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CONDITIONS FOR USE OF LIQUID FUELS IN STATE ECONOMIC SYSTEMS

This paper aims at structuring and popularisation of knowledge concerning the functions of the Polish market of liquid fuels in terms of interest of small and medium-sized enterprises. It should provide a measurable value to all concerned parties by streamlining and increasing efficiency of the decisions related to an assessment and a selection of liquid fuel suppliers. The purpose of the study is to determine the attributes of the analysed market. These question, being the essence of the research problem, may be further developed in detailed questions regarding the subsystems of liquid fuels supply, production and distribution. The goal of the study will be fulfilled by determining the current knowledge in terms of the described problem, specifying the conditions for operation of the global oil market, characterising the national system of liquid fuels and formulating the conclusions. The research method involves analysis of available statistical reports. The scope of presented data will regard the period from 2010 to 2018 and the global and Polish market of liquid fuels. The analysis will include basic balance sheet values, i.e. documented assets, supply, demand, trade and prices. Additionally, the objective and subjective structure of the described market will be analysed. Individual values will be assessed using basic statistical analysis measures.

Keywords: market, energy, Poland.

1. INTRODUCTION

In the recent years, globalisation processes, as well as political, economic, social and technological integration determine most transformations in contemporary organisations environment. Enterprises in many industries urge to adjust their activities to the constantly growing market requirements. Mechanisms that boost competitiveness in all functional aspects are gaining popularity. Activities taken in this field focus on increasing cost-effectiveness, improving quality of products and services and accelerating individual operations. It is worth noting that over the last few years, the share of liquid fuels costs has increased in the global cost structure of Polish enterprises. It is mainly linked to the growing importance of road transport in business activity and high prices of transport fuels. Consequently, major requirements of the enterprises include reliability of liquid fuel supply and guarantee of acceptable prices.

This paper aims at structuring and popularisation of knowledge concerning the functions of the Polish market of liquid fuels in terms of interest of small and medium enterprises. It

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should provide a measurable value to all concerned parties by streamlining and increasing efficiency of the decisions related to assessment and selection of liquid fuel suppliers. The purpose of the study is to determine the attributes of the analysed market. These question, being the essence of the research problem may be further developed in detailed questions regarding the subsystems of liquid fuels supply, production and distribution.

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2. THEORETICAL BACKGRAUND

The term of „energy” is broadly used, but it is not easy to describe using the language of theory (it is a primitive notion). It can be analysed in different aspects. In physics, it is a scalar physical value denoted in work units that determines the capability of an object or a system of objects to perform work related with transition from one physical state to another (Dubisz, ed., 2003).

Energy cannot be produced *ex nihilo*, it can be delivered in various ways, using energy carriers. In the literature, the concept of „energy carrier” refers to a product that participates directly and/or indirectly in the processes of transmitting various forms of energy from its sources to the usage sphere (Górzyński, 2017). Assuming the energy transformation criterion, these energy carriers are classified as primary (natural form) and secondary (derivative, processed). Considering their renewability in the natural environment, we can distinguish renewable and non-renewable energy carriers. In terms of physical state, energy carriers divide into solid fuels, liquid fuels, gaseous fuels and electric energy.

Crude oil, as a liquid fuel, is critical for global economy. It is a natural mixture of liquid hydrocarbon and non-hydrocarbon compounds. Its basic mass, i.e. 80 to 95% are liquid compounds with dissolved paraffin and naphthenes. Beside that, it contains resins, asphaltenes, sulphur compounds, nitrogen compounds and naphthenic acids (Grzywa, Molenda, 2000). It is worth mentioning that no general petroleum classification exists, as its chemical properties differ and depend from geographical location of oil accumulation or its depth. Knowing these features is essential when it comes to determining the method and directions for use of this resource.

Almost entire oil is used by petroleum refineries. In this regard, the demand for oil is secondary and depends on the demand for petroleum products. These products are widely used as fuel for combustion engines and to a lesser extent, for starting up steam boilers and heating or process purposes. Quality of petroleum products is assessed based on parameters, i.e. calorific value, combustion heat, density, ignition temperature, boiling and setting point, viscosity, sulphur content and water content (*Zasady metodyczne...*, 2006).

In the literature, the term „system” is widely used and refers to phenomena, items and issues that are perceived and described in a comprehensive way. Depending on the purpose and type of considered system, there are many different definitions. In most general terms,

it is a separate part of reality, that is an arrangement of interrelated elements with specific structure and forms an ordered entirety following accepted rules (Dubisz, ed., 2003).

The system of liquid fuels is a subsystem of state economy. It includes any business activity conducted by specialised entities, in material production and services segments, involving available productive powers to provide access to liquid fuels to all parties concerned, in proper quantities and quality, in a specific location and time, and at acceptable cost. The most general division of liquid fuels system is based on the institutional criterion, fuel stream trading phases and fuel types. It is commonly used in the literature.

Assuming the institutional criterion, liquid fuels subsystems would be distinguished in micro approach (intra-organisational system, covers a subsystem operating within a given organisational unit), meta approach (inter-organisational system, reaching beyond the boundaries of individual enterprises, involves cooperation of several entities in trading a given type of fuel) and macro approach (complex system with general economic character, composed of multiple correlated meta and micro energy systems).

Considering the phase criterion, liquid fuel supply, production and distribution subsystems can be distinguished.

Finally, classification by fuel type distinguishes energy products subsystem (including petrol, kerosene, oil and gas) and non-energy products subsystem. General scheme of liquid fuels system is presented in Fig. 1.

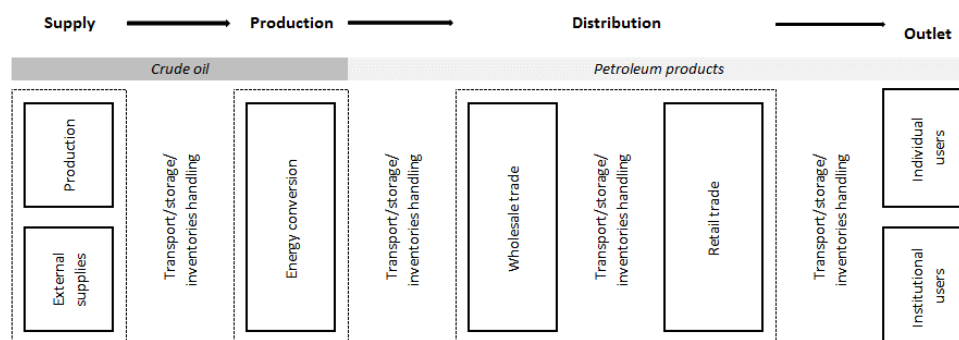


Fig. 1. Liquid fuels system scheme

Source: own work.

3. GLOBAL CONDITIONS

In 2018, documented global petroleum inventories reached 1,729.7 billion barrels. As compared to 2010, it was 5.4% more (88.2 billion barrels). High oil inventory increase was recorded in Iraq, Saudi Arabia and USA (91.6 billion barrels in total) (*Bp Statistical Review...*, 2019). As at the end of the analysed period (2018), inventory coverage index, based on the current demand, was more than 18 years.

In the analysed period, oil accumulations were highly concentrated in terms of entities and geography (shares of OPEC in 2018 reached 71.8% and the Middle East 48.3%) (*Bp Statistical Review...*, 2019). It must be pointed out that significant petroleum inventories were located in regions with unstable social and political situation (i.e. South America, Middle East, West Africa). Oil resources kept by the largest global consumers of liquid

fuels (USA, China, EU and Japan) were limited in relation to their demand. The global balance of petroleum inventories is presented in Tables 1 and 2.

Table 1. Global petroleum inventories balance in the period from 2010 to 2018

Type	2010	2015	2016	2017	2018	2018/2017		2018/2010	
[Thousand million barrels]									
Inventories	1641	1684	1691	1727	1729	2.2	0.1%	88.2	5.4%
[Million barrels per day]									
Supply	83.2	91.5	91.8	92.5	94.7	2.2	2.4%	11.5	13.8%
Demand	88.7	95.0	96.7	98.4	99.8	1.4	1.5%	11.1	12.5%
Import/export	55.3	62.5	66.5	69.6	71.3	1.7	2.5%	15.9	28.9%

Source: individual work based on: (*Bp Statistical Review...*, 2019, *World Oil...*, 2019).

Table 2. Global petroleum balance structure in 2018

No.	Inven- tories	%	Supply	%	Demand	%	Import	%	Export	%
1	OPEC	71.8	OPEC	41.5	OECD	47.5	Europe	21.2	OPEC	34.5
2	OECD	14.7	OECD	27.8	USA	20.5	China	15.5	Russia	12.8
3	Russia	6.1	USA	16.2	China	13.5	USA	13.9	USA	10.0
4	USA	3.5	Russia	12.1	EU	13.3	India	7.3	Canada	6.3
5	EU	0.3	EU	1.6	India	5.2	Japan	5.5	Europe	4.8

Source: individual work based on: (*Bp Statistical Review...*, 2019, *World Oil...*, 2019).

In 2018, global daily petroleum output reached 94.7 billion barrels. As compared to 2010, it was 13.8% more (11.5 billion barrels). Over 67% of that increase in petroleum supply was recorded in the USA. The major global oil producer was OPEC (41.5% in 2018). Petroleum output in the USA and Russia was also significant (28.3% in total) (*Bp Statistical Review...*, 2019).

Global daily usage of petroleum in 2018 reached 99.8 million barrels, which was a 13.8% increase (11.5 million barrels). In general, the quantitative increase in fuel demand could be attributed to countries not belonging to the OECD. The demand coverage index in that period was 94.0%. In the global usage structure of particular groups of products, the share of Middle Distillates amounted to 36.1%, Light Distillates 36.9% and Fuel Oil 3.9% (*Bp Statistical Review...*, 2019).

In the recent period, petroleum industry was concentrated in highly developed countries, with high growth potential. It developed most rapidly in the USA, EU, China, Russia, India, Japan and South Korea. At the end of the analysed period, total production in those countries reached around 70.2% of the global output. It means that the major petroleum suppliers to global markets act only as exporters.

The discrepancy between the geographic location of oil accumulations and areas of highest petroleum consumption, determined the directions in global trade in the period from 2010 to 2018. At the end of the analysed period, average daily import of petroleum, in a global scale, reached 71.3 million barrels, which was a 28.9% increase in relation to 2010

(15.9 million barrels). In the recent period, the largest petroleum buyers were European countries, China, USA, India and Japan (63.4% in total in 2018). It is worth noting that the degree of diversification of supplies to individual countries differed. Considering the export directions, the largest amounts of petroleum were supplied by the OPEC countries (34.5% in 2018) and Russia (12.8%) (*Bp Statistical Review...*, 2019).

Petroleum prices were quoted on global commodities markets. The quotations concerned not only selected types of products - they serve as a reference for other items. The analysed period marked a highly dynamic increase and uncertainty in petroleum prices. The highest prices were quoted in the period from 2001 to 2014. It was said to be caused by two factors. The first was a fundamental factor, i.e. the relations between the demand for petroleum and its supply. The second was market speculation. It is worth noting that no stable trends in yearly price changes were recorded in the recent period. Additionally, the discrepancy between oil price in the USA and other regions of the world has consolidated (Kaliski, Jedynak, Białek, 2013). Oil prices in the analysed period are presented in Fig. 2.

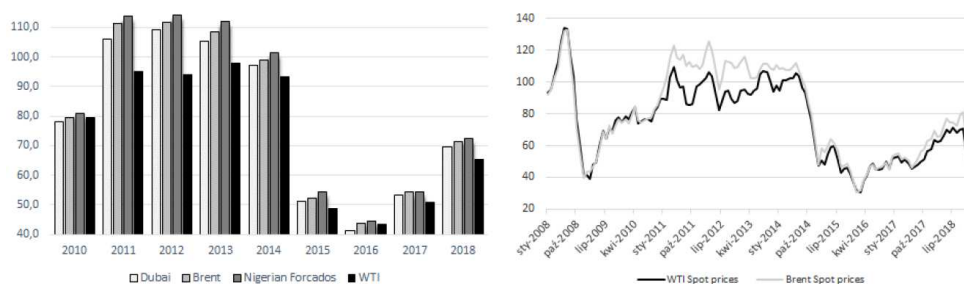


Fig. 2. Global oil prices from 2008 to 2018 and daily oil prices - Brent Spot Prices from 2015 to 2018 [USD per barrel]

Source: individual work based on: (*Bp Statistical Review...*, 2019, *Petroleum and Other Liquid...*, access on 10 Oct 2018).

4. NATIONAL SUPPLY AND PRODUCTION SUBSYSTEM

At the end of the analysed period, balance petroleum inventories in Poland were low, amounting to 23.5 million tonnes. In 2017, national fuel demand coverage with documented inventories was 0.94 years.

Most significant in the recent period were petroleum inventories located in the Polish Lowlands region (65.7% of total inventories in 2018) and in the Baltic region (29.7%) (*Bilans zasobów...*, 2011–2017). Table 3 presents changes in the Polish petroleum inventories balance.

At the end of the analysed period, oil output in Poland reached 0.937 million tonnes. The inventories coverage index, considering the demand scale, was 23.6 years in 2017. Petroleum production structure was largely determined by oil supply from the Polish Lowlands (75.6% in 2018) and the Baltic region (20.5%) (*Bilans zasobów...*, 2011–2017). Inland oil production was mainly conducted by PGNiG S.A. (71.88% of share capital held by the State Treasury), branches in Sanok and Zielona Góra (*Raport zintegrowany...*, 2019). Offshore production activities were performed by Lotos Petrobaltic S.A., an entity of the Lotos S.A. Group (53.19% of share capital held by the State Treasury) (*Zintegrowany raport...*, 2018).

Table 3. National oil balance in the period from 2008 to 2018

Type	2010	2015	2016	2017	2018	2017/2016		2017/2010	
[Million tonnes]									
Inventories	25.2	22.8	22.0	23.6	23.5	1.6	7.3%	-1.6	-6.3%
[Million tonnes per year]									
Supply	0.667	0.898	0.957	0.939	0.937	0.0	0.0%	0.3	43%
Demand	22.8	26.1	25.8	25.1	no data available	-0.7	-2.7%	2.3	10%
Import	22.7	26.5	24.6	24.6	no data available	0.0	0.0%	1.9	8.4%
Export	0.2	0.3	0.2	0.2	no data available	0.0	0.0%	0.0	0.0%

Source: individual work based on: (*Bilans zasobów...*, 2011-2017, *Gospodarka...*, 2011-2018).

In Poland, petroleum supply covers only a small portion of documented demand (coverage index amounting to 3.9% in 2017), which results in high import dependency. The current import directions were established in the 1970s. In the recent period, both inland and offshore infrastructure was used for these purposes. The inland infrastructure was the Polish section of the “Friendship” pipeline, controlled by PERN S.A. (owned by the State Treasury). It was divided into two parts: eastern, from Adamów to Płock (yearly throughput of 43 million tonnes) and western, from Płock to Schwedt (yearly throughput of 27 million tonnes). Additionally, the reversal flow Pomeranian Pipeline allowed two-way transfer of oil – from Płock to Gdańsk (yearly throughput of 20 million tonnes) and from Gdańsk to Płock (yearly throughput of 30 million tonnes) (PERN SA, access on 10 Oct 2019). The offshore infrastructure, controlled by Naftoport Sp. z o.o. (owned by PERN S.A.), included marine transshipment terminal at the Northern Port of Gdańsk. It was composed of four transshipment facilities suitable for handling liquid fuels (total yearly capacity of 34 million tonnes) (Naftoport SA, access on 10 Oct 2019). The location of logistic infrastructure used for liquid fuels in Poland is presented in Fig. 3.

In the analysed period, oil supplied from Russia (REBCO) dominated in the Polish petroleum import structure. In 2018 its share amounted to 76% of total supplies. The rest of imported petroleum was delivered mainly by the Middle East countries (*Paliwa ciekłe*, access on 10 Oct 2019). The predominance of supplies from the east was determined by long-term contracts, prices, Polish refineries’ technological compatibility with REBCO and benefits of using long-range pipelines (*Przemysł i handel...*, 2019).

In 2017, the demand for oil reached 25.1 million tonnes. Compared to the base year, it was a 10.1% increase (2.3 million tonnes). It is worth noting that consumption of transport fuels increased in the period from 2010 to 2017 (in particular – LPG 8%, motor gasoline 6%, diesel fuel 37%) (*Gospodarka...*, 2011–2018). The percentage of diesel fuel in the Polish liquid fuels usage rates of 2018 was 60.7%. For motor gasoline it was 18.2%, for LPG 14.4% and for light heating oil 2.3% (*Przemysł i handel...*, 2019). A major driving force behind that increase was the lasting economic growth, increasing number of vehicles participating in road traffic and significant reduction of grey market. The balance of liquid fuels in Poland is presented in Table 4.

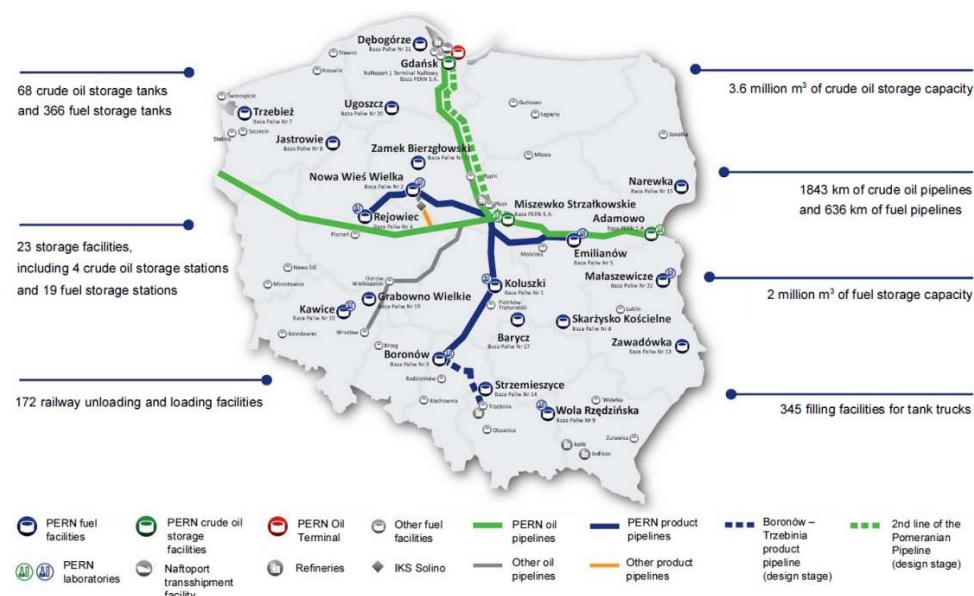


Fig. 3. Liquid fuels logistic infrastructure in Poland, operated by PERN S.A.

Source: (PERN SA, access on 10 Oct 2019).

Table 4. LPG balance in Poland in the period from 2010 to 2017 [thousand tonnes]

Fuel	Type	2010	2015	2016	2017	2018/2017	2018/2017	2018/2017	2018/2017
LPG	Supply	424	575	601	545	-56	-9%	121	29%
	Total usage	2395	2420	2525	2588	63	2%	193	8%
	Import	1982	2035	2196	2488	292	13%	506	26%
	Export	60	196	259	448	189	73%	388	647%
Motor gasoline	Supply	4210	4155	4178	4159	-19	0%	-51	-1%
	Total usage	4141	3777	3994	4384	390	10%	243	6%
	Import	415	363	345	481	136	39%	66	16%
	Export	463	762	509	221	-288	-57%	-242	-52%
Diesel fuel	Supply	9742	11814	11325	11678	353	3%	1936	20%
	Total usage	12006	12084	13791	16436	2645	19%	4430	37%
	Import	2355	2050	3779	5209	1430	38%	2854	121%
	Export	43	1790	1087	239	-848	-78%	196	456%
Light heating oil	Supply	1147	486	536	726	190	35%	-421	-37%
	Total usage	1145	658	639	679	40	6%	-466	-41%
	Import	12	11	2	0	-2	-100%	-12	-100%
	Export	0	0	0	0	0	-	0	-

Source: individual work based on: (*Gospodarka...*, 2011–2018).

In the analysed period, oil refining industry was mainly concentrated in refineries owned by PKN Orlen S.A. (27.52% of share capital held by the State Treasury) (plants in Płock, Trzebinia and Jedlicze in Poland, foreign refineries in Lithuania and Czech Republic) and the Lotos S.A. group (Gdańsk refinery). Total yearly production capacity of the PKN Orlen S.A. group in 2018 reached 35.2 million tonnes (16.3 million tonnes produced in Poland alone) (*Raport zintegrowany...*, 2018). In the Lotos S.A. group it was 10.5 million tonnes a year (*Zintegrowany raport...*, 2018). It must be mentioned that almost entire technical capacity of Polish refineries has been used by the end of the analysed period. In 2018, production of liquid fuels in Poland was dominated by diesel fuel with the share of 56%, followed by motor gasoline reaching 22% (*Przemysł i handel...*, 2019). In 2017, LPG, motor gasoline, diesel fuel and light heating oil delivered by Polish producers satisfied the demand in 21.0%, 94.8%, 71% and 106.9%, respectively (*Gospodarka...*, 2011–2018).

Fuel shortages on the national market were supplemented with imported fuel. Import to Poland in 2017 covered 96.1% of used LPG, 10.9% of motor gasoline and 31.7% of diesel fuel (*Gospodarka...*, 2011–2018). The share of diesel fuel in the type structure of fuels imported in 2018 was 55.1%, while for LPG it was 36.8%, for motor gasoline 6.1% and for light heating oil only 1.0%. Russia was the major importer, with the rate of 45.1% in 2018. Import from Germany reached 22.9%, from Lithuania 14.3% and from Belarus 12.0%. Motor gasoline was mainly imported from Slovakia – 38%, Germany 38%, Hungary 9.0% and Czech Republic 8.0% (*Przemysł i handel...*, 2019).

At the end of the analysed period liquid fuels introduced to the Polish market fulfilled all quality standards and ensured reliable operation of vehicles. It was confirmed by the tests conducted by the Trade Inspection. For instance, in 2017 Polish Energy Regulatory Office (URE) received 69 reports concerning entities in which inspections revealed violation of valid legal regulations (*Paliwa ciekłe*, access on 10 Oct 2019).

It is worth noting that major amount of motor gasoline and diesel fuel produced in Poland for the local market in the analysed period was mixed with biocomponents in order to execute the National Indicative Target (in 2018 it was 7.5%) (Regulation of the Council..., 23 July 2013).

5. NATIONAL DISTRIBUTION SUBSYSTEM

In the period from 2010 to 2018, wholesale of liquid fuels in Poland relied on services of companies buying fuels produced in the country or abroad and reselling them to subsequent intermediaries. According to the Polish Energy Regulatory Office, the most frequent model was participation of at least two entities in supply chain before the end user. The retail of transport fuels was conducted both at petrol stations and liquefied gas stations. Liquid fuels were transported to the wholesale and retail markets using restricted sections of product pipelines, supported by storage and handling infrastructure as well as rail and road transport. Services in transfer and storage of liquid fuels were provided by PERN S.A. Additionally, an important role on the market of logistic services belonged to specialised entities operating under the brands of PKN Orlen S.A. and Lotos S.A.

At the end of the analysed period, 9448 filling stations selling at least one type of fuel operated in Poland. Products sold by these entities were mainly motor gasoline, diesel fuel and LPG (in 2018 sales of these three types of fuel was 66.0% of all sales, considering only motor gasoline and diesel fuel – 83.3%, LPG 12.6%). Almost half of the diesel fuel sales to end users took place outside commercial filling stations and were carried out at industrial

and container filling stations belonging to fuel recipients (*Paliwa ciekłe*, access on 10 Oct 2019). Considering the geographical structure of sales at filling stations in 2018, 5 regions of Poland surpassed total sales in the rest of the country. These were: Mazovian Voivodeship (15.0%), Silesian Voivodeship (12%), Lower Silesian Voivodeship (10%), Greater Poland Voivodeship (9%) and Lesser Poland Voivodeship (8%). Considering the capital criterion, 29.4% of filling stations belonged to Polish companies, 19.5% were run by international corporations, while independent operators owned 48.7% (*Przemysł i handel...*, 2019). As regards particular ownership structure, the highest number of stations belonged to PKN Orlen S.A. (23.0%). Lotos S.A. owned 6.4% of stations. The most significant foreign corporations were BP Europa SE - Polish branch (running 7.1% of filling stations), Shell Polska Sp. z o.o. (5.4%) and Circle K Polska Sp. z o.o. (4.5%). In the analysed period, the number of filling stations belonging to retail chains increased (in 2018 their proportion reached 2.5%). The three major retail chains were: Auchan Polska Sp. z o.o., Tesco Polska Sp. z o.o., Carrefour Polska Sp. z o.o. with the total of 95 out of all 192 filling stations run by chain stores (*Paliwa ciekłe*, access on 10 Oct 2019). In the segment of independent chain filling stations, the highest growth rates were recorded by Moya, Huzar and Aviva (*Przemysł i handel...*, 2019).

The filling stations market shifted in the analysed period towards the shopping and services centre model. It means that petrol stations offered not only the possibility to fill up the car, but also to do basic shopping, take a rest during the travel, use financial services, have a snack or perform simple maintenance or repair. Major determining factors were large-scale road investments, changes in location, acquisition by Polish corporations and independent networks. Poland's Sunday trading ban also largely contributed to the dynamic growth of these facilities.

At the end of the analysed period, Polish corporations still operated under four brands (PKN Orlen S.A. – Orlen, Bliska, Lotos S.A. – Lotos, Lotos Optima). It must be explained at this point that recent policy of Polish fuel corporations shifted towards unification of brands and offering a new standard of customer experience.

The offer of filling stations included normal and premium fuels. Sales of premium fuels, under own names given by individual operators, were mainly driven by fuel corporations. A small part of that market was also supplied by independent vendors. In the analysed period, sales of premium quality fuels was largely affected by their prices and season of the year. At the end of the described period, their share (both for motor gasoline and diesel fuel) was 7.0% in total sales (*Przemysł i handel...*, 2019).

Non-price factors have been gaining significance in the recent times. Customer loyalty programmes have appeared in the offer of filling stations. Loyalty cards have been addressed to various groups of enterprises. Beside cashless payment possibility, they offered many other functionalities, from mobile application, collective invoicing and deferred payment to highway toll payment. These programmes also enabled cashless payment at filling stations abroad.

In the analysed period both wholesale and retail prices of fuel were high. As in the previous years (2013 to 2016), at the end of the analysed period, prices of standard transport fuel maintained at the level of PLN 5 a litre. Most frequently, the price of motor gasoline exceeded the price of diesel fuel. These relation reversed towards the end of the analysed period. In comparison with the EU prices, the average price of BS95 in Poland was around 87.0%, while ON (EN590) 93% (*Przemysł i handel...*, 2019). Variability in prices of selected liquid fuels in Poland in the period from 2006 to 2018 are presented in Figures 3.

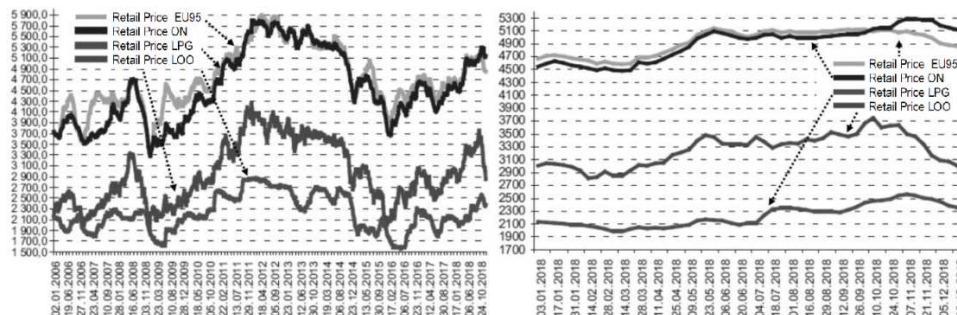


Fig. 4. Liquid fuel prices in Poland in the period from 2006 to 2018 [PLN/1000 litre]

Source: (*Przemysł i handel...*, 2019).

At the end of the analysed period, prices of liquid fuels in Poland were not adjusted by the Energy Regulatory Office. They were set according to the market rules, based on the so-called import parity, major components of which were prices of crude oil and ready-to-use fuels, US dollar exchange rate and tax rates in Poland. The price structure contained the following fixed components: excise (in 2018 – 24% of price on average for diesel fuel, 31% for motor gasoline and 17% for LPG) and fuel surcharge (BS 6%, ON 3%, LPG 4%%), as well as variable components, including VAT rate (19%), margin (BS 3%, ON 2%, LPG 9%%) and net price (BS 44%, ON 49%, LPG 51%). Retail price determinants in different regions of Poland remained unchanged in the recent period. Of course, documented demand and the scale of competition between operators were crucial (*Przemysł i Handel naftowy 2018...*, 2019). The regions where fuel prices reached the highest levels at the end of the analysed period were: Mazovian, Lesser Poland, Subcarpathian and West Pomeranian Voivodeships (*Przemysł i handel...*, 2019).

6. CONCLUSION

High degree of geographic and subject concentration of oil accumulations and reported fuel demands is observed on the global petroleum market. There are large geographical distances between the site of production and the place of highest consumption. Significant petroleum resources are located in areas with reduced social and political stability, which affects the safety of supplies. However, global output and consumption levels remain stable. The largest petroleum producers restrict supply. In developing countries, a close relation between the economic growth and increasing fuel demand is observed. Highly industrialised countries are characterised by stable usage of individual fuels. There are large fluctuations in oil prices on global commodities markets, which results in uncertainty. Non-economic factors are among the major price determinants. Despite this situation, the degree of geographical and subjective diversification of petroleum supplies to individual countries is varied.

In Poland, the capacity of documented oil inventories is limited in relation to the reported demand. It results in a strong dependency from import of petroleum. Oil supply is still at risk in Poland, due to a strong relationship with a single unpredictable producer. It should be noted that Poland has a well-developed logistic infrastructure, that enables transport of oil from multiple directions. The Polish petroleum sector is dominated by local

entities. However, limitations in supply of selected products are not uncommon. Liquid fuels are delivered to the wholesale and retail market using a limited transfer network, with significant participation of rail and road transports and support of storage facilities. The retail market of liquid fuels is quite flexible. Strong market competition of Polish and foreign entities is reflected in the prices and non-price offerings. The prices of individual types of fuel are still high in Poland and they are set according to the market rules. Additional price determinants include local demands and scale of competition between suppliers.

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