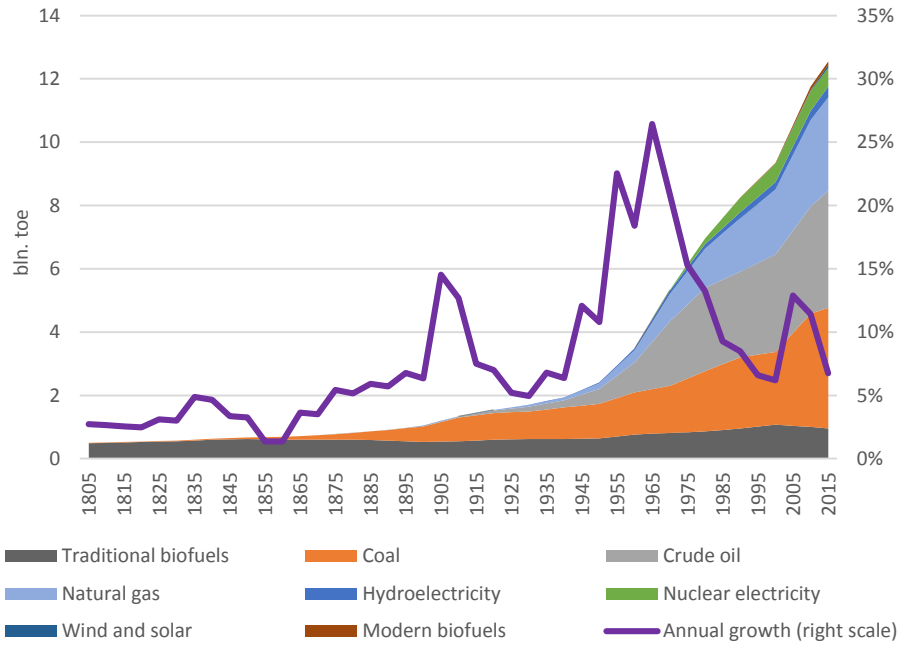
Oil market: current status and prospects

Over the past decade, the oil market has undergone major changes. The "Shale revolution" made the USA one of the leaders in the production of hydrocarbons. However, the current situation makes us treat about its future prospects with caution.

World power balance

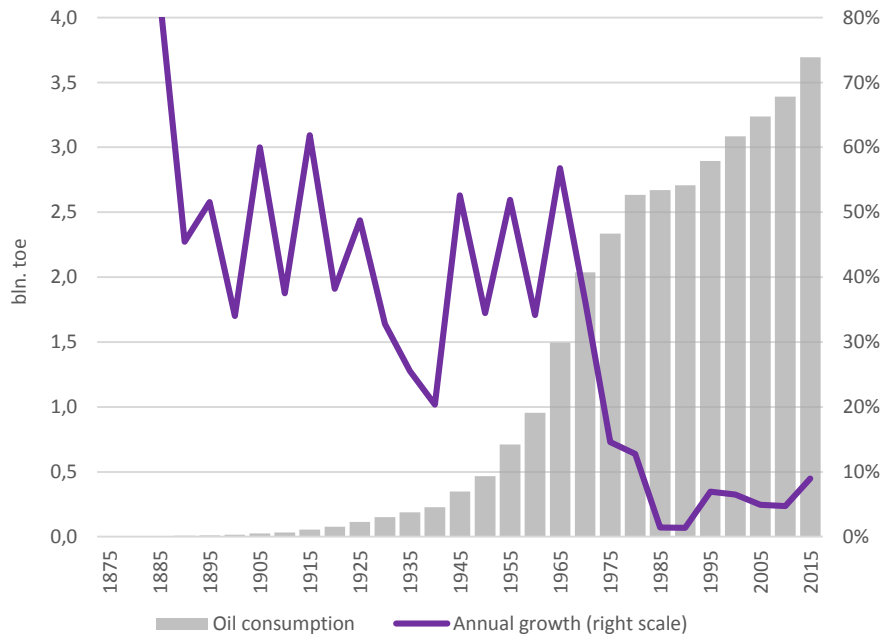
Energy consumption in the world keeps growing. For the last 25 years, the annual average growth rate was 1,7%. In general, oil consumption growth is only slightly inferior to energy (annual average growth rate 1,2%).

World energy consumption by energy type



Source: British Petroleum

World oil consumption

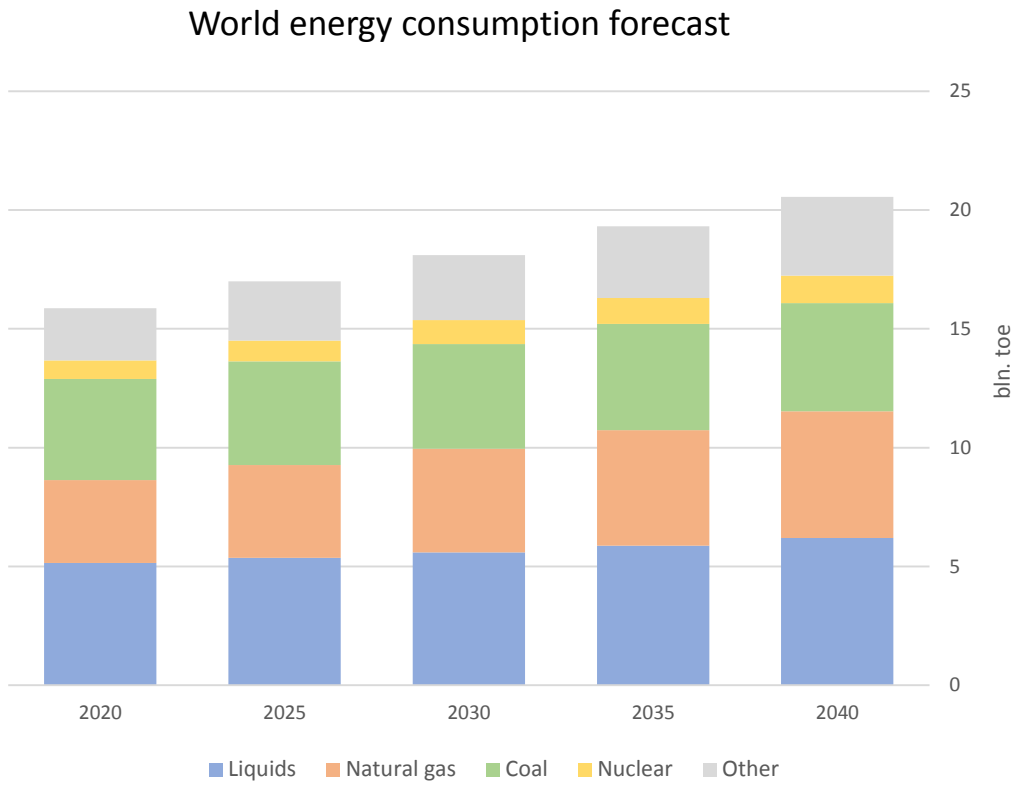


Source: British Petroleum

The EIA's[1] forecasts for both total energy consumption and its single sources do not imply sharp variations in the current trends. The worst-case scenario concerns carbon, the consumption of which will decay.

The rate of growth of oil consumption is expected to be just below 1% per year. In absolute ratings, the increase in oil consumption averages 50 million tons per year (appr. 1 million barrels per day). Therefore, the production must be increased by the same amount to meet the expected demand. It stands to mention, that maintaining production at the current level is a sophisticated problem, since the debit of any well is reduced by 1-3% per month without major extensive works, such as sinking of new wells and hydraulic fracturing.

Thus, oil retains its role as one of the most important source of energy for humanity and there will be no fundamental changes in the near future. According to the EIA forecast, even by 2040, at least 30% of the energy received by mankind will be obtained from oil.

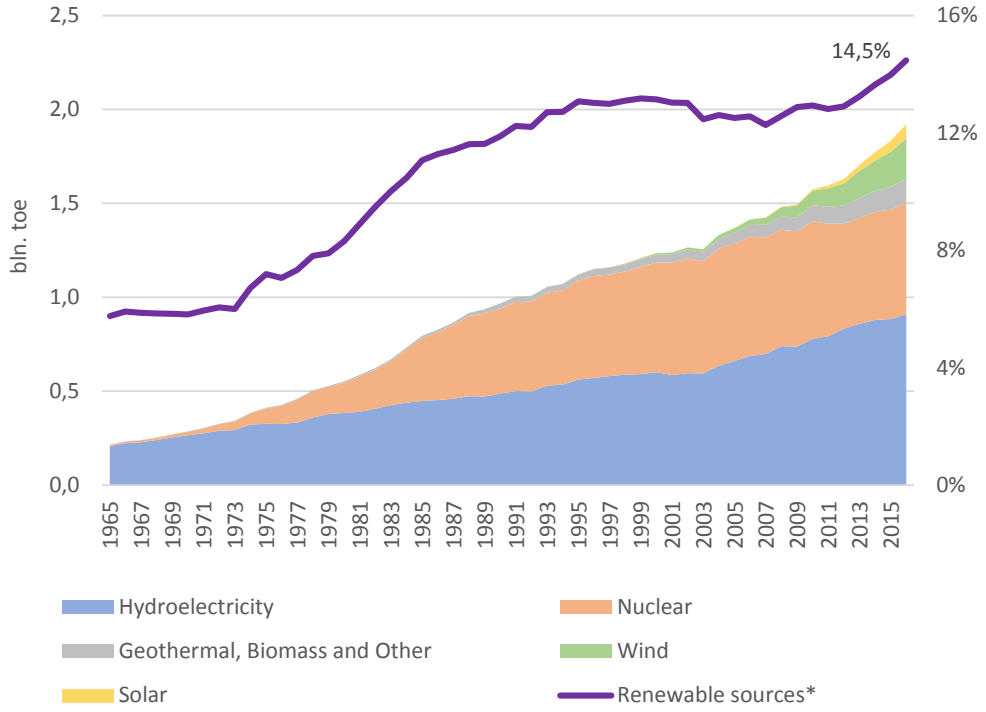


Source: EIA

[1] *Energy Information Administration (EIA) is a principal agency of the U.S. Federal Statistical System responsible for collecting, analyzing, and disseminating energy information.*

Renewable energy sources take up increasingly more place in the world power balance. 14.5% of the total energy in the world was obtained in 2016 due to them (including nuclear energy). Hydroenergy is about half-power of renewable energy sources. Nearly 22% of renewable energy falls on solar, wind and other.

World energy consumption from renewable sources



Source: EIA

** cumulative energy consumption*

Oil equivalent

Different types of fuel can be compared by the amount of output energy. Term “oil equivalent» is used for this. It can be measured in volume (barrel), as well as weight (ton). Oil barrel in other measures equals:

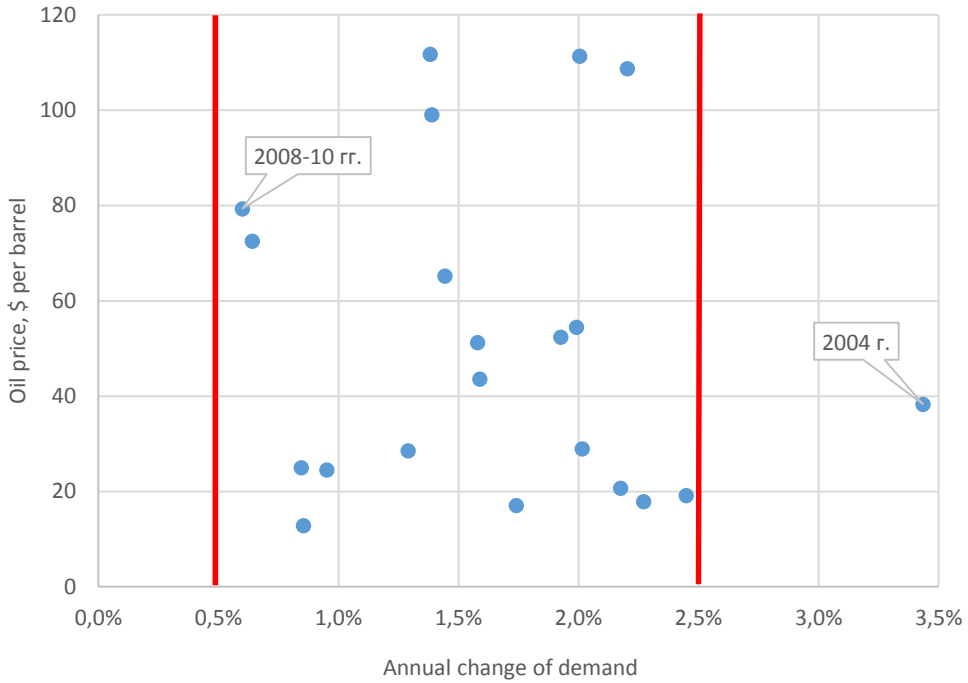
Barrels of oil equivalent (boe)	1
Tons of oil equivalent (toe)*	0,14
Millions of British thermal unit (mmbtu)	5,55
Gigajoule (GJ)	5,86
Megawatt/hour (MW*h)	1,63

** Due to worldwide average oil density 858 kg/m3*

From 1994 to 2013 the oil price increased more than fivefold, but the growth rate of demand remained more or less stable. Except for some extremes, the growth rates were in the range of 0.5-2.5%.

Data for 2008-10 is statistically unreliable because of the world crisis and rapid recovery. That is why it is averaged for three years.

Oil price and difference in demand for oil (1994-2017)



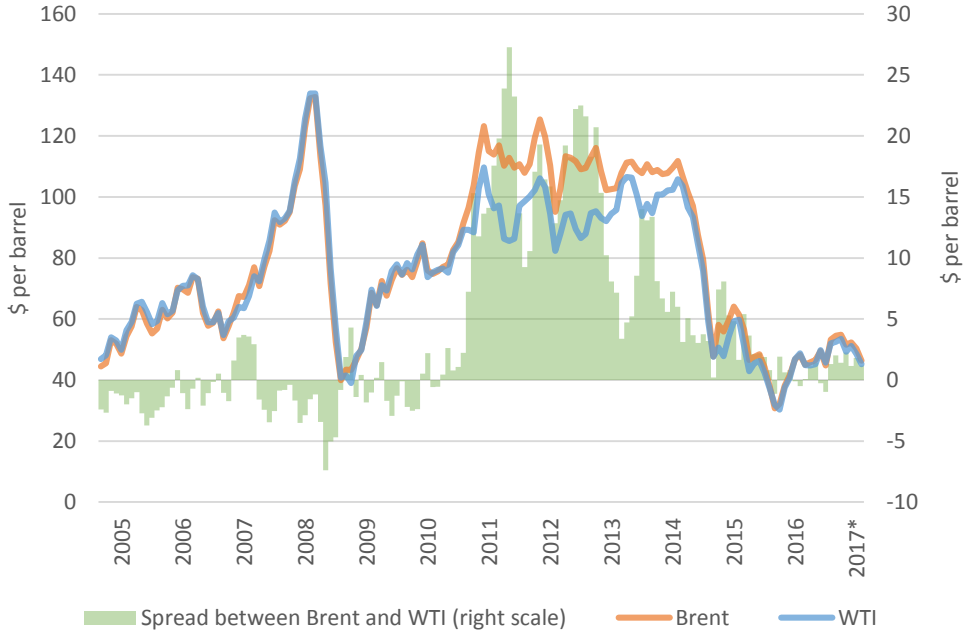
Source: EIA, Reuters

Brent and WTI

There are two main indicative oil grades. The European Brent is composed of many kinds of oil produced in the North Sea. And the American WTI, which is produced in Texas. For a long time, the price spread between them was small, within + - $5. With the beginning of the "slate revolution" in the US, the spread has increased dramatically, exceeding even $25 in some periods.

The oil shipping costs from the east coast of the United States to Western Europe is on average $3-4 per barrel. However, even considering the rapidly increased oil production, the US remains its net importer. Therefore, oil exports to other countries are episodic.

Brent and WTI prices and their difference



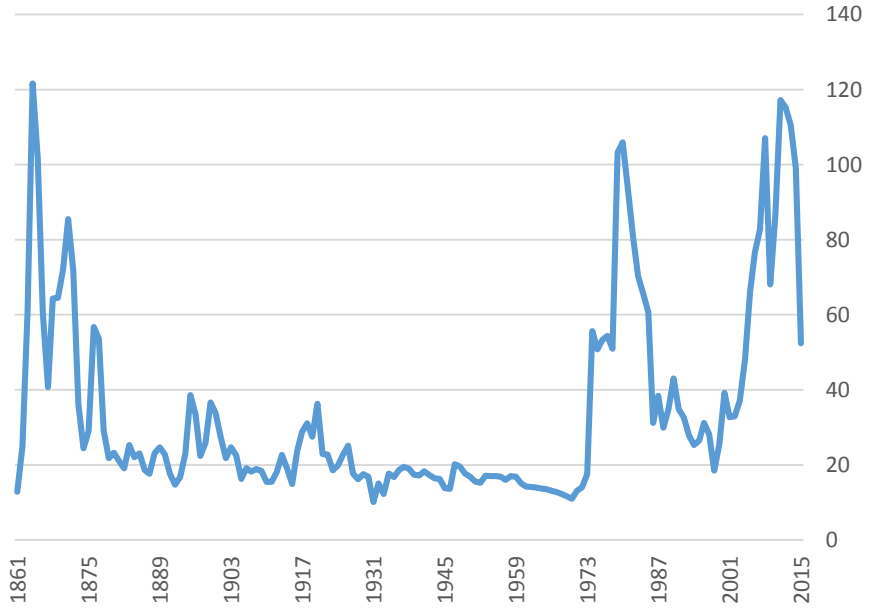
Source: Reuters

Supply and demand balance

Through history, the oil price was quite volatile. There are three key price peaks. The first occurred in the XIX century, when the market was not yet developed, production and demand were too unstable. The next peak, in the 1970-80's, was caused by a number of geopolitical factors: the US and European oil embargoes by the Arab OPEC members, the Islamic revolution in Iran and the subsequent war between Iran and Iraq. The cause for the last peak in 2008-13 was economic ramp-up of China and a high share of financial tools in the assessment of the oil price.

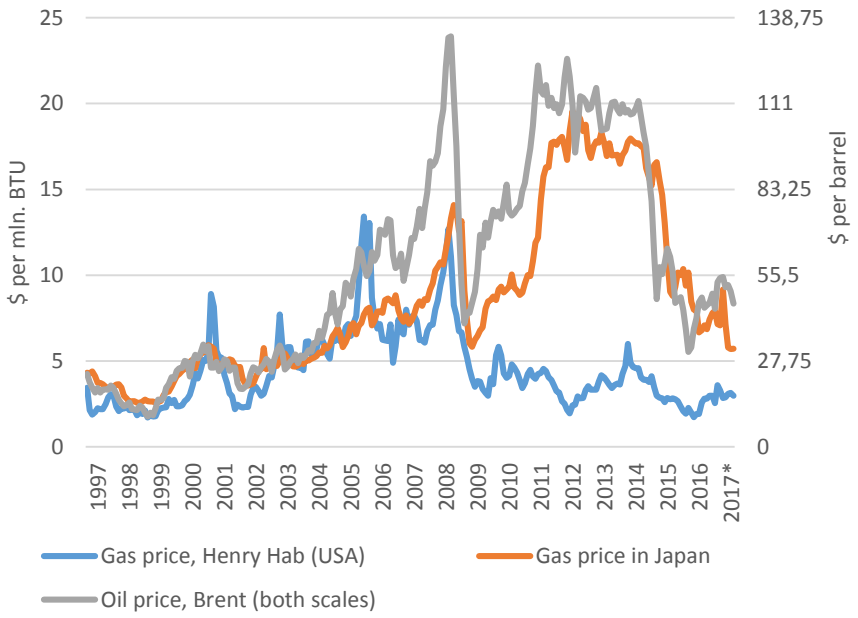
There are various price assessment mechanisms on the gas market. Gas is supplied to Japan in liquefied form, and is increasingly traded at spot prices determined within exchange trade. In the USA, there is a competitive pricing system, price by Henry Hub in Louisiana is considered as standard. Despite the formal independence of USA gas prices from oil, there was a stable correlation between them until 2009. A strong divergence began only after the development of shale deposits that caused gas prices in the USA to fall.

Oil price in US dollars 2015.



Source: British Petroleum

Gas and oil spot-prices



Source: Reuters

** last date is June, 2017.*

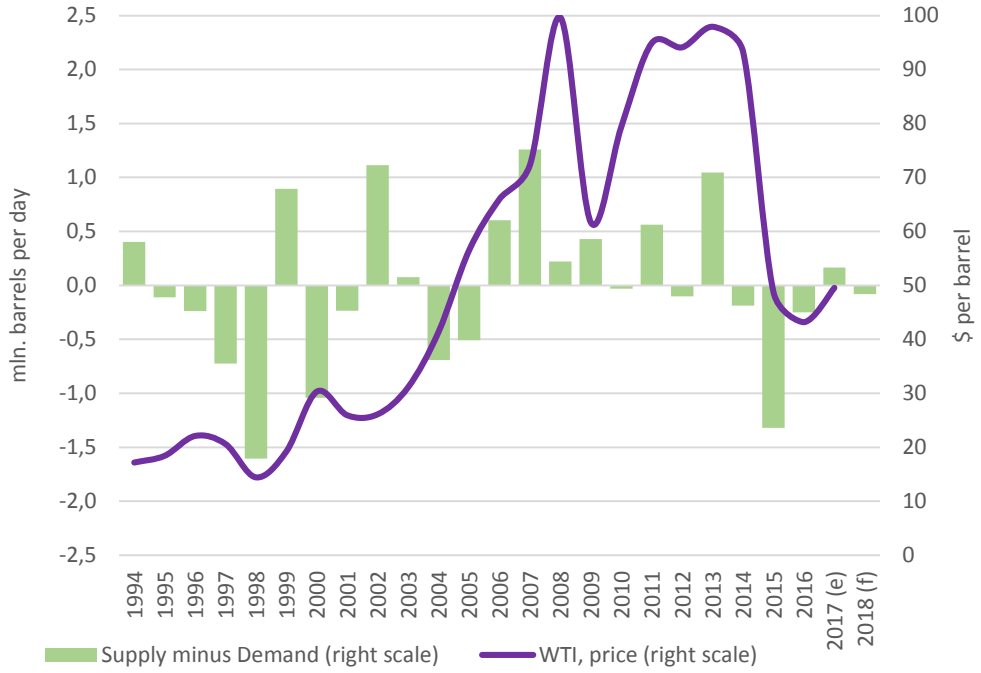
Over the past twenty years, the oil market has not been able to achieve the balance.

In general, oversupply remained unchanged since 1994 till 2005. Due to this, the oil price was relatively low. Then the situation reversed course. From 2006 to 2013 yrs. the demand exceeded supply and maintained prices at a high level. And in 2014-16 the oil supply brought down prices by exceeding the demand.

According to the EIA forecast there will be a small excess of demand in 2017. In 2018, there is an insignificant excess of supply.

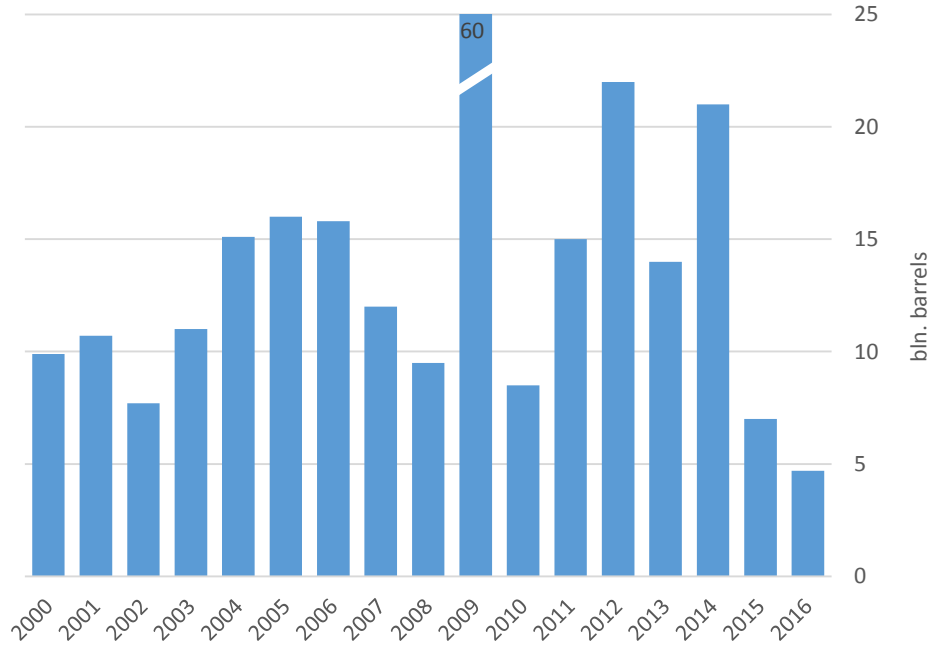
In 2016, the new estimated reserves made up only 4.7 billion barrels, which is the lowest value for the last 15 years. It is related to low oil price - the proven oil fields were not recognized due to their uneconomic development costs.

Difference between oil supply and demand in the world (including forecast)



Source: EIA, Reuters

New estimated world reserves of conventional raw oil, annual changes



Source: International Energy Agency (IEA)

Light tight oil

The light tight oil (LTO) is the light oil in low-permeability reservoirs (limestones, dense sandstones), as well as condensate during gas extraction from shale. The widely used term "shale oil" is technically incorrect, since oil is not produced from shale.

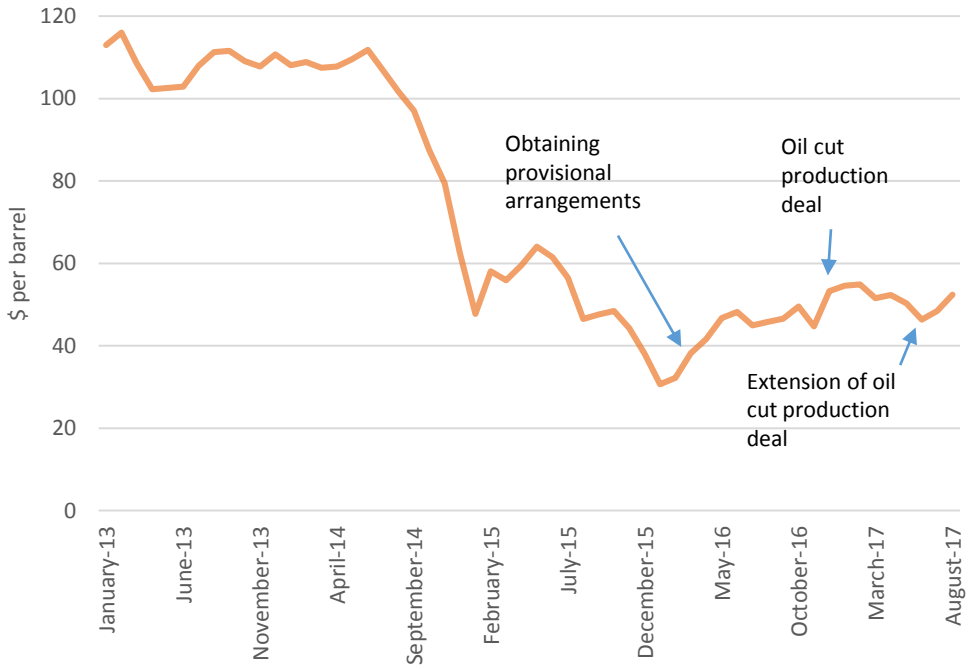
Ten years ago, in the USA began an intensive application of hydraulic fracturing (HFT). Due to more advanced than in most other oil-producing regions oil and gas transportation infrastructure and its proximity to consumers, oil extraction from low-permeable rocks of the USA has become profitable, allowing the development of poorer reservoirs. High oil price at that time has also contributed.

Currently, the United States plays the role of a swing producer at the oil market. The LTO production sector in the USA consists of numerous companies are receptive to price changes.

Power of Saudi Arabia

With the development of LTO production techniques in the USA, Saudi Arabia's role in the market balancing has significantly decreased. Even united efforts of OPEC and other oil-producing countries, which agreed to cut and oil production had a limited effect on oil price.

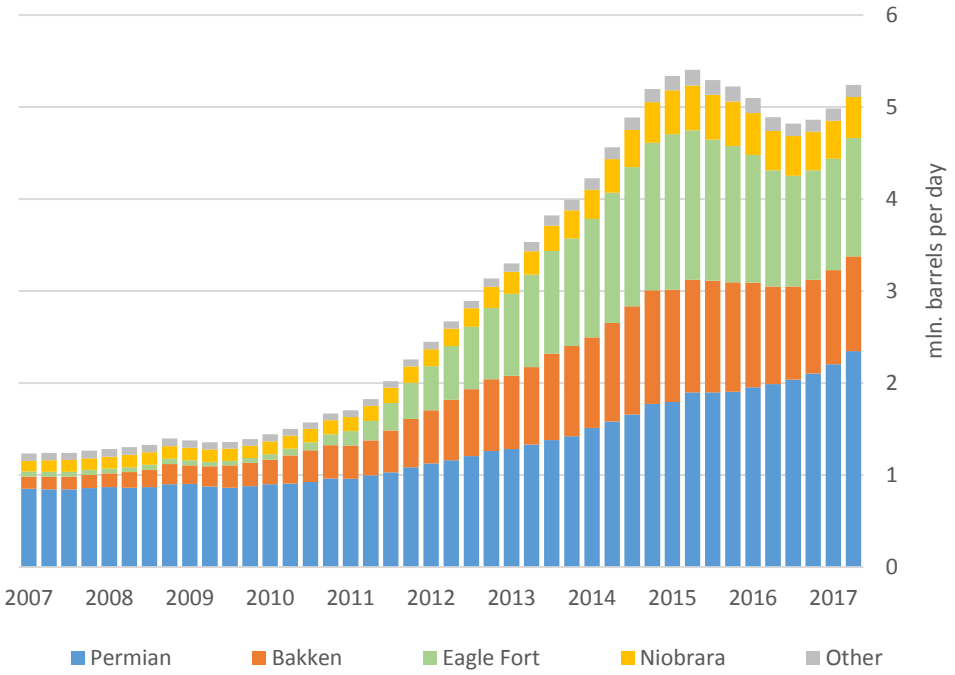
Brent prices and OPEC+ oil cut production deal



Source: Reuters

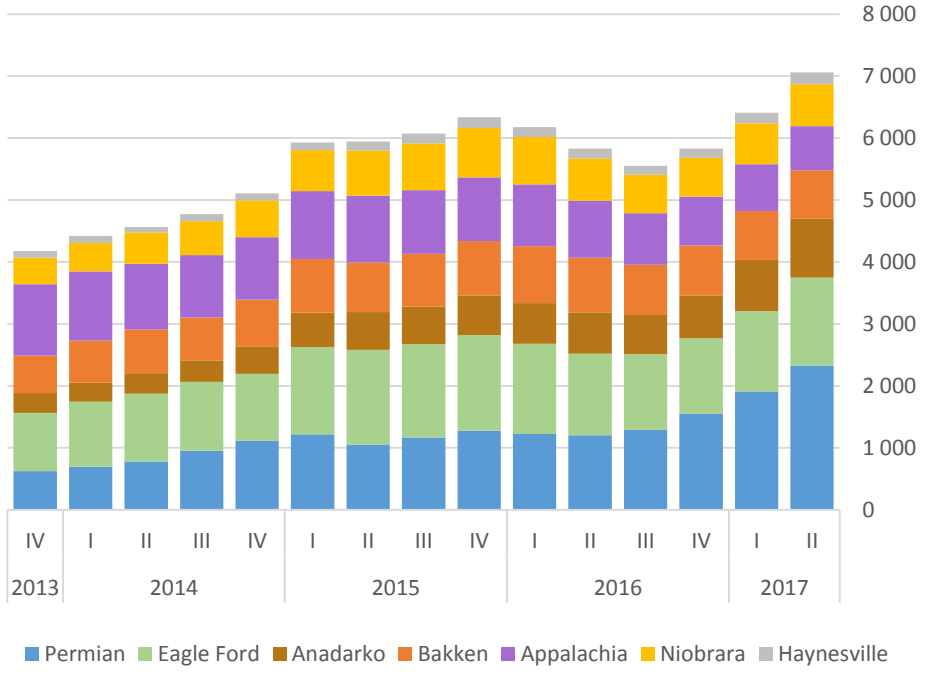
The oil price drop in 2014-2015 took a heavy toll on the LTO production volume in the United States. However, the positive trend resumed and in the second quarter of 2017, oil production in the largest US fields was only 3% below the historical peak (second quarter of 2015). The number of active fields has already exceeded the one in 2015 by reaching 7 thousand.

LTO production in largest fields of the USA



Source: EIA

Number of LTO active wells in US largest fields



Source: EIA

Financial status of “shale” companies

Let’s analyze the situation of companies operating on the largest LTO deposits in the United States.

The total production volume of the considered companies was 93 million tons of oil equivalent in 2016, which is approximately 13.5% of the total oil and gas extraction from low-permeability rocks in the USA. The joint debt is $29 billion, investments - $200 billion.

The companies made positive progress in production cost reduction. In 2016, they generally had a production cost lower than the average price of their products by a mean of 10%.

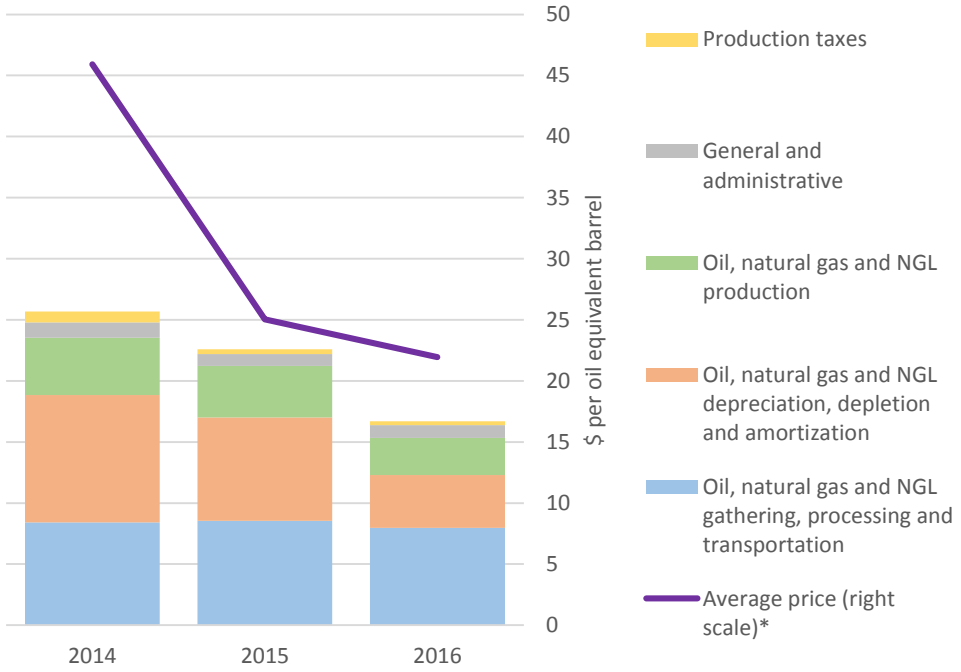
However, there are significant problems in other aspects.

In 2016, the joint operating cash flow equals $6,8 bln. (without considering of amortization and depletion of fields, the flow is negative: -$3,7 bln.). Thus, even the support of the existing production level requires more funds than the companies generate.

The investment cash flows were close to zero in many companies. In other words, the companies prefer to develop brownfields and do not intend to invest in the development of new ones.

Chesapeake was founded in 1989. Its base reserves are accumulated in Eagle Fort formation, Texas. In 2016, the company produced 35 mln. tons of oil equivalent, 77% was gas. The company's debt is $10,4 bln. During its existence, the company invested $74,3 bln.

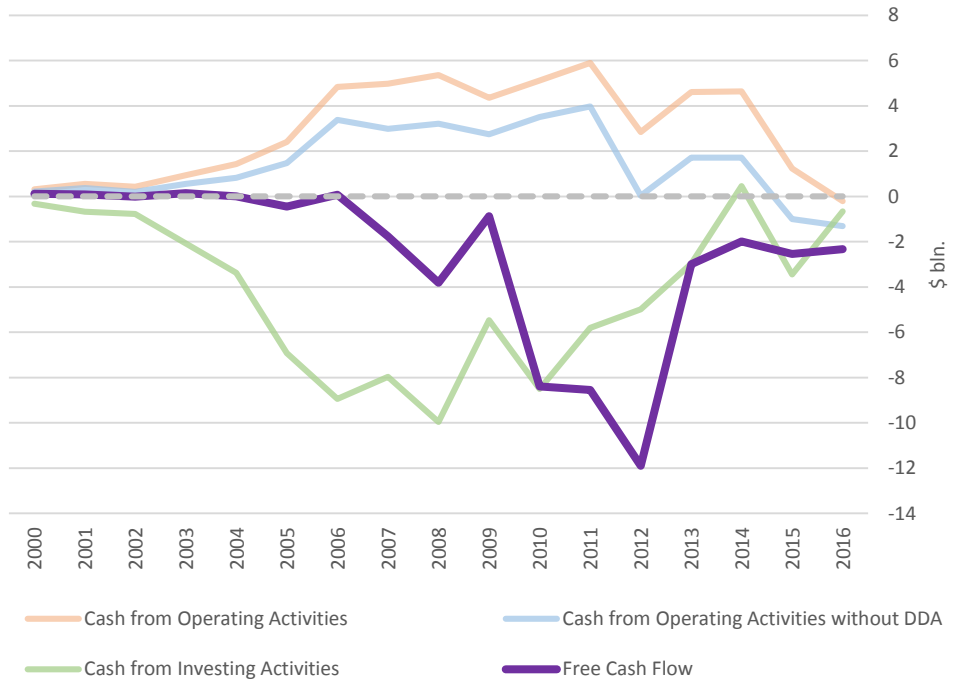
Chesapeake costs per oil equivalent barrel



Source: Reuters

** Henry Hab gas price multiplied by share of gas extraction plus WTI price multiplied by share of oil extraction*

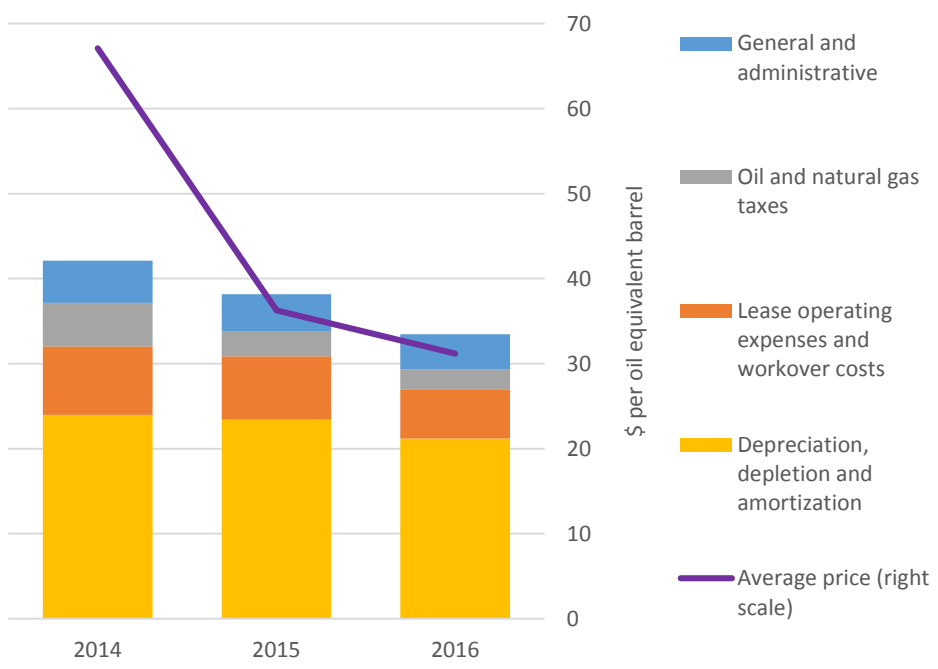
Chesapeake cash flow



Source: Reuters

Concho Resources was founded in 2004. The company operates in Perm formation at the boundary of Texas and New Mexico. In 2016, the company produced 8,1 mln. tons of oil equivalent, 59% was oil. The company's debt is $2,7 bln. During its existence, the company invested $17,8 bln.

Concho Resources costs per oil equivalent barrel



Source: Reuters

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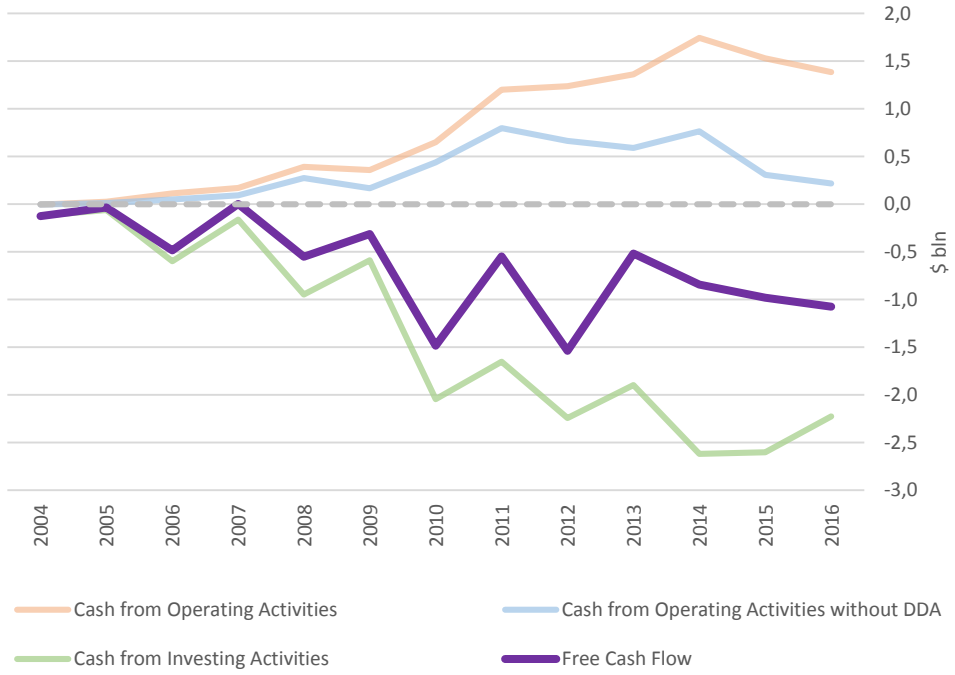
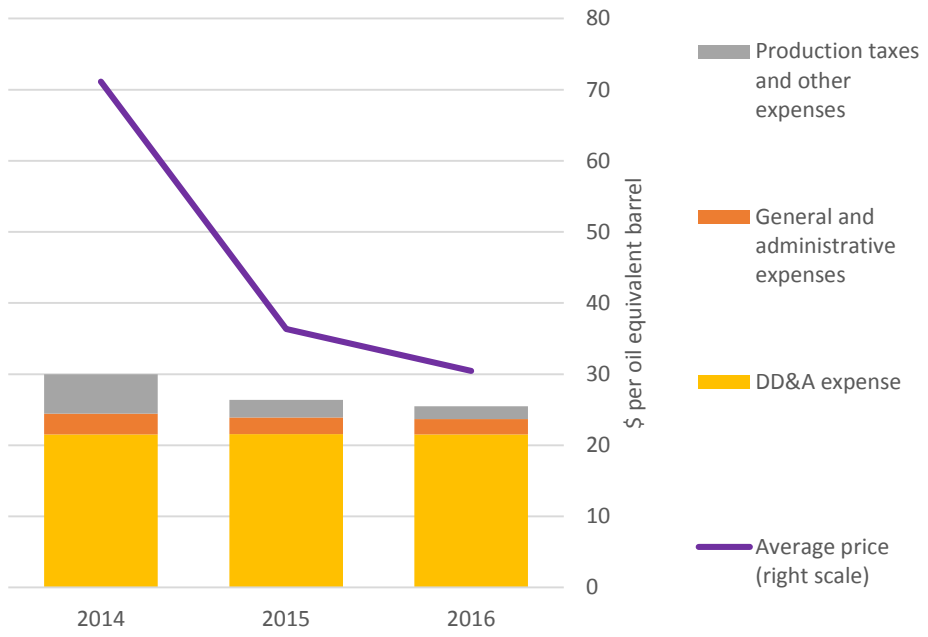
Concho Resources cash flow



Source: Reuters

Continental Resources was founded in 1990. Its base reserves are accumulated in Bakken and Niobrara formations. In 2016, the company produced 11,7 mln. tons of oil equivalent, 56% was oil. The company's debt is $6,6 bln. During its existence, the company invested $21,4 bln.

Continental Resources costs per oil equivalent barrel



Source: Reuters

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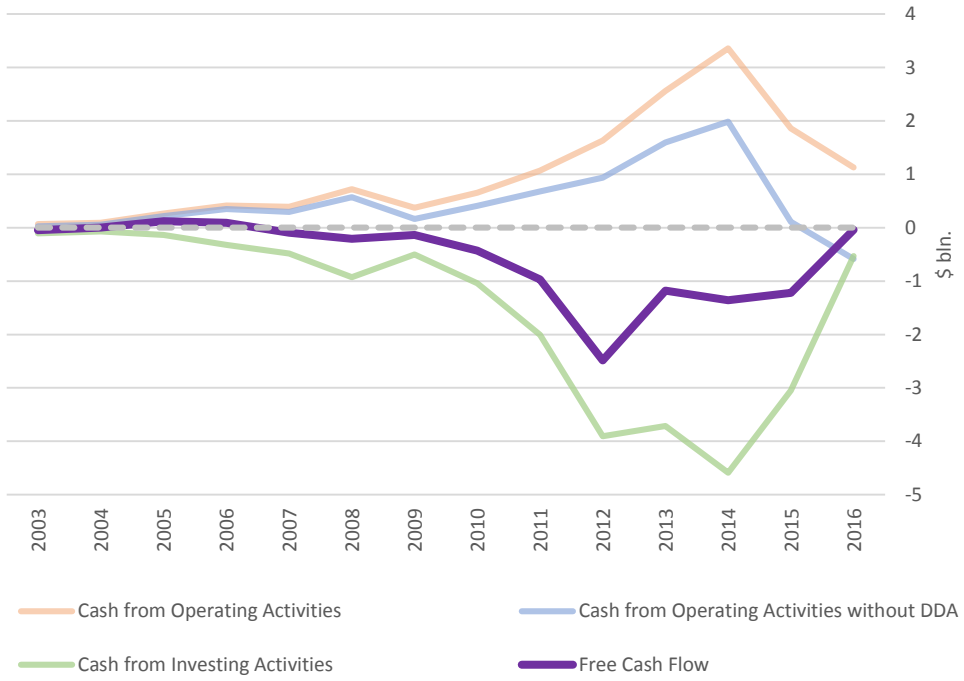
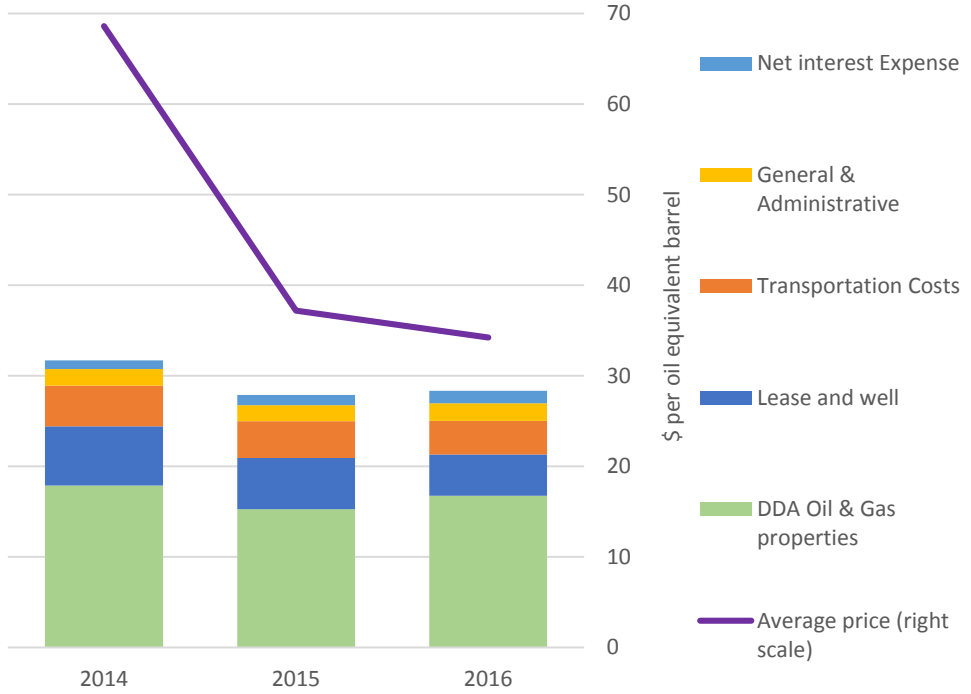
Continental Resources cash flow



Source: Reuters

EOG Resources was founded in 1999. Its base reserves are accumulated in Eagle Fort formation. In 2016, the company produced 30 mln. tons of oil equivalent, 39% was oil. The company's debt is $7 bln. During its existence, the company invested $62,8 bln.

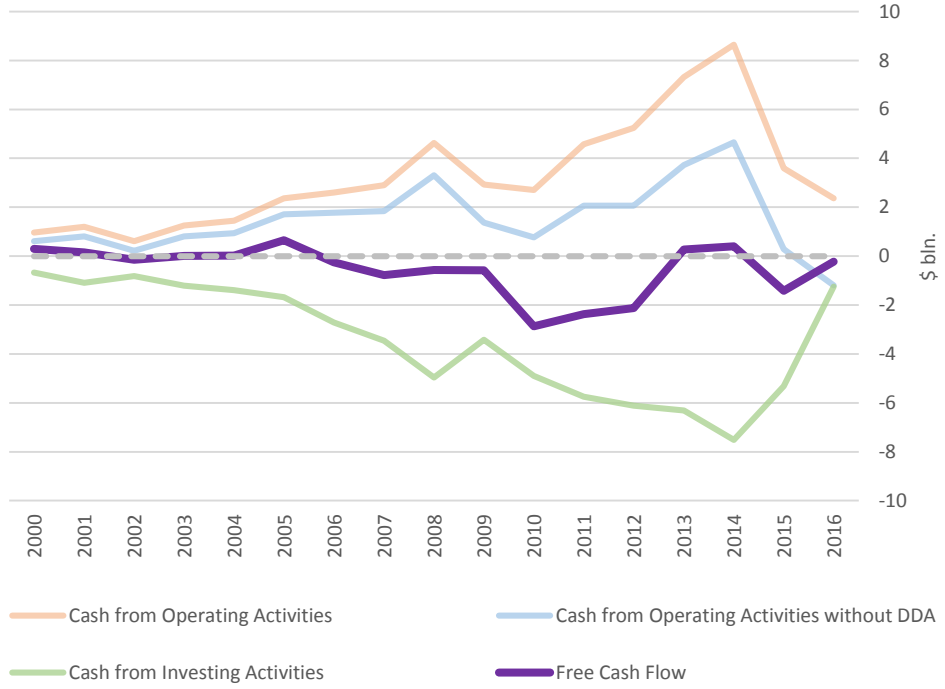
EOG Resources costs per oil equivalent barrel



Source: Reuters

** Henry Hab gas price multiplied by share of gas extraction plus WTI price multiplied by share of oil extraction*

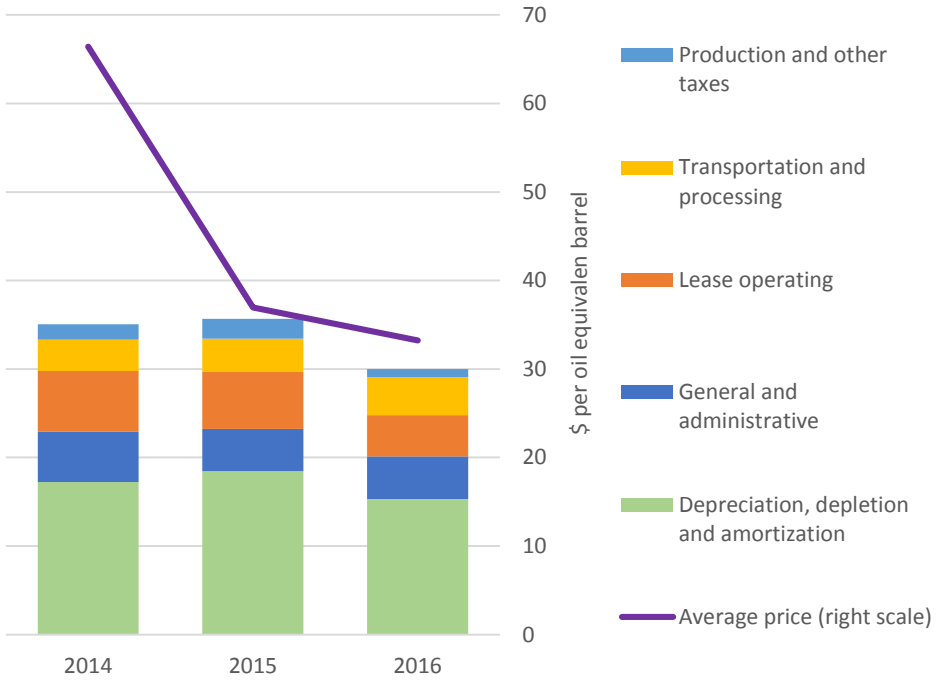
EOG Resources cash flow



Source: Reuters

Newfield Exploration Resources was founded in 1988. Its base reserves are accumulated in Anadarko formation. In 2016, the company produced 7,8 mln. tons of oil equivalent, 43% was gas. The company's debt is $2,4 bln. During its existence, the company invested $23 bln.

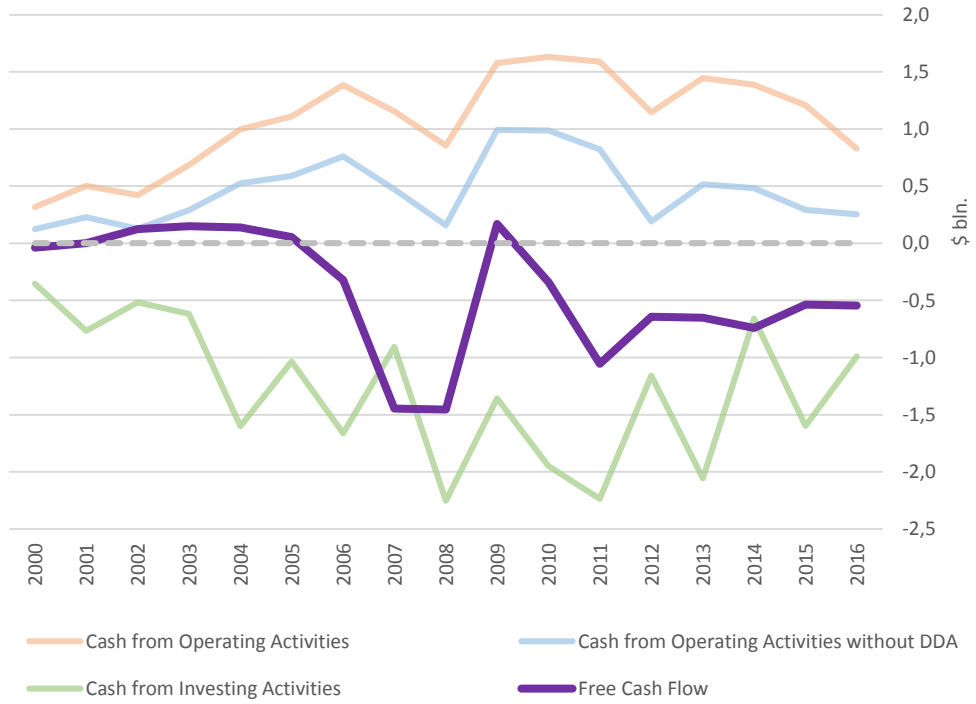
Newfield Exploration costs per oil equivalent barrel



Source: Reuters

** Henry Hab gas price multiplied by share of gas extraction plus WTI price multiplied by share of oil extraction*

Newfield Exploration cash flow



Source: Reuters

Despite the development of alternative energy, oil remains the most important energy source, and in the coming decades, there will be no drastic changes. The "shale revolution" can be considered complete. It affected the balance of supply and demand, but the current situation of companies producing light tight oil suggests they have increasing problems and the end of investors' optimism.

The companies cannot service a debt while maintaining sustainable development. Moreover, they should forget of investments. The period of low oil prices was actually financed by investors who invested in US companies to produce light tight oil.

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