less than three months.

Unsurprisingly, amid this massive liquidation of positions, the price of Brent fell more than \$13 per barrel, 11 percent, to the lowest level for more than a year.

Much worse was to come. The price of Brent fell to \$86 per barrel at the end of October, \$70 by the end of November, \$57 by the end of December and less than \$47 on January 13, 2015.

The spectacular slide in prices was comparable to previous slumps in 1985-86, 1997-98, 2000-01 and 2008-09.

It has plunged the industry into crisis. Major international oil companies and small independents have cancelled billions of dollars worth of projects planned for 2015 and 2016.

Schlumberger, the world's leading oilfield services company, is axing 9,000 jobs (7 percent of its worldwide workforce) as exploration and production activity slows.

And the heavily-indebted shale drillers at the heart of the American energy revolution have raced to idle rigs and layoff crews to conserve cash.

But if the resumption of Libyan oil exports was the immediate trigger for the plunge in oil prices, the seeds were sown years earlier at the height of the boom.

## **Demand destruction**

In 2005, already spooked by the rise in oil prices to \$55 per barrel, up from less than \$20 at the end of the 20th century, U.S. legislators approved the Energy Policy Act.

The act, which passed with substantial support from both Republicans and Democrats, and was signed into law by President George W Bush, instructed fuel distributors to begin blending increasing amounts of ethanol into the gasoline supply.

In 2007, responding to a further increase in oil prices to around \$70, Congress passed the Energy Independence and Security Act, which stiffed the blending targets even further and raised fuel-economy standards for vehicles sold in the United States.

The Energy Policy Act and Energy Independence and Security Act were just two instances of a raft of new laws and government regulations introduced in the United States and across the other advanced economies between 2004 and 2014 to promote energy conservation and reduce demand for increasingly expensive imported oil.

In the meantime, the soaring cost of gasoline, diesel and jet fuel encouraged motorists, truck operators and airlines to do everything possible to reduce fuel consumption.

The number and length of discretionary car journeys began to fall, consumers bought smaller and more fuel efficient vehicles, trucking companies rationalised deliveries and improved route planning, and airlines rationalised their networks and removed excess weight from aircraft.

Compressed or liquefied natural gas became increasingly popular as a cheaper alternative fuel for transit buses, refuse trucks and some trucking fleets. Railroad operators revived long-dormant plans to convert locomotives to run on a mix of gas and diesel, though none have yet made the change.

In retrospect, 2005 proved to be the peak year for oil consumption in the United States and the other advanced economies.

U.S. consumption of motor gasoline, diesel, jet fuel and other refined products declined by more than 2 million barrels per day, almost 12 percent, between 2005 and 2013, even though the country's population increased by more than 20 million over the same period and real output grew 10 percent.

It was the biggest drop in fuel demand in history and mirrored around the rest of the industrialised world. On one estimate, the advanced economies' fuel consumption in 2013 was 8 million barrels below what would have been predicted if the pre-2005 trend had continued.

Since 2005, fuel conservation has saved the equivalent of the entire exports of Saudi Arabia, the world's largest oil exporter.

Demand destruction in the United States, Europe and Japan provided room for rapidly developing economies in China, Southeast Asia, Latin America and the Middle East to increase their own fuel consumption without repeating the 2008 price spike.

But in Asia, too, there were signs in 2014 that consumption growth was slowing in response to the pressure for greater efficiency and a general slowdown across the region.

## Shale revolution

High prices did more than just restrain demand. They were the catalyst for the shale boom in the United States which resulted in the fastest growth in oil production in history during 2013 and 2014.

The shale revolution stems from the successful application of horizontal drilling and hydraulic fracturing techniques to particularly dense and impermeable rock formations which proved resistant to conventional vertical drilling.

Neither technique was new to the oil industry. The first horizontal well was drilled in 1929 and the idea of fracturing rock formations to stimulate oil recovery has been around since 1860s.

In the 19th century, fracturing was done with dynamite, but the industry switched to acid in 1930s, napalm in the 1940s and water mixed with chemicals in the 1950s and 1960s.

The problem has always been the relatively high cost of horizontal drilling and fracturing treatments. Horizontal drilling and fracturing was used extensively in North Dakota's Bakken shale in the early 1990s but could not be made to work commercially and was abandoned by the end of the decade.

However, the quadrupling of oil prices between 2002 and 2012 -- coupled with significant technological improvements in downhole steering, telemetry and logging while drilling -- created conditions for a second shale revolution, and this time it did not stall.

In 2005, fewer than 150 oil wells were drilled in the state of North Dakota. But the number of new wells drilled soared to 850 by 2010 and more than 2,000 in 2013.

Almost all the new wells were drilled into the Bakken formation -- two layers of rich black marine shale, which are found thousands of feet below the north-western corner of the state as well as beneath parts of neighbouring Montana and Saskatchewan.

Production from the Bakken surged from 2,500 b/d in 2005 to 250,000 b/d in 2010 and more than 750,000 b/d in 2013. By the end of 2014, Bakken output had reached more than 1.1 million barrels per day.

Horizontal drilling and hydraulic fracturing to target oil spread to Texas from around 2010, first to the Eagle Ford formation in the southwest corner of the state, and then to the Permian Basin in the west, which already had a long history of conventional oil production.

Smaller output increases have come from the application of fracking techniques in Oklahoma, Colorado, Utah and New Mexico. But Texas and North Dakota account for 95 percent of the increase in U.S. oil output since 2008.

The result has been an extraordinary renaissance in U.S. oil production. Output has surged from just 5 million b/d in 2008 to an average of more than 8.5 million b/d in 2014 and now stands over 9 million b/d at the start of 2015.

Production growth has been accelerating as shale drillers become much more efficient at locating wells and drilling and fracking them faster.

Output increased by 160,000 b/d in 2011, 850,000 b/d in 2012, 950,000 in 2013 and 1.2 million b/d in 2014, according to the U.S. Energy Information Administration.

Production increases were accelerating right through the summer and early autumn of 2014 as shale firms drilled a record number of super-productive wells into the Bakken, Eagle Ford and Permian Basin.

Bakken production increased by an extraordinary 260,000 barrels per day by October 2014 compared with December 2013, while combined output from the Eagle Ford and Permian Basin was up by another 400,000 b/d.

Elsewhere in the world, high prices also stimulated record investment in exploration and production activities in new and more challenging areas, ranging from the Caspian Sea and deep waters off the coasts of Latin America and West Africa to the Arctic and East Africa.

So much extra oil has come from the shale plays and other sources that oil prices continued to fall throughout the last three months of 2014 and into the first weeks of 2015 even as Libyan crude supplies were interrupted again.

## Supply disruptions

By 2012 or 2013 at the latest it was apparent to careful observers the global oil market was on an unsustainable trajectory: stagnating fuel demand meeting rapidly increasing oil supply.

The only solution to the problem of incipient oversupply was a sharp fall in prices, which had been trading over \$100 per barrel, to stem the rate of demand destruction and reduce the rate of investment in new sources of production.

But the need for lower prices was masked by two factors. First, many observers doubted the shale revolution could be sustained. Second, increased output from wells in North America was offset almost exactly by the loss of production across the Middle East and Africa as a result of war, unrest and sanctions in Libya, Syria, South Sudan and Iran.

In its *2011 World Oil Outlook*, OPEC expressed doubts about the shale revolution's sustainability and concluded "shale oil should not be viewed as anything other than a source of marginal additions to crude oil supply."

The *WOO* went on: "Significant constraints over the next ten years include: the need for geological analysis of other shales; trained people to perform hydraulic fracturing; and acquiring the horizontal drilling and fracturing equipment. In the U.S. already, costs have accelerated sharply as the demand for fracing equipment cannot be met."

"Looking ahead, it is evident that output from new shale oil deposits will not grow at a similar rate of 60,000 b/d per year as the Bakken basin is presently," OPEC concluded in what must be one of the most spectacularly inaccurate forecasts of the shale boom.

But OPEC was not alone in being deeply sceptical about shale's sustainability. It was a position shared by many oil analysts and non-shale producers.

By 2013, and certainly by the start of 2014, however, that position was no longer tenable, as shale production continued to accelerate. OPEC's *2012 World Oil Outlook* acknowledged "shale oil represents a large change to the supply picture" and the scale of that shift has only become more obvious over the last two years.

With so much new oil coming from the U.S. shale plays, the oil market relied on large supply disruptions from conventional producers in the Middle East, North Africa and other parts of the world, as well as continued demand growth from China, Southeast Asia and the Middle East, to remain in balance.

In fact, the oil market needed ever increasing outages to offset the rapid growth in shale production and maintain balance.

Until the middle of 2014, it seemed that unplanned outages might indeed increase by enough, or even more than enough, to offset the continued rise in shale production.

Growing turmoil in the wake of the Arab revolutions which started in 2011 had already almost eliminated Libyan oil exports.

With Islamist fighters surging across northern Iraq and capturing the city of Mosul in June 2014 many oil experts became alarmed at the threat to the country's northern oil fields around Kirkuk and Kurdistan, and potentially even the much larger fields in the south of the country if Baghdad government could not stem the advance.

Some even began to worry about external or internal threats to political stability and oil production in the Gulf monarchies.

The perception of intensifying "geopolitical risks" to oil supplies encouraged hedge funds and other speculators to amass a record bullish position in crude-oil linked derivative contracts.

From late June onwards, it became increasingly clear that geopolitical risks would not, after all, further interrupt the supply of crude. Oil continued to flow from all parts of Iraq and increase from Libya.

Robbed of the last remaining source of support, the incipient oversupply in the market became increasingly obvious and a sharp price correction inevitable.

## **Price war begins**

Senior policymakers in Saudi Arabia appear to have grasped the inevitability of lower prices faster than many investors.

Throughout September, October and November 2014, speculation intensified about possible production cuts by OPEC members, led by Saudi Arabia, to support prices.

The Saudis themselves, however, downplayed the prospect. In early October, senior Saudi officials began to brief friendly analysts and traders not to expect production cuts and indicated that the kingdom was prepared to allow prices to slide.

Cutting production to sustain prices at an artificially high level would only sacrifice Saudi Arabia's and OPEC's market share and allow shale production to continue expanding. Instead, the kingdom determined to allow prices to fall low enough to begin curbing the investment in new shale wells and plays.

Policymakers remembered bitter lessons from the early 1980s, when Saudi Arabia cut its own production and exports to prop up prices in the face of falling demand and rising supplies from non-OPEC suppliers including the North Sea, Mexico, China, the United States and the Soviet Union.

In the end, the kingdom suffered a double hit to its revenues from lower prices and lower output. Saudi policymakers are determined not to make the same mistake again.

On November 27, 2014, OPEC announced that its members would maintain their combined production level at 30 million b/d. Brent crude prices, which had already fallen to \$77 per barrel by the time of the OPEC meeting, dropped by another quarter to \$59 over the next month as the market digested the fact OPEC would not come to the rescue.

The current slump in oil prices is often portrayed as a straight fight between Saudi Arabia and the North American shale drillers but the real picture is more complicated. Shale has had such a disruptive impact on the oil market because it has emerged right in the middle of the cost curve.

Breakeven prices for shale wells range from as low as \$30 per barrel to as much as \$75 or more. Shale production is more expensive than conventional fields on the Arabian peninsula. But it is cheaper than some megaprojects like Kashagan in the Caspian Sea. Its breakeven range overlaps with high-cost oil from stripper

wells, oil sands, heavy oil projects as well as ultra-deepwater and Arctic projects and aging fields like the North Sea.

As a result, Canada's oil sands producers, North Sea firms, ultra-deepwater drillers, heavy-oil promoters and shale drillers outside North America have all found themselves caught in the cross-fire between Saudi Arabia and its closest OPEC allies on the one hand and the U.S. shale entrepreneurs on the other.

## **Painful adjustment**

Oil prices must ultimately drop to the point where the market rebalances -- which means eliminating some of the previously forecast production growth and slowing or reversing the loss of demand.

There are signs the adjustment is already well underway. U.S. motorists have begun to buy bigger cars again as low prices reduce the emphasis on miles per gallon in favour of space and performance.

Large and small oil companies have already slashed tens of billions of dollars from their exploration and production budgets for 2015 and 2016.

In the shale patch, producers have slashed drilling programmes for 2015 and started to idle rigs and lay off crews.

Between early October 2014 and January 9, 2015, almost 190 rigs previously drilling for oil in the United States were idled, around 12 percent of the total. In total, 550 rigs could be deactivated in the coming months.

It will take some time for the slowdown in drilling to filter through to a slowdown in supply growth because there is a large backlog of shale wells that were drilled in 2014 but not yet completed. As these are put into production, supply will continue to grow for a few months more.

But output from existing wells is not stable. After a burst of very high production in the first few months after a well is completed, output from shale wells tapers off rapidly as the natural underground pressure is exhausted by the production of the oil. Production from Bakken wells declines by as much as two-thirds by the end of the first year.

New wells must be constantly drilled and fractured to replace the declining output from old ones. Unless oil prices are high enough to cover the full costs of drilling and fracturing a shale well, drilling will stop and output from the shale plays will decline.

Estimates for breakeven costs vary, but many sources suggest oil prices have already fallen beneath the threshold needed to sustain enough drilling to maintain current levels of output.

North Dakota's state oil regulator has released projections showing that output declining several hundred thousand barrels per day by the middle of 2015, and even more in 2016, unless prices recover from their current very low level.

The Energy Information Administration forecasts U.S. output will grow by another 300,000 b/d to a peak of almost 9.5 million b/d in May 2015, then decline between June and September as the lack of new drilling and the decline rates on all the wells leave production falling.

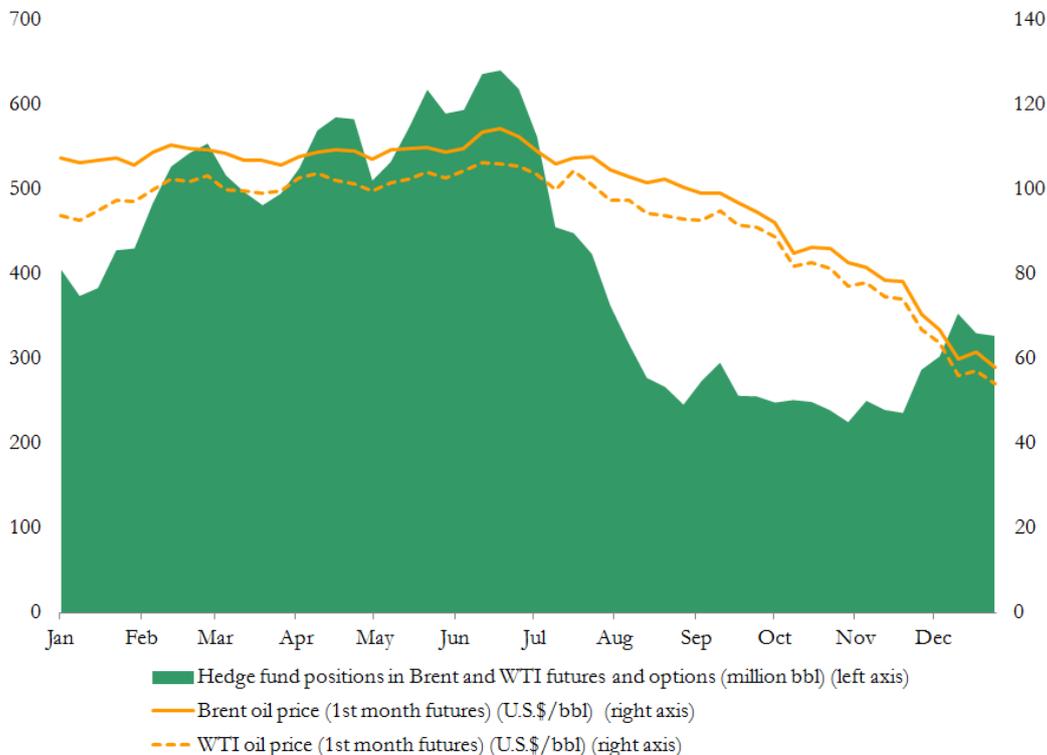
Beyond September, the EIA expects U.S. oil output to start growing again but that is based on the assumption prices recover to around \$70 by the end of 2015 and edge up further in 2016, which is more than \$20 per barrel above current levels.

Saudi Arabia and the United Arab Emirates have made clear they will not cut their own production to push prices back up unless the shale producers also restrain their output, and perhaps not even then.

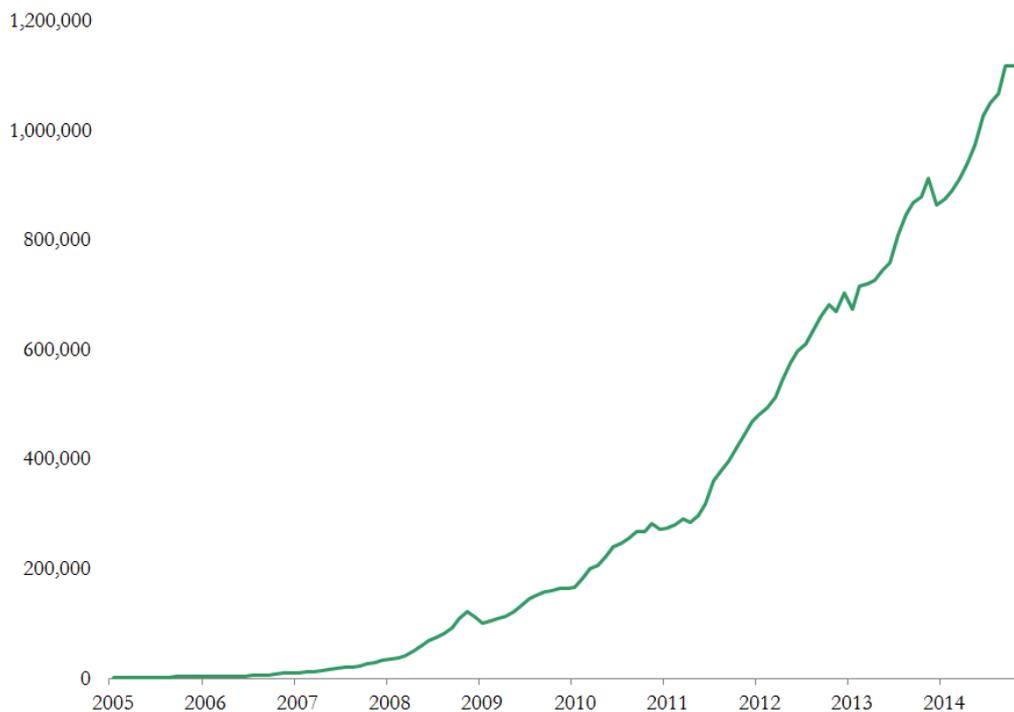
The Gulf monarchies amassed large financial reserves during the boom and are now indicating that they are prepared to run budget deficits for a year or two to wait out the shale players.

What actually happens to production and prices in 2015 therefore largely depends on the responses of the shale drillers – how far they cut drilling and production rates, and how far they can improve efficiency and cut costs to reduce the breakeven price for new wells and sustain production in a lower price environment.

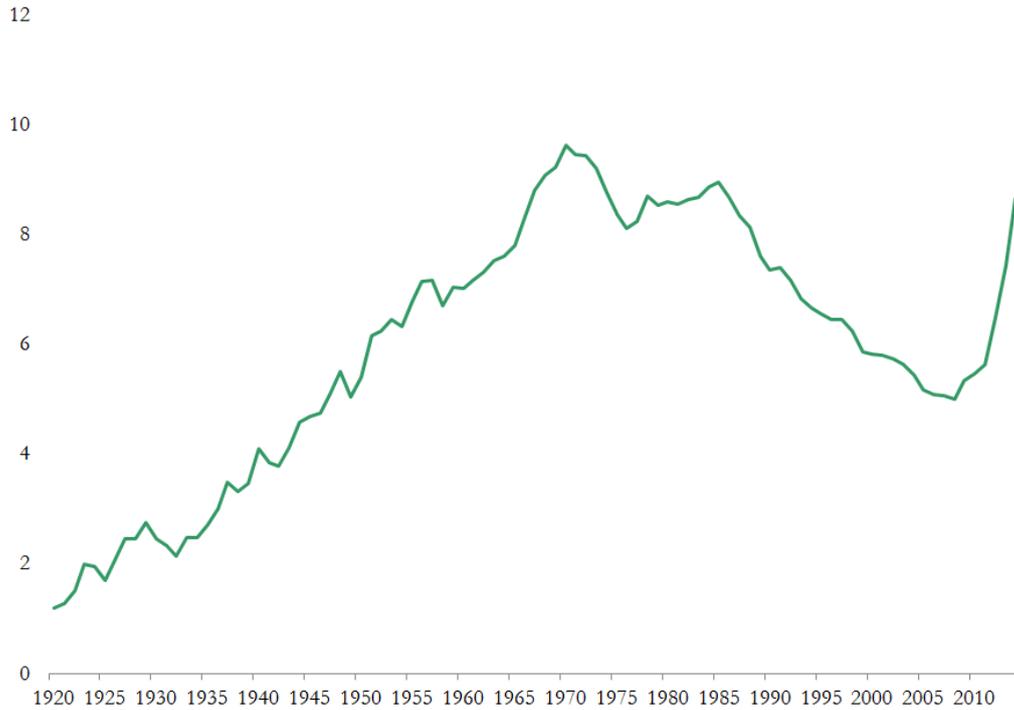
**Hedge fund positions and oil prices during the course of 2014**



**Daily oil production from North Dakota's Bakken shale (barrels)**



**U.S. oil production since 1920**  
(millions of barrels per day)



**Estimated oil supply interruptions worldwide (EIA)**  
(millions of barrels per day)

