

Stanisław Rychlicki*, Jerzy Stopa*

PROSPECTS FOR DEVELOPMENT OF THE OIL MARKET IN THE WORLD

Crude oil and natural gas were in the twentieth century and are still the most important strategic resources, which determine many aspects of politics and the world economy. The price level and the availability of oil and gas has a huge impact on the economic situation of all countries of the world and developments in the oil market were the cause of many wars. The use of oil on an industrial scale it was observed at the end of the nineteenth century and once was considered the most effective source of energy for universal use. Since then, a steady increase of its share in the energy balances of the World. Even in the nineteenth century lighting in both homes and streets it was very comfortable and became an impulse for the greater use of oil. Growing automotive industry in the early twentieth century was also an important factor in increasing the use of oil, which is then processed in many emerging refineries. All this led to the development of the oil industry, which has become an alternative to coal as the main fuel so far. However, a major breakthrough in the use of oil occurred only after the Second World War, when began to rapidly develop such industries as chemical-based oil or plastics industry.

Oil deposits occur most frequently together with the natural gas deposits in many areas of the world (Fig. 1). They were formed millions of years ago. Oil was formed from organic matter during the generational complex processes under specified temperature and pressure. Today also there are formed deposits of oil, but in geological time, what is not important for our civilization. The first oil fields were discovered in the mid-nineteenth century in the mountainous areas in the Carpathian Mountains, the Appalachian Mountains and the Caucasus and for some time, even at the beginning of the twentieth century there was the view that oil is present only in areas anticlinal formations. It was a so-called folded theory of the origin and the presence of oil, which is

* AGH University of Science and Technology, Faculty of Drilling, Oil and Gas, Krakow, Poland

very limited in both quantity of its resources, and its spread. In the twenties and thirties of the twentieth century there have been discoveries of oil also in the areas of platform and in so-called transitional areas, which shed new light on the spread of oil in the world. It soon turned out that the discovered deposits platforms and in the areas of transition between platforms and folded areas, they are much larger than the deposits in the areas folded.

World oil resources

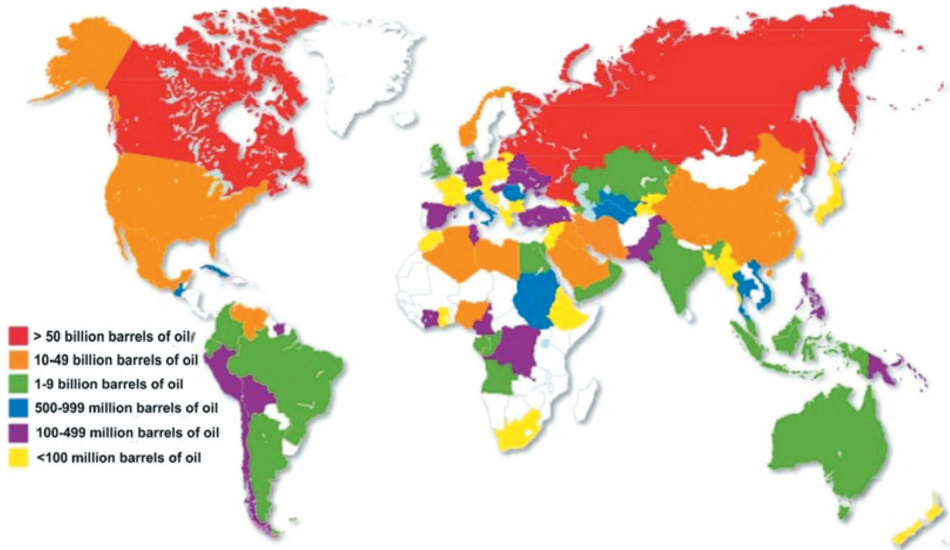


Fig. 1. World oil reserves [5]

In the second half of the twentieth century they followed the discovery of large oil reserves in the so-called zones of shelf seas and oceans. Today, more than 30% of the world's crude oil is extracted from these areas. All of this expands the exploration and discovery of new areas to oil and new oil deposits in the already known areas of sands. World oil industry, which after many transformations took shape in the form of international and less national companies. Now is one of the economically strongest industries.

The size of proven oil reserves in the world in 2014. Was approximately equal to 234 billion tonnes [9] and in comparison to 2000. increase by 31%, with an increase in oil production by 17%. As a consequence, the rate of life of its resources, in the reporting period increased by 30% and in 2014. was 52.5 years [1, 6, 7].

Since the early 80s of the twentieth century in the United States oil reserves increased from 3.8 to 5.9 billion tonnes (the result of the shale revolution), and in the EU drop from 1.2 to 0.8 billion tonnes [1]. At the same time, there was an increase in world oil resources of 142.7 to 234 billion tonnes [9].

That should be enough for an average of forty to fifty years. As shown in Figure 2, this value will vary geographically. Life indicator resources will be highest in regions of South & Central America and Middle East. This will cause the passage of time exploitation of oil will mainly focus beyond the Euro-Atlantic area. Figure 3 is presented distribution of proved reserves (%) in 1995, 2005 and 2015 by region and it correlates with the results presented on Figure 2.

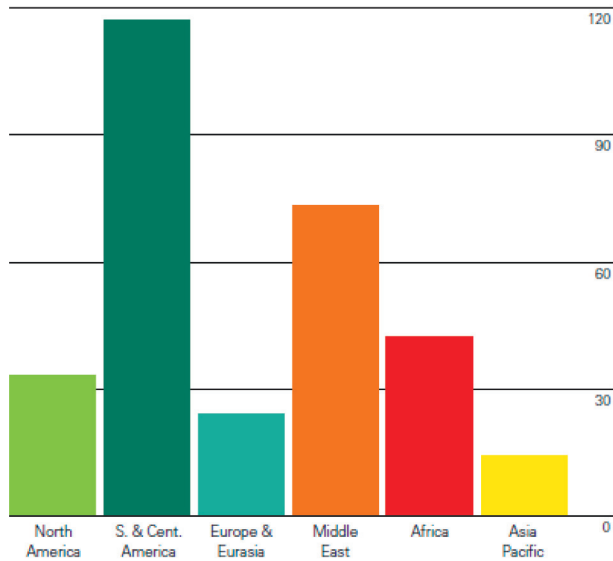


Fig. 2. Oil reserves to oil production (R/P) – years – by region in 2015 [10]

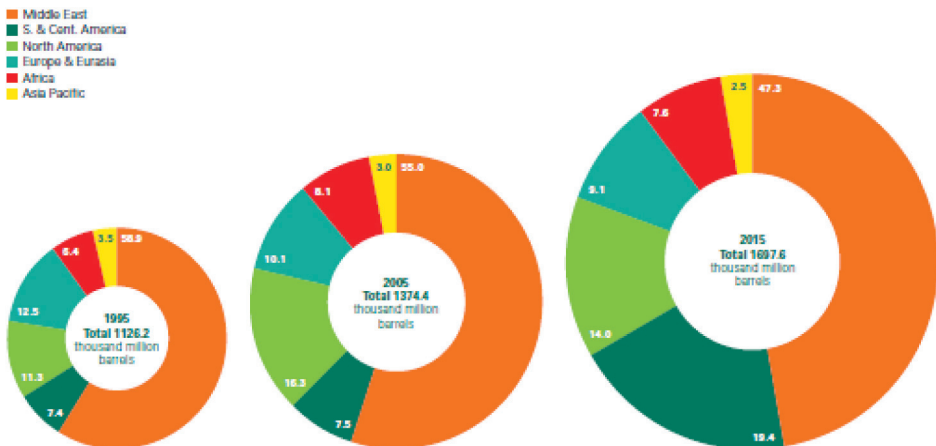


Fig. 3. Distribution of oil proved reserves (%) in 1995, 2005 and 2015 [10]

In recent years a huge impact on the volume of oil production methods play a secondary and third (Enhanced Oil Recovery). By the end of the last century the greatest impact on production was growth, among the methods of secondary water injection, and then joined to the third method. Given the increasing scope of research in the area of seas and oceans, the huge potential of unconventional oil, broad introduction to the operating methods of third parties, as well as new technologies associated with the holes horizontal, branched, and hydraulic fracturing can be said that this leads to a slow slide World summit of oil, which forecasts the IEA is expected for 2019 years. This change can forecast progress in production in the Middle East and in Brazil (Fig. 4) regardless of the drop in oil production for most manufacturers. Keep this in mind that the basis of the current mining are big deposits. Of the 14 largest deposits comes up 20% of world production. 13 of them are mature deposits, which increased production have already passed. In total, half of the world production comes from only 120 large deposits. The remaining half of 4000 provides small deposits [10].

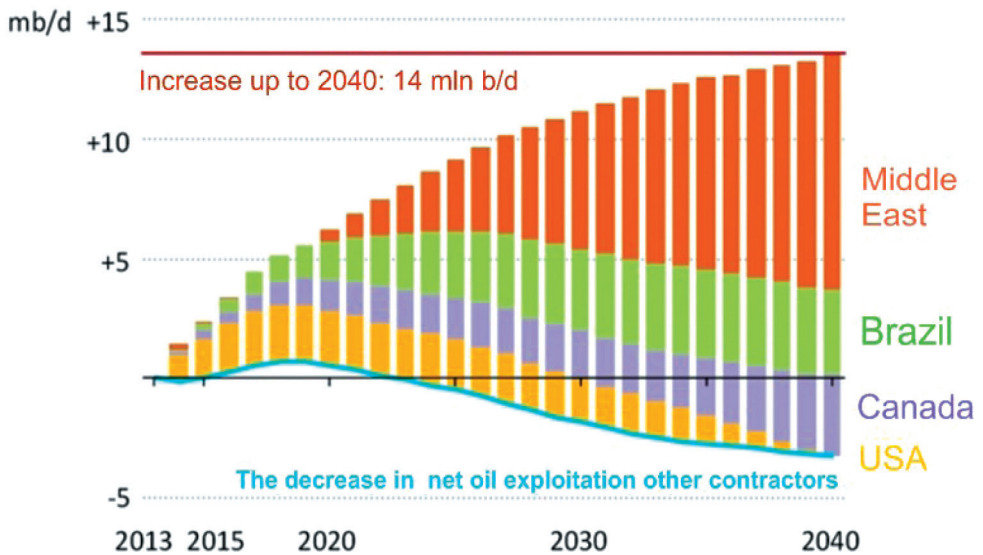


Fig. 4. Forecast of oil production by 2040 [11]

Trade in goods and services between the countries has a significant impact on the global economy. Precisely, the situation in the global market determines the wealth or poverty of millions of people. International trade is the total value of exports and imports for individual countries, often the term is used interchangeably with the term: foreign trade. An important element of this economy is the international oil market, which gives Member exporters of crude oil or natural gas enormous financial benefits.

The oil market trades primarily contracts. It is specialized in the several stock exchanges, the largest of which is the New York Mercantile Exchange (NYMEX) and the International Petroleum Exchange (IPE) in London. On the stock markets the spot contracts (immediate) are traded, but more often futures (futures) and options for the purchase and sale of oil [12]. On the NYMEX sells and buys crude oil Brent (North Sea), oil in Texas or light oil from the Middle East. It traded as gas, electricity, gasoline of various species and variety of raw materials. London is specialized in operations on Brent crude.

A tanker carrying crude oil may be on the way several times bought and sold. Many buyers are buying contracts for speculative purposes, suspecting that prices will rise. An example of speculation on oil markets was not justified “jacked up” the price of oil to over \$ 140 (bbl / 2008), and its rapid decline. In the oil trade are also used “short sales”, i.e. The deferred delivery. Hoping that prices will fall, sellers waive goods, which do not yet have. After some time, they buy it cheaper on the market, carry out contract and take to pocket the difference in price. Futures contracts allow to stabilize the market. Refinery can buy contracts for oil delivery in the spring of next year, paying the price, which is now established on the market.

In short, the price of oil is played just like every financial market and the like are reactions to information coming from the world. Crude oil market – like any financial market – is susceptible to fundamental factors and psychology. The foundation of the relationship between demand for oil and its demand between price and the cost of obtaining oil. In the long prediction, a detailed fundamental analysis determines the level of oil prices. Stock exchange players know, that in the short term, everything is decided by psychology. In assessing gains or losses arising from the transaction favor way of analysis is the Fibonacci method (named after the thirteenth-century mathematician).

The price of oil varied within very wide limits (Fig. 5). It decided about the political situation in the world as well as the relationship between supply and demand. A clear drop in oil prices dates back to the mid 2014 years (Figs 5 and 6). This was associated with oversupply on the oil market. Fighting for market share in OPEC production remained at a high level, so at the end of 2015 years the price of oil fell to the lowest level from the beginning of the financial crisis (Fig. 6). Statement given by the Minister of Energy of the United Arab Emirates Suhaila Muhammad ibn al-Mazrui stopped falling prices per barrel. He stated that the current price starts to force the whole world to freeze production. He referred to the agreement signed between Russia, Saudi Arabia, Venezuela and Qatar to freeze raw material extraction level from January 2016. Oil still on the market were too much. Diversification of sources was also not easy because many countries have held back production. The value of a barrel of oil from 2014 until the end of 2015 fell by 70 percent, which led to the highest in more than two decades, the oil crisis. Record cheap oil was a major problem for economies that are associated with its extraction.

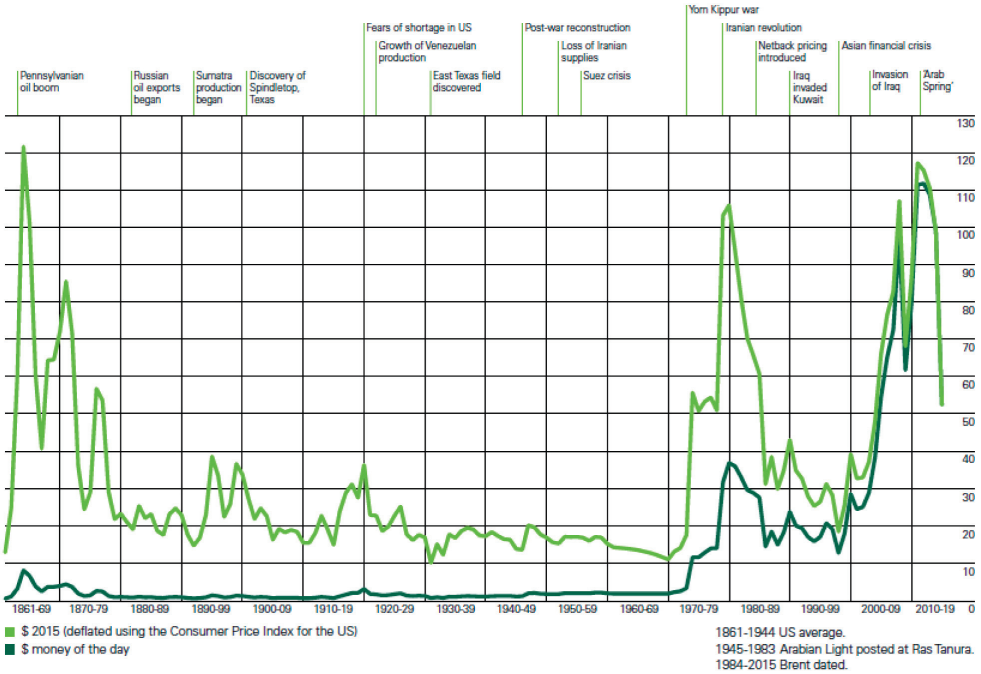


Fig. 5. Oil prices since 1861 until 2015 [10]



Fig. 6. Changes in oil prices from 9.03.2014 to 7.03.2016 [3]

The two largest African producers – Angola and Nigeria – were forced to ask for financial assistance to the World Bank. Budget deficits require major cuts in public spending; Venezuela, Colombia, Ecuador, Mexico, Russia and even Canada and Saudi

Arabia. It is the problems of the largest manufacturers were the reason for which every few months organized meetings, after which experts forecast a further scenarios on the market. Russia organized at the beginning of April 2016 consultation for largest producers of crude oil. Unfortunately, they did not bring the expected changes. Not every manufacturer was able to accept the restrictions. An example would be Iran, which holds quarters largest oil reserves in the world and this is the 72 percent. of Iranian exports. After years of sanctions announced a return to the market with 2 million barrels per day [3, 4]. Although countries such as Iran, Libya or Kurdistan will complement the market by an additional million barrels [8]. In the long prospectively, the low oil prices can't be maintained. There are many groups who depend on increases. Many companies restrict production, driven by unstable geopolitical situation. This will increase the pressure on – predicts most of the international agencies and experts, which monitoring changes on the oil market in the world.

From 30.11.2016 OPEC agreed to reduce crude oil production to 32.5 million barrels per day. Daily demand for oil, by EIA, is currently about 95 million barrels. The agreement is valid from 1.1.2017. In the wake of this they went to countries non-members, who decided to cut production by approx. 550 thousand. barrels a day along with a drop in output in the OPEC countries will give 1.8 million. The most important in this regard is proceeding countries with the greatest resources extracted oil. Figure 7 shows recoverable top ten countries oil producers in the world. It should be remembered about the huge resources of unconventional oil (Fig. 8) that the increase in oil prices might affect in a fundamental way to change the situation on the market. Figure 9 presents the estimated resources of oil shale on all continents in the billions of barrels of oil.

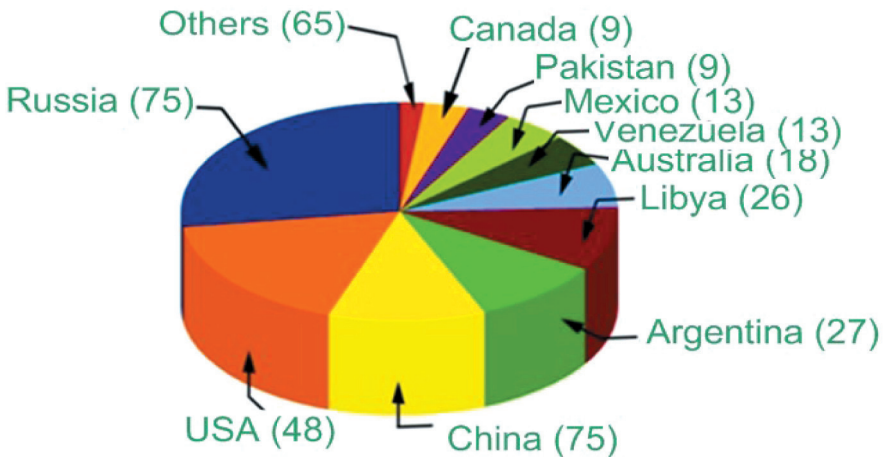


Fig. 7. Recoverable oil reserves in the top ten countries in billions of barrels of oil [13]

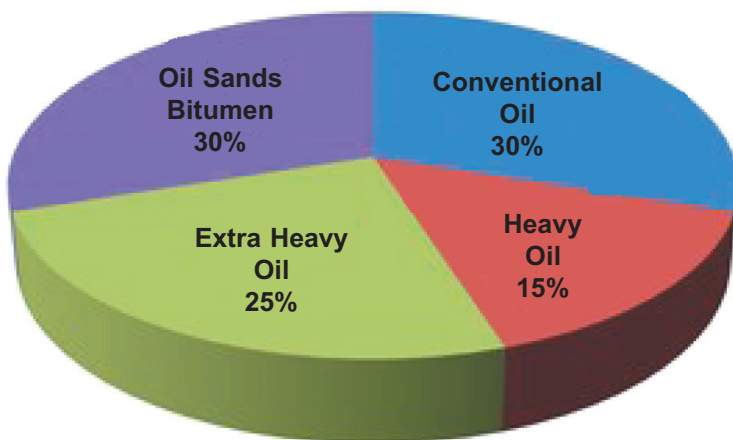


Fig. 8. Total world oil reserves

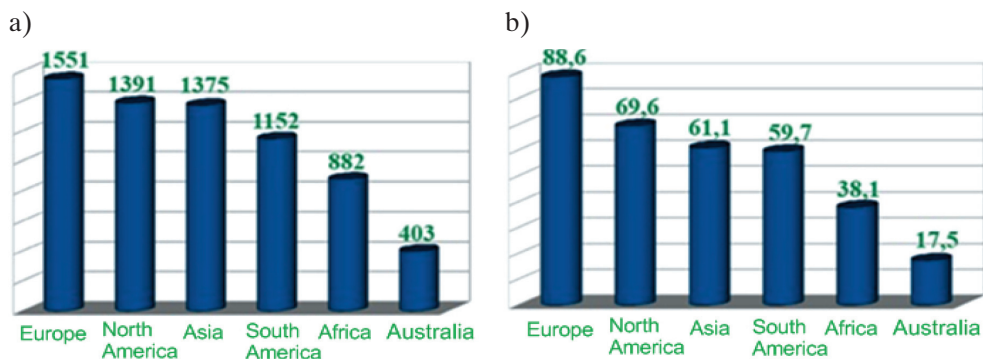


Fig. 9. Approximate reserves of shale oil in billions of barrels of oil [13]: a) estimated potential in the rocks; b) estimated reserves with exploitation possibilities

The latest data on shale oil resources and recoverable resources presents EIA report (American Information Agency for Energy Affairs) and ARI (Advanced Research Institute) from 2013 year. The amount recoverable by far excels Russia, which has deposits of an estimated amount of 75 billion barrels of oil. Huge resources are located on the territory of Russia. At the same time Europe is leading in the ranking of the continents with the largest resources of oil shale. After that, North America, mainly due to the resources US (48 billion barrels). Further South America and Asia (China 32 billion barrels).

The oil industry, in its historical periods of growth and decline in prices for petroleum products, is now in its deepest crisis since 1990. Very strong influence on price changes were political aspects (Fig. 5).

The biggest changes in the last fifty years caused [10, 15]:

- Yom Kippur war,
- Iranian revolution,
- Iraq invaded Kuwait,
- Asian financial crisis,
- Invasion of Iraq,
- Arab Spring.

There are various scenarios related to predicting prices in the future [16], but at prices below \$ 50 per barrel revenues of oil companies fell very clearly. This led to a downtime of more than two-thirds of drilling equipment and sharp cuts in investment in exploration and production. Dozens of companies went bankrupt and an estimated 250,000 oil workers lost their jobs. The number of rigs in the US market, monitored by Baker Hughes, has fallen from a peak of 1,609 devices in October 2014 year, only 316 devices in May 2016 year. From that moment began their slow but steady growth. In 2016, it rose to 508 devices, and as analysts estimate Simmons & Co, in the coming years will grow to 723 units in 2017 and 933 units in 2018.

On the market is not observed clear declines in production, but this situation can begin to change this year. There are signs that the supply-demand-price – could recover some balance at the beginning of 2017 years. At the same time we must remember that in the United States domestic oil stocks are at the highest level for more than 80 years. US Department of Energy (DoE) reported that for 02.08.2017 amount of barrels is 508.59 million and still rising [14].

The latest report from Wood Mackenzie predicts [17] that in 2017 oil and gas sector for the first time in two years will increase investment in mining operations. Global investment of mining companies will increase by 3 per cent., to \$ 450 billion. It's still about 40 per cent, less than in the record year of 2014. This reflects in the deep company savings they have made in the oil sector, as well as the return of the whole industry towards smaller projects. This causes – according to company Wood Mackenzie, that in 2017 global production of hydrocarbons will increase by 2 per cent. Analysts Goldman Sachs Group Inc. said that on the global fuel market in the first half of 2017 years will be an observable deficit, associated with the implemented by OPEC and other suppliers decreasing supply of oil.

CONCLUSION

From what is written above, it can conclude that in the near future cannot be expected the radical changes in the market for oil and natural gas. It seems that in the long

perspective in many countries, the demand for fuels will increase significantly, which will certainly contribute to a renewed increase in oil prices in the coming years. A barrel of West Texas Intermediate for March delivery on the NYMEX exchange of fuel in New York is priced at 52.60 USD, the barrel of Brent crude for April delivery on the stock market fuel ICE Futures Europe in London is priced at 55.41 USD [17].

REFERENCES

- [1] BP 2015
- [2] Dobski T.: *Czy jest miejsce na znaczący udział gazu w bilansie energetycznym Polski*. Przegląd Gazowniczy nr 3/2015.
- [3] <http://www.money.pl/giełda>.
- [4] <http://www.money.pl/gospodarka/wiadomości/artykuł2016>.
- [5] Oil&Gas Journal, 2014.
- [6] Janusz P., Kaliski M., Szurlej A.: *Rewolucja łupkowa a zmiany na rynku gazu skroplonego*. Gospodarka Surowcami Mineralnymi – Mineral Resources Management, vol. 31, Iss. 3, 2015, pp. 5–24.
- [7] Olkusi T., Szurlej A., Janusz P.: *Sektor gazu ziemnego w polityce państwa*. Polityka Energetyczna, t. 18, z. 2, 2015, pp. 5–17.
- [8] WNP.pl [4.04.2016].
- [9] Puls Biznesu 24.07.2016.
- [10] *BP statistical review of world energy 2016 – full report*.
- [11] IAE 2014.
- [12] Wenus M.: *Podstawowe definicje związane z zabezpieczeniem ryzyka walutowego*. Comparic.pl. [14.12.2013].
- [13] EIA, ARI 2013.
- [14] CIRE [13.12.2016].
- [15] R. Rychlicki (ed.): *Możliwości zwiększenia efektywności wydobycia ropy naftowej ze złóż karpaccich*. Wydawnictwa AGH, Kraków 2010.
- [16] PAP 9.02.2017.
- [17] WNP.pl [13.01.2017].