

## The price of oil. The disruption caused by the American shale oil industry

*Martin Hvidt*

### News

Following the OPEC meeting decision 30 November 2017 to continue the restriction on member's production of oil, the price of oil is continuing – however – slowly to climb and is currently listed at around \$63 pr. barrel. This is sad news for the consumers in oil-importing countries but indeed good news for the Arab Gulf states which have been hard pressed on their national budgets from the last 4 years low prices.

### Summary

This article will discuss the factors which determine the current level of the oil prices and their outlook for the coming decade. The energy market seems to be in a significant restructuring, including new oil and gas resources from shale oil producers.

### Key words

OPEC, Arab Gulf countries, Shale oil, Fracking, oil reserves, energy mix

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**Analysis:**

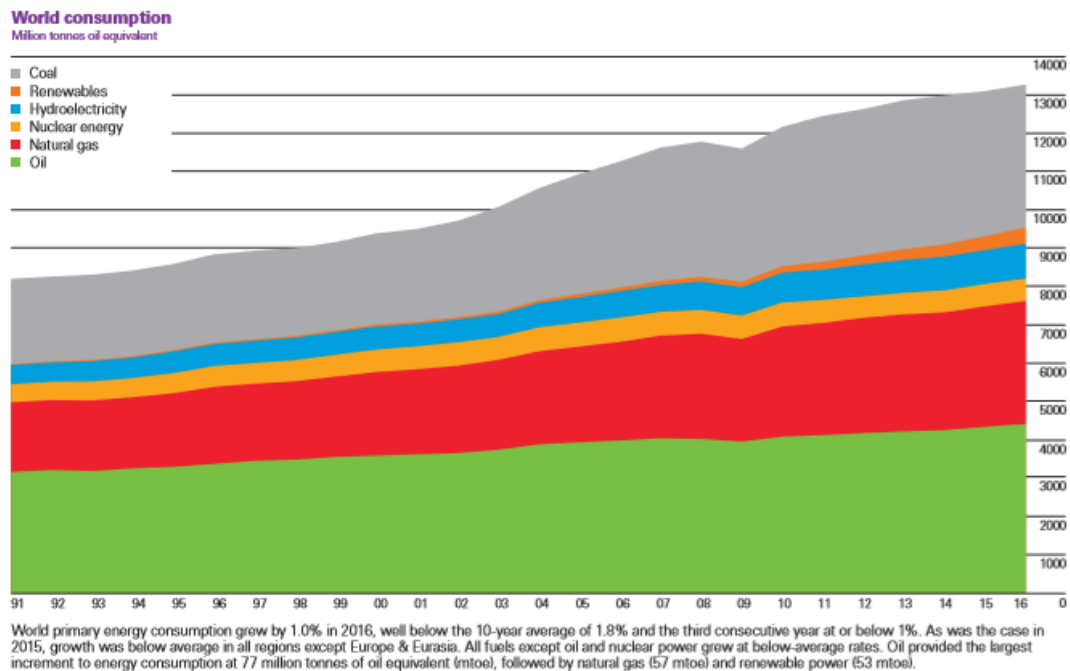
The energy industry is a highly technical business, that represents a mixture of privately owned enterprises and state companies. However, the price of oil, coal and gas is largely determined by supply and demand, since no single producer, company or cartel are large enough to singlehandedly determine the price. Earlier the Organization of Petroleum Exporting Countries (OPEC) (OPEC members: Algeria, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, United Arab Emirates and the non-Arab members: Angola, Ecuador, Equatorial Guinea, Gabon, Nigeria, Venezuela) was the only sizeable supplier of oil to the world oil market and as such had the ability to 'dictate' the price of oil as we saw in the 1973 'oil crisis.' Today, this is not the case. Following 1973 oil consuming states, Denmark being the prime example, have diversified their energy sources to cover coal, oil, gas, and more recently renewable energy. And not only have they diversified their import, many have started production of energy themselves with the purpose of reaching a higher level of energy security, that allow the country to function, even though one source of energy might fall out or become too expensive.

Furthermore, the oil consuming countries established the International Energy Agency (IEA), in 1974. Through this organization the 29 OECD countries, agreed to each hold a stock of 'strategic oil reserves' equal to 3 month of consumption, to mitigate both intended and unintended interruption of oil flows. In this way, IEA provides energy security to its members, and at the same time renders the OPEC 'oil weapon' without much power (Yergin, 2011.p.271)

The combined effect of these activities is the energy market today represents a host of smaller and bigger producers, with no single player being able to set the prices.

Presently the World consumes around 92 million barrels of oil each day. Of these OPEC supplies approximately 39 million or 42 % (BP 2017, 14). The rest is supplied by a multitude of non-OPEC producers large and small. The biggest non-OPEC producers are America, Russia, China.

But as mentioned, oil is not the only energy source used. As depicted in the graph below, oil makes up only around one third of the energy consumption World Wide. Coal (27%) and Natural gas (23%) are sizable sources of energy as well, while hydroelectricity and Nuclear energy and renewables make up far smaller parts on a world scale.



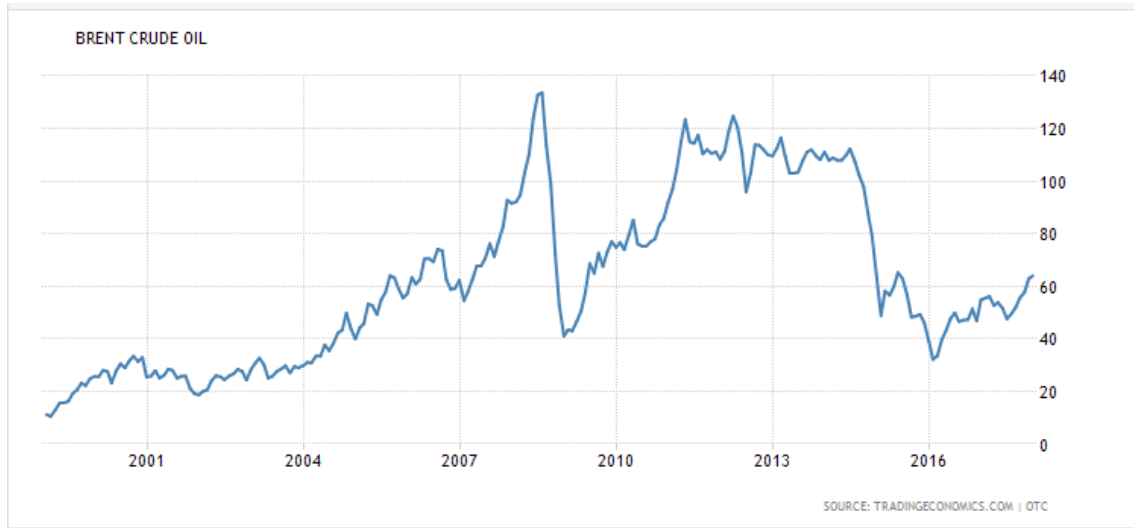
BP statistical Review of World Energy 2017, p. 10

All the energy sources depicted in the figure above can substitute one or the other if they are used as fuel in a power plant that produces electricity. However, oil distinguishes itself from the other fuel types due to its energy content and its flexibility. For the same volume, oil contains far more energy than coal or especially gas and furthermore, because oil is liquid it flows, and as such is easy to transport and store. Furthermore, oil can be used as input in chemical processes that creates plastic, rubber and gels.

In other words, oil takes a special place among the fuel types. Because of the higher price of oil compared to the other fuels, oil is seldom - and only if there is compelling reason to do so, - used for power generation. For that purpose, both coal and gas is far cheaper. Oil thus, is primarily use in the transport sector, that is as fuel for cars, trucks and not least air planes, where weight and volume of the fuel is important. So far there has been no substitute for oil in the transport sector. In the future, there might be, if we see a large-scale growth in the number of electrical vehicles both for private transportation and especially for hauling cargo.

## The oil prices

The oil prices have fluctuated vastly over time, and not least over the past decade as can be seen from the table below. Generally, from 1999 the prices increased from 17 dollars p/b to the current level of around 63 dollars/barrel, with substantial fluctuations in between.



<https://tradingeconomics.com/commodity/brent-crude-oil>

Below I will attempt to analyze both the fall in oil prices during 2014 and after, and the current upturn.

## The downturn

Analysts generally agree that the reason for the fall in the oil prices in 2014 and forward was a result of changes in the market fundamentals.

Firstly, because world growth did not pick up as fast as the market had expected following the economic crisis in 2008-2010, both Europe and especially Asia with China as the major power, showed modest growth rates. While economies in especially Europe have been able to grow, that is to increase its GDP, without consuming more energy, due to energy saving policies and low energy type of production (office work)

and economic ability to invest in energy saving hardware, this has not been the case for the manufacturing-and transport intensive economies of China, India and US. As such, for most economies in the world, excluding Europe there is a link between output produced and consumption of energy. So, in this case with years of modest production, this negatively affected the consumption of oil, and thus less demand for oil. It was the same link that created the rise in oil prices 1999 to 2008.

The second important factor leading to the low oil price was the increased supply by the oil producing nations the world over. During first decade of the 21<sup>st</sup> century, the traditional oil producers had experience ever increasing oil prices, which led them to investment further in exploration for new sources of oil and not least in oil production facilities. One example of this development was that oil production was taken on in much more economically and technological demanding areas, e.g. the oil sands in Canada or in deeper waters, in more remote areas etc. simply because the high oil price allowed for production in more difficult areas. In year 2000 1,5 mill/b/d was produced from deep water drilling, while in 2009 the production stood at more than 5 mill/b/d. Some oil rigs were drilling at depths of 10 km and the now infamous Deep Water Horizon oil rig lifted oil from a depth of 1,6 km of water and 4.3 km of rock when the accident struck! (Yergin, 2011.p.247)

The third element in this development was the growth of the 'shale' oil (also called Tight oil) industry primarily in US. It had long been known that sizeable amounts of oil and gas was trapped in the less permeable layers of shale in US and World Wide. However, it was first in 2003 that this industry was proven effective, that both the technology was ready and not least that the oil prices rose to a level where it was profitable to extract this type of oil (Yergin, 2011.p.261) Generally, this type of oil production needed an oil price above 60 dollar /b in order to be able to return a profit.

And in an environment of high oil prices and investors eagerly to invest, the shale industry took off. From a very careful start around year 2000, the shale oil reached a production of 1 mill b/d in 2006 and from there it increased to around 4 mill b/d in January 2015. Then with the lower oil price it fell, but has recently risen significantly. US is currently producing approximately 9,9 mill /b/d of oil, of these 6 million originates from the shale oil. Analysts predict that the production will reach 6.5 mill b/d by mid-February 2018 DiChristopher (2018).

Shale oil became a game changer in the oil industry. While US has always been a large oil producer, it has basically been supplying its home market. Its production peaked in 1971 at 10 mill b/d. From that year, the production has been falling until 2008, where it only produced 5 mill b/d. As mentioned, currently US is back to a production level of around 10 mill b/d.

The major implication is that US instead of importing 2-3 mill b/d now export 2-3 mill b/d. In other words, the shale production in US adds around 5 mill b/d to the world market. In the highly sensitive oil market bringing just a few hundreds of thousands barrels of oil on the market affects prices. So, the US shale revolution was the direct course of the drop in oil prices commencing in 2014.

### **The upturn – the OPEC response**

While OPEC cannot set the world market price, they have been successful over the years in stimulating higher oil prices, by withholding oil from the world market by agreeing among its member states to lower their collective output. However, to much surprise, this strategy was not used to mitigate the oil price drop in 2014.

In 2014 and 2015 OPEC, did nothing to curb the fall in prices. Saudi Arabia was successful in persuading the other OPEC members that their long-term interest would be to let the price fall, because this would drive the shale oil producers out of the market, due to their high production costs (Economist, 2014 p.71-72). This has happened but only to some degree. The shale business has had significant problems to stay profitable over the past years, and the so-called rig-count, that is the number of drilling rigs in operation have shown a significantly decreased activity within the business. However, and what the OPEC countries did not anticipate, was the technological progress in the shale industry continued at a very fast rate. Generally, where an oil price of 60-65 dollars were required to make a profit in the shale oil industry earlier, this threshold has come down to 40-50 dollars currently. This basically explains the resurgence of the shale oil industry in US during the past year, and the resulting surge in production now.

At the same time, the losses became too great for the OPEC members. In 2016 the combined income from oil among the OPEC countries was approximately half compared to the incomes in 2013, implying that the coup of countries lost or is losing, approximately 600 billion dollars a year OPEC, 2017, p.19). So, having difficulties meeting their budgets and recognizing that the possibility of killing of the shale production at their meeting in November 2016 OPEC decided to reduce their output by around 1.2 mill b/d to 32.5 mill b/d. Furthermore, and in doing so OPEC had successfully negotiated an agreement with Russia (currently the world largest oil producer) that they voluntarily made a reduction of 600.000 b/d. At the Meeting on the 30 November 2017 this restriction of output was reconfirmed for 2018, and is the reason why, we are experiencing higher prices on gasoline and diesel in Denmark currently.

## Perspectives

While oil-importing countries have enjoyed low prices at the filling stations in the past years, the economy in the oil producing states has suffered, leading to the first real attempts to reduce public spending and reducing the extend of the welfare states.

Historically the price of oil has fluctuated, and there is no reason to believe that they should not continue to do so. But there might be good reason to believe that the current price level will remain relatively stable over the coming years.

While the OPEC countries, and especially the Arab Gulf states are by far the cheapest producer of oil today they still need a high oil price 70-90 dollars /b in order to make ends meet.

This upward pressure on the oil prices is however counterbalanced by the profits to be made in the shale industry and in e.g. other oil exporting countries, e.g. Russia. Meaning if OPEC by restricting their output, and thus suffers loss of market shares are successful in pressing the price up, then their action will result in vastly increased revenues for non-OPEC member. This is why OPEC in 2016 emphasized that for Russia there would be no free-riding. OPEC would only restrict their output, if Russia a non-OPEC member agreed to follow suit. In this way OPEC has succeeded in bringing Russia on board their policies, a move not seen before, and which might prove beneficial for both parties in the future.

The second element is the future outlook for the US shale industry. So far, the shale industry could be viewed as a price controller, in the sense, that the shale production will grind to a halt if the price is low, while it will pick up if prices rise above 40-50 dollars /b. As such, if prices go up it will counteract this move by increased shale production, which according to the laws of supply and demand would lead to lower prices.

However, OPEC forecast that growth in the world economy is picking up over the next half decade, and as such the relatively small amount of oil originating from the shale industry viewed globally, cannot keep a downward pressure on the oil prices.

In addition, as reported by DiChristopher (2017) the global shale oil production is expected to peak in 2025 implying that from there on, production will be falling.

OPEC is forecasting that by 2040 due to growth in demand for energy especially in the developing countries, the daily consumption of oil will rise from its current level of 90 mill b/d to 111 mill b/d. And since OPEC command nearly 65% of all known oil reserves, they will be the ones that will be called upon to provide the increasing amounts of oil the world is needing. As such, the future looks bright for OPEC.

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