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OIL INDUSTRY AND TRADE



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DEAR READERS,

the past year was one of the most difficult for the fuel industry in years. Businesses were operating in a new regulatory environment, including the implementation of the mandatory electronic delivery document or the 'Polish Deal'. At the same time, preparations were being made for challenges of a systemic nature, such as the mandatory use of the National e-Invoice System, the Central Register of Excise Goods, the expanded SENT system, etc. However, no legislation has had such an impact on the fuel business as the war across our eastern border.

On 24 February 2022 the attack on Ukraine caused Russia to lose the remnants of its credibility as an economic partner. Reaching agreement at EU level on sanctions was difficult because of the dependence on energy resources from the East.

It was much quicker to introduce restrictions under national law. At the end of April, on the basis of a Polish law, Novatek Green Energy Sp. o.o., an important supplier of autogas in Poland, was subject to sanctions targeting entities supporting aggression in Ukraine. As a result, a number of rail tankers with gas belonging to this company were blocked. This caused market turbulence, which was only calmed down after several months.

In June, an embargo on oil and fuel imports from Russia was enacted as part of the EU's VI package of sanctions, yet their entry into force was delayed. On 5 December 2022, offshore oil supplies were halted, which did not adversely affect the global market. On 5 February this year, the EU fuel import embargo came into force, which also did not disrupt supply in the European Union.

In the oil sector, the war against Ukraine mainly caused a diversion of oil and fuel supplies, which had a significant impact on fuel prices. European countries were affected particularly hard, as the refineries located there were unable to meet all of the region's fuel needs. In addition, last year saw an unusually high number of shutdowns and unplanned breakdowns, and in the autumn the whole Europe could feel the effects of strikes by workers of the energy sector in France. As a result, there was a fuel deficit in the European Union and increasing volumes were imported from distant countries

Fortunately, outside Europe, refineries are producing sufficient volumes of fuel, which might be delivered to us. Though the global market allows for the easy purchase of large volumes of oil and fuels, transporting them and distributing them in retail trade face significant logistical challenges. While most European sea terminals have adequate infrastructure to receive and unload large vessels with oil and finished fuels, Poland, unfortunately, has significant limitations in this respect.

Nonetheless, it should be stressed that the production of the two refineries, in Płock and Gdańsk, is not able to meet the entire domestic fuel needs. This means the need to import finished fuels from abroad. Only half of the missing volume can be imported by sea. A key role is played here by the terminal in Dębogórze, located in the port of Gdynia, which, for the time being, cannot be entered by large fuel tankers. Additionally, the full capacity of the terminals cannot be used due to logistical circumstances, in particular bottlenecks in rail traffic and the lack of an adequate number of rail tankers. The remainder of the finished fuel deficit has to be supplied by rail and road from neighbouring countries, primarily Germany, where diesel shortages also occur.

An important factor influencing the fuel balance in Poland, and consequently their prices on the domestic market, will be the development of the situation in Ukraine, whose market is largely supplied with fuel from Poland.

The experience of the last year confirmed the need for further investment in fuel infrastructure in Poland and the rationality of the decision to diversify supply sources. The industry's orientation towards the country's energy security has resulted in a minimal impact of the aftermath of the war against our eastern neighbour on the Polish consumer. The challenges of the energy transition, and in particular the preparation for the implementation of the European Green Deal, still remain relevant. The industry is aware of the ongoing changes, even if the role of fossil fuels has temporarily increased due to the current geopolitical situation. The war against Ukraine has provided additional arguments to justify the development of green transport and the gradual shift away from fossil fuels in the long term. The energy transition will have a huge impact on society as well as the economy. Cross-sectoral dialogue is therefore worthwhile in order to work out how best to implement the changes.

We recommend the 'Oil Industry and Trade 2022' Report and hope you will read it with interest.

Leszek Wiwała President & Director General

Jesek Himan R. Sterzec

Krzysztof Starzec Chairman of the Board of Directors



STRUCTURE OF THE ORGANIZATION GENERAL MEETING BOARD OF DIRECTORS

Supervisory body appointed by the General Meeting for a three-year term of office. Current term of office is: June 2022 – June 2025.

Krzysztof Starzec	– Circle K Polska Sp. z o.o.
	Chairman of the Board of Directors
Bogdan Kucharski	– BP Europa SE
	Vice-Chairman of the Board of Director
Krzysztof Strzelecki	– AMIC Polska Sp. z o.o.
Rafał Pietrasina	– ANWIM S.A.
Armen Konrad Artwich	– PKN ORLEN S.A.
Rafał Miland	– PERN S.A.
Ireneusz Nieznański	– Shell Polska Sp. z o.o.
Katarzyna Mazurek	– Slovnaft Polska S.A.
Rafał Galli	– TotalEnergies Marketing Polska Sp. z o.o.
Robert Brzozowski	– UNIMOT S.A.

MANAGEMENT BOARD

CHAIRMAN-DIRECTOR GENERAL – appointed by the Board of Directors for a three-year term of office. Leszek Wiwała – since 14 June 2019

OFFICE

Krzysztof Romaniuk Joanna Lewandowska Nadia Rybczyńska

Jan Strubiński

- Director of Fuels Market Analysis
- Office Manager
- Senior Specialist on communication, safety and environment
 - Senior Specialist on taxes and lubricating oils market

THE REPORT USES THE FOLLOWING CONVERSION VALUES:

1 barrel of crude oil (1 bbl) = 159 litres

1 tonne of crude oil = 7.26 bbl

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 1ST QUARTER OF 2022:

Petrol	0,743 Mg/m ³
Diesel	0,833 Mg/m ³
Light fuel oil	0,830 Mg/m ³
LPG	0,543 Mg/m ³

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 3RD QUARTER OF 2022:

Petrol	0,748 Mg/m ³
Diesel	0,834 Mg/m ³
Light fuel oil	0,829 Mg/m ³
LPG	0,540 Mg/m ³

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 2ND QUARTER OF 2022:

Petrol	0,741 Mg/m ³
Diesel	0,832 Mg/m ³
Light fuel oil	0,829 Mg/m ³
LPG	0,544 Mg/m ³

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 4TH QUARTER OF 2022:

Petrol	0,748 Mg/m ³
Diesel	0,834 Mg/m ³
Light fuel oil	0,827 Mg/m ³
LPG	

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THE IMPORTANCE OF THE FUEL SECTOR FOR POLAND'S ENERGY SECURITY IN THE ERA OF THE WAR AGAINST UKRAINE AND THE ENERGY TRANSITION

The war against Ukraine made the global oil market and the European fuel market highly volatile in 2022. Quotations fluctuated widely and frequently. The fluctuations were linked to speculations about future sanctions on Russia, supply chains were broken, and there were fuel shortages at filling stations in some EU countries. Global oil production was balancing with demand. In crisis situations members of the International Energy Agency balanced the market from strategic stocks. Last year the United States of America played a special role in stabilising the refinery crude market, supplying as much as 180 million barrels of oil from its reserves. This helped to reduce the price of crude oil and consumers around the world were less affected by the war against Ukraine.

On 5 December 2022, the European Union halted offshore oil supplies from Russia. At the same time, a maximum price cap on oil transported by tankers from third countries (non-EU and G7) was introduced. On 5 February 2023, the EU embargo on oil fuel imports from Russia came into force. Currently, the situation of the oil sector is stable, despite projected increases in global oil consumption. Contrary to fears, the fuel industry in the EU has prepared well for the implementation of sanctions. The Polish oil and fuel market is also in a good position. At the beginning of February 2023, supplies of Russian oil via the northern section of the Friendship Pipeline fell to such a low level that they could be replaced by several tankers within a month. Taking into consideration the existing infrastructure, this does not pose a major logistical challenge. When the unannounced stoppage of supplies by the oil pipeline from Russia occurred on 25 February 2023, there was no turbulence on the Polish market.

ON 5 DECEMBER 2022, THE EUROPEAN UNION HALTED OFFSHORE OIL SUPPLIES FROM RUSSIA

The excess of fuel supply (especially diesel) over demand in Poland is evidenced by price trends in February. Within a month of the fuel embargo coming into force, the average retail price of diesel fell by more than PLN 0.5 per litre. At present, there are no grounds to expect major market disruptions or sharp price increases in the coming weeks. The fuel sector is taking measures on an ongoing basis to increase the country's energy security. In the public debate, the question of when we can possibly expect the conditions of the fuel market in Poland to deteriorate is being asked.

The latest forecasts of the International Energy Agency predict that the daily demand for oil this year may increase by as much as 2 million barrels compared to last year, while the daily supply is likely to increase by only 1.2 million barrels. The IEA experts, however, do not forecast any problems with the oil supply-demand balance, at least in the first half of 2023. Further developments in the global market will largely depend on the degree of development of a powerful oil consumer such as the Chinese economy, the health of which is in question.

RUSSIA: A THREAT TO PEACE

When analysing the area of security (including energy security), it is first worth discussing the actions of the Russian Federation. It is the largest state in the world, a nuclear power with, among other things, very rich natural resources and a large army. This does not change the fact that, until recently, Russia has been an important economic partner for many Western companies, despite a severely tarnished reputation by the aggression against Ukraine in February 2014 and the attacks against civilians in Syria since 2015. The war that has been going on for more than a year across our eastern border has changed the world irrevocably and today it is difficult to predict all the consequences of this conflict. Without any doubt Russia has already lost the remnants of its credibility as an economic partner.

It was not easy to break economic relations with Russia due to its importance in the global market for energy raw materials. To many decision-makers from different countries, it seemed impossible to stop economic relations with that country. Before the outbreak of war against Ukraine, Russia was the world's third largest oil producer (after the United States and Saudi Arabia). Its daily production was over 10 million barrels, half of which was for export. This

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gave it second place in the list of oil exporters (after Saudi Arabia). Indeed, 27% of the EU's oil imports came from Russia. At the same time, it was also in second place in terms of the volume of fuel exports, with more than 21% of diesel imports to the Community market. In addition, Russian natural gas accounted for more than 45% of EU imports and coal for nearly half.

One of the reasons why the European Union has become so dependent on Russian energy resources is due to the Kremlin's strategy, consistently pursued for several years. Oil and gas transmission infrastructure was being developed. At the same time, the Federation promoted its image as a reliable supplier of cheap raw materials, which could be imported into the EU in large quantities without major logistical problems. As a result, financial revenues from the oil and gas sector accounted for more than 40% of the Russian budget. Meanwhile, steering the direction of raw material supplies and spot investments in elements of the EU's critical infrastructure gave the authorities in Moscow the tools to exert political influence over some European countries.

As part of the Russian strategy, two lines of the Nord Stream Pipeline were built on the Baltic Sea bed

(the so-called Nord Stream I and Nord Stream II), and the South Stream Pipeline a well as the TurkStream Pipeline were expanded. These investments gave Russia the opportunity to supply gas directly to Western Europe, bypassing the central part of the continent altogether. Simultaneously, terminals for the shipment of oil and fuels in the Baltic ports of Primorsk and Ust-Luga and in the Black Sea port of Novorossiysk were expanded. These three ports were able to handle all fuel exports in the western direction, without the use of the Friendship Pipeline system.

The Federation had no qualms about taking advantage of its position in Europe. Russia's disruption of the European gas market in the second half of 2021 can be seen as an example of this. In this context, it seems that the chloride contamination of the oil in the Friendship Pipeline in April 2019 was not an unfortunate accident. The Russians then simply checked the functioning of the Polish mandatory reserve system. For 46 days, no oil flowed through the pipeline at all. The restoration of supplies took place gradually. The reserves were enough to ensure that drivers refuelling at Polish filling stations did not suffer from the chloride crisis.





LAST YEAR'S INDUSTRY STRUGGLES DEMONSTRATE THE IMPORTANCE OF LOGISTICS

The importance of transport and logistics to the market can be seen when there are disruptions to the fluidity of demand or supply. Last year many drivers, fearing price spikes or fuel shortages, bought fuel to spare, often filling up in tanks that did not meet basic technical requirements for storing liquid fuels. On that fateful Thursday, sales at most stations in Poland were several times higher than the average for the preceding week.

Panic-buying caused supply chains to break down. Although fuel was plentiful at refineries and depots, it was not physically possible to transport all the missing volumes to retail outlets. Only extraordinary measures, such as periodically extending drivers' working hours, optimising and intensifying fuel supplies, including bringing in additional drivers and tanker trucks from abroad and logistical support from the military brought the situation under control. At the same time, fuel production at refineries was increased and sales limits were introduced at some stations. Although retail sales were at a record high in the following days, the availability of petrol and diesel at filling stations was maintained.

DISTURBANCES ON THE LPG MARKET

On the basis of the Act of 13 April 2022 on special solutions on counteracting support for aggression against Ukraine and serving to protect national security(Journal of Laws, item 835), the Minister of Internal Affairs and Administration included the company Novatek Green Energy on the list of sanctioned entities. This meant that one of the leading suppliers of autogas to Poland lost its right to operate

LAST YEAR, THE DOMESTIC FUEL MARKET WAS AFFECTED SEVERAL TIMES BY RAIL LOGISTICS

in our country overnight. The said decision came into force on the day it was published. Although other LPG suppliers could be found without too much trouble, the market was sorely affected by the absence of several hundred rail tankers with gas of the sanctioned company.

Although the Head of the National Revenue Administration fairly quickly issued a decision to allow the unloading of gas belonging to Novatek, its implementation started more than a month later, i.e. in mid-June. The operation lasted nearly three months, after which the market stabilised. In the meantime, in Poland there were many offers for LPG from different directions.

RAIL MARKET

Rail logistics plays a key role in the stability of the fuel market. It handles fuel imports from neighbouring countries and most of the deliveries from refineries and fuel terminals to storage depots, and even deliveries to some filling stations. One of the effects of the war across our eastern border has been the disruption of rail transport in Poland. Part of the humanitarian aid to Ukraine and deliveries of various equipment and materials, including fuels, were made by trains. Furthermore, the shipment of Ukrainian grain to Polish ports and imported coal shipments were also carried out by rail with very high priority. The above had a negative impact on the operational capacity of companies that served the fuel market.

In the middle of the year, a significant proportion of diesel supplied to the Ukrainian market came from Poland (34% of deliveries). This support was at the expense of long delays in rail shipments in Poland, where there was a shortage not only of gas tankers (due to sanctions on Novatek), but also of tankers for the transport of fuels and biofuels. It is worth noting that, at the same time, retail sales of fuels in Poland were at a record high. Fortunately, it was actually possible to handle all the increased demand. At the end of August, the situation improved, among others because of the fact that other Member States increased their support for Ukraine.

Last year, the domestic fuel market was affected several times by rail logistics. The most difficult situation was witnessed at the beginning of October. At that time, several unfortunate circumstances coincided with repairs to important railway lines, which are access routes to fuel depots. Diesel tankers had to wait in the roadstead and rail tankers had to wait in a railway siding. Fuel levels at some depots dropped alarmingly, but it was possible to supply fuel from other sources and drivers had no cause for concern. Last year's experience shows how important it is for the sector to manage rail logistics efficiently, especially as there are still many challenges in this area.







UNSTABLE REGULATORY ENVIRONMENT

The tense geopolitical and macroeconomic situation creates legislative risks in the form of sudden regulatory actions that are not consulted with the market and can generate significant costs for companies. It is impossible to predict how long the war against Ukraine will last and thus how deep the economic and energy crisis associated with it will be. Faced with the risk of stagflation in Poland and other European countries, the authorities sometimes adopt legislative measures that do not always take into account the complexity of the fuel market.

The excess profits levy is one prominent example of such legislation, which was ultimately not adopted. At the end of September 2022, Deputy Prime Minister Jacek Sasin announced that it would be introduced. The media reported that it was to account for as much as 50% of excess profits, in various configurations. Ultimately, the government decided to adopt solutions with an adequate effect, which were not explicitly extended to the fuel industry. The debate around this issue continues to emerge, with businesses lacking a sense of certainty about the law and fiscal policy.

There are many other legislative areas that have a significant impact on the functioning of the fuel market. In this group, it is worth mentioning the changing principles of accounting for biocomponents, which, due to the high penalties for failing to meet the National Biofuel Target, have a significant impact on fuel sector companies. Just before the outbreak of war against Ukraine, the government presented the draft act amending the act on biocomponents and liquid biofuels and some other acts (UC110). It implemented the RED II Directive and contained many proposals, the implementation of which would be very costly for the industry, and ultimately for consumers. On the one hand, the attempt to comprehensively agree on all the necessary regulatory elements proved to be too big a challenge for the drafters. On the other hand, a lack of legislative change would mean negative consequences for agriculture, biofuel producers and the fuel industry¹. Meeting the level of the mandatory share of biocomponents would, in theory, only be possible with the use of significant quantities of advanced biocomponents, enabling the double NBT fulfilment rate. Such biocomponents would have to be imported from abroad. This would cost the sector several billion PLN.

¹ No change to the legislation would mean a reduction in the scale of use of the substitution charge mechanism in the NDC (from 20% in 2022 to 15% in 2023), with the expiry of the reduction factors supporting domestic agriculture, would make it essentially impossible to meet the legally binding targets. The actual level of the mandatory NBT is to increase from 5.7% in 2022 to over 7.5% in 2023 (this would be the largest surge in this obligation ever).



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Fortunately, the Ministry of Climate and Environment carried out the legislative process of the so-called 'Bridge Act' (Sejm Paper No. 2541), which introduced mechanisms to make the biocomponent obligation more realistic for 2023. Such an action was necessary for the time being. Nevertheless, the industry needs long-term solutions which take into account the realities of the fuel industry's business in Poland, including the scale of costs that fuel companies incur each year due to successive legislative requirements.

As a word of caution, it is worth mentioning that record high fuel prices are causing advocates of official price capping to come to the fore. Such a measure was introduced in Hungary and it led to a fuel crisis. Although the Hungarian refinery was theoretically able to meet the country's needs there, intensified fuel tourism significantly increased the demand for fuel, leading to shortages at the stations. Eventually, the price cap on fuel was lifted. As a result, petrol and diesel prices rose by around 40% virtually overnight. In Poland, too, there were calls or the implementation of such solutions, also at the parliamentary level, but fortunately they were not implemented.

SANCTIONS

Of all the regulations with a significant impact on the fuel sector, last year the most important were undoubtedly the sanctions legislations imposed on Russia.

In the first months of the aggression, the lack of agreement at EU and G7 level on an embargo on Russian oil and fuels made markets very vulnerable to speculation. Shortly after the outbreak of war, many western countries abandoned their purchases of Russian oil. Lithuania did so in April, the UK in May, Finland in August and France in September. Several Asian countries also decided to abandon imports² and so did Australia. Many oil companies ended cooperation with Russian suppliers.

On 5 June 2022 the Council of the European Union decided to ban the purchase, import and transfer of oil and certain petroleum products from Russia to the EU. The deadline for EU countries to become independent from Russian oil was set for 5 December 2022, and for refined petroleum products it was 5 February 2023. At the same time, a temporary derogation was introduced for oil brought by pipeline to EU countries

² Thailand in April, Malaysia and Singapore in July.

that, due to their geographical location, are particularly dependent on Russian supplies and have no viable options for securing alternative supplies of oil. Bulgaria was granted a temporary derogation for the import of Russian oil transported by sea, and Croatia for the import of diesel.

What is more, on 2 December 2022 the Council of the European Union decided to implement a price cap on Russian oil at USD 60 per barrel. On the same day the decision was endorsed by the G7 countries and Australia. The cap, which took effect from 5 December, applies to tanker owners and insurance companies based in the EU and G7 countries. These entities control more than 90% of the global freight market and its insurances. According to the International Energy Agency, in January this mechanism resulted in a 30% drop in Russian revenue³.

The EU's ten sanctions packages are already being felt strongly by the Russian oil sector, and the economic importance of these restrictions is likely to increase over time. The restrictions include a ban on investment in Russia's energy sector and the supply of technology important for the development of the refining industry.

International sanctions and the business decisions of individual oil companies have changed the direction of Russian exports. There was a decrease in sales to the EU countries⁴ and an increase to non-EU ones. India has become the main customer for Urals oil, followed by Turkey and China. The trade itself can generate unusual problems for Russian exporters. For example, a 33-fold increase in oil shipments to India is settled in rupees, in line with the Kremlin's policy of no longer transacting in dollars. The problem is that settlement in rupees outside India is severely restricted. In this situation, Russian companies do not have the opportunity to effectively use the money earned from trade with India.

It should be taken into account that, in the long term, new export destinations will not be able to absorb all Russian oil. More importantly, this crude will be used to produce fuels that will compete with Russian diesel. In addition, it is worth bearing in mind that Russia's so-called 'ghost fleet' of obsolete tankers is capable of carrying oil, but is not equipped to transport fuel. This means that Russia's refining sector will have to reduce its production, which will exacerbate its already compromised financial condition.

INTERNATIONAL SANCTIONS AND THE BUSINESS DECISIONS OF OIL COMPANIES HAVE CHANGED THE DIRECTION OF RUSSIAN EXPORTS

WAR AND CLIMATE POLICY

With the outbreak of war and rising energy prices, voices were raised in many EU countries to put the Green Deal on hold. However, the European Commission, together with the majority of Member States, decided to consistently pursue the course once chosen, as it not only serves the fight against global warming, but is also intended to benefit the EU's energy security.

At the end of 2022, the European Parliament and the Council agreed on a new design for the EU Emissions Trading System (EU ETS). Industries so far covered by the system should reduce CO2 emissions by up to 62% by 2030. Extended number of free allowances withdrawn from the market each year: this is to become the mechanism, the aim of which is to increase emission reduction ambitions. What is crucial for the fuel sector is that in 2027 there will be a new emissions trading system (ETS II), which will cover housing and transport. This will virtually generate increased costs for the fuel sector.

In October, the European Commission, the Council of the European Union and the European Parliament reached an agreement on carbon dioxide emission standards for passenger and commercial vehicles. It was agreed that from 2035 passenger cars and vans could only be placed on the EU market with a 100% emissions reduction requirement.

In practical terms, this means a ban on the sale of new cars with an internal combustion engine⁵. According to the European Commission's plans, the economic importance of the liquid fuels market will be severely marginalised several years after the introduction of this mechanism.

³ https://www.bankier.pl/wiadomosc/Szef-Miedzynarodowej-Agencji-Energii-Limit-cen-na-rope-uderzyl-finansowo-w-Rosje-8484355. html (access: 9.03.2023).

⁴ The European Union was the largest market for Russian oil before the outbreak of war against Ukraine. According to data for 2021, total Russian oil sales to EU countries amounted to 105 million tonnes. This was close to 50% of Russia's exports of this commodity. ⁵ However, formal adoption of the legislation has not taken place yet. Media reports suggest that the German government may

have withdrawn support for the controversial idea - T. Sewastianowicz, Are Diesel and petrol engines to stay?

Sensational turn of events in Brussels, 4 March 2023 https://auto.dziennik.pl/artykuly/8673705,silnik-diesla-benzynowy-zakaz-sprzedazy-samochodow-spalinowych-2035.html (access: 8.03.2023).

POPiHN

INVESTMENT IN LOW-CARBON FUELS WILL ALSO IMPACT ENERGY SECURITY

Another important legislative element to fundamentally accelerate the move away from fossil fuels is the revision of the energy taxation directive. Declarations from the Spanish government, which will lead the Council from 1 July this year, indicate that an agreement should be reached by the end of 2023. The Commission wants to remove all excise exemptions for fossil fuels, which will have an impact on aviation and marine fuel prices. As autogas is extremely important for the Polish market, it is likely that the Polish government will attempt to obtain appropriate transition periods for its taxation as part of negotiations at EU level. Similar demands will also be made for the postponement of the elimination of tax exemptions for aviation and marine fuels.

It is worth noting that although work on legislative projects implementing climate policy at the EU level is progressing, at the same time fossil fuel subsidies are increasing worldwide. The International Energy Agency argues that, contrary to the findings of the Glasgow COP climate conference, countries all over the world are ineffectively promoting carbon-intensive fuels instead of limiting public interventions to only helping the poorest. Amid a global energy crisis triggered by the Russian invasion of Ukraine, the total of last year's financial subsidies for fossil fuels reached nearly one trillion US dollars. This was twice as much as in 2021 and almost five times as much as in 2020. These rising outlays were in contrast to the assumptions of global climate policy, built on the Paris Agreement or the European Green Deal. The said outlays show the real challenge faced by climate policy. It is difficult to implement long-term legislative packages aimed at reducing the consumption of cheap, readily available energy resources when, in numerous countries around the world, people do not meet their basic energy needs.

Investments in building a low-carbon economy require a stable legal framework. Without financial support, it will be difficult to develop alternative fuel technology. To date, the high variability of EU law in this area hinders the strategic development of this sector. Investments in modern biofuels or synthetic fuels with high emission reduction rates, recommended by Brussels for years, now appear to be largely outdated. Currently, according to the European Commission's assumptions, electrification is to be the main tool for 'greening' transport. This means that Poland with its 'black' (coal) energy mix has more catching up to do in this race.

Climate policy is built on the current state of knowledge in climate change research. In the long term, the proposed legislation is expected to lead to price increases for fossil fuels, in particular petrol, diesel or LPG. The energy crisis related to Russia's actions, the disparity in the wealth levels of societies within the EU, the large share of coal in the energy balance and the recession that is likely to come, will mean that the development of a low-carbon economy in Poland may lag behind that of western countries. However, there is no turning back from the direction of changes. Importantly, investment in low-carbon fuels will also impact energy security. These effects will not be achieved overnight, they must be worked for over years. The war against Ukraine is another argument for moving away from technologies that power transport with fossil hydrocarbons, of which we do not have adequate resources.

FUEL SECTOR IN POLAND DEPENDENT ON FOREIGN SUPPLIES

Poland has insignificant oil deposits. Its domestic production satisfies just over 3% of the raw material processed by the refineries in Płock and Gdańsk, while the remaining nearly 97% is imported from abroad. Although global oil consumption is at a record high and continues to grow, there are several countries that are able to supply the market relatively quickly with volumes of crude oil to mitigate the effects of the decline in Russian production. As of 2023, the main supplier of oil to Poland is Saudi Arabia, which in 2021 accounted for approximately 16% of the oil supply to our country. Last year it was as much as 28%. This share is steadily increasing due to the extension of PKN Orlen's long-term contract with Saudi Aramco. Crude supplies from Norway, the UK, the US and Nigeria have also increased.

The situation in the fuel market is more complex as fuel prices in Europe rose more than crude oil prices last year. The reason was quite obvious. The 67 largest refineries in the EU (including the plants in Płock and Gdańsk) were not able to cover the fuel needs of the EU economy. Moreover, there were numerous shutdowns and unplanned breakdowns of such plants, and in the autumn the whole of Europe could feel the effects of energy workers' strikes in France. As a result, fuels in the EU were a scarce commodity and increasing volumes were imported from distant countries. Besides, the capacity of Polish refineries is insufficient to cover our fuel needs. In 2022, imports were required

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to balance the domestic market, which for diesel was 32% of sales, for petrol 24%, and for LPG as much as 89%. Fortunately, a number of new refineries are coming on stream in various parts of the world, eager to supply their products to Europe.

Poland's heavy reliance on oil and fossil fuel imports is an exposure to risks that can be mitigated. From a strategic perspective, the gradual electrification of transport and the development of low-carbon fuels, especially those that we can produce with our own resources, are in Poland's interest. The fuel industry is aware of the changes underway. Even if the role of fossil fuels has temporarily increased due to the current geopolitical situation, in the long term the process of greening transport and moving away from fossil fuels has just found additional justification and is expected to accelerate. The scale of the impact that this change will have on society and the economy is difficult to estimate today, which is why it is so important for this issue to remain on the expert agenda. The 'Green Transport: Current State and Prospects' report, prepared by POPiHN in cooperation with industry partners and research centres, is an example of active participation in the debate on the new transport model.

SITUATION OF OUR COUNTRY VERSUS NEIGHBOURING COUNTRIES

Large quantities of oil and fuels can easily be purchased on the international market, but transporting them and marketing them at retail is a major logistical challenge. With long distances, it is most profitable to import oil and fuels with the largest tankers (with a minimum capacity of 100,000 tonnes). This is particularly relevant in the light of significant





 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$

increases of freight costs. In this context, it should be mentioned that European ports have adequate infrastructure to unload large oil tankers.

Poland is in a particularly favourable position thanks to the oil terminal in Gdańsk (Naftoport) built in 1975. Work on the diversification of oil supplies in Poland has been carried out since the late 1980s. The expansion of the port in Gdańsk served this purpose, as a result of which Naftoport is capable of receiving

POLAND HAS A FAIRLY EXTENSIVE NETWORK OF PIPELINES TRANS-PORTING CRUDE OIL AND FINISHED PRODUCTS WITH A TOTAL LENGTH OF NEARLY 2,500 KM 36 million tonnes of oil per year. Currently, all of the crude for the refineries in Gdańsk and Płock is imported by sea. Its surplus can also be sent to refineries in eastern Germany (Schwedt and Leuna). Naftoport is also equipped with facilities for unloading fuel tankers with a total unloading capacity of up to 4 million tonnes of products. Furthermore, we also have 5 fuel terminals in Poland (1 in Gdynia connected to the fuel depot in Dębogórze, 1 in Świnoujście and 3 in Szczecin).

In theory, the total throughput capacity of the fuel terminals alone should easily be sufficient to bridge the gap between domestic production and demand. In practice, this is not so easy when the large fuel exports from Poland to Ukraine are included in the balance of the domestic market. After taking into account infrastructural constraints (including rail bottlenecks), only half of the missing volume can realistically be imported by sea. The rest is imported by rail or road tankers.

It is worth noting that Poland has a fairly extensive network of pipelines transporting crude oil and finished products with a total length of nearly 2,500 km. However, for the safety of the fuel sector, the expansion of storage capacities has proved crucial in recent years.



The 'PERN Megainvestments' programme is particularly noteworthy. It has been ongoing for four years and it concerns storages with a capacity of as much as $830,000 \text{ m}^3$.

If Poland is to fulfil its role as a fuel hub and continue to actively support Ukraine, further expansion of fuel storage capacity is advisable, as well as investment in railway network.

What should be considered is a return to the idea of the Odessa-Brody-Gdańsk pipeline. The destruction

of Ukrainian refineries by the aggressor in the first days of the war speaks for itself: in addition to the oil pipeline, a fuel pipeline and fuel depots may be built in eastern Poland for the Ukrainian market. In this regard a lot depends on political decisions. The basic problem, however, is the timing and sources of funding for these investments. Oil pipelines, product pipelines or fuel depots cannot be built at a moment's notice. Such investments require many years.

CONCLUSIONS:

In Poland, the EU and worldwide, the use of oil currently plays a key role as the most important source of primary energy used to power transport. It is a factor which enables economic development. Relatively inexpensive fuels and their reliable supplies are essential elements of a vision for the future. Liquid hydrocarbons are products with a unique energy density; they are easy and safe to store, transport and use. It seems that in the short term, there is no single technology which, especially in Polish conditions, could replace fuels obtained as a result of processing crude oil. Nevertheless, the share of alternative fuels (including electricity) should increase. It will be, however, more difficult to replace diesel used in maritime transport, aviation and heavy-duty vehicles.

Recent years have been full of challenges, from which the fuel industry has emerged unscathed. This allows us to draw positive conclusions about the correctness of the processes in place and the efficiency of the mechanisms implemented to safeguard market stability. The experience of the past year has confirmed the validity of every zloty invested in fuel infrastructure and the rationality of decisions to diversify supply sources. The industry's orientation towards the country's energy security has resulted in a minimal impact of the effects of the war against our eastern neighbour on the Polish consumer.

Poland's strategic goal should still be to diversify its sources of supply of energy raw materials and technologies for the production, processing and storage of energy, in order to achieve independence from any single source and maintain technological flexibility. Over the past 20-plus years, many steps have been taken to meet this goal. For several years, Russia has sought to make Western Europe dependent on its energy resources to the extent which would give this country a real opportunity to influence EU policy. Fortunately, this plan has not been fully realised, because, among other factors, the time of fossil fuels may be coming to an end sooner than anticipated. The struggle for energy security is still ongoing and requires a lot of work in order to effectively break the dependence on the Russian economy, especially on the supply of energy resources.

The next few years will be very difficult for many EU Member States, including Poland. The prices of heating, electricity and transport fuels will be significantly higher than a year ago. Expensive energy will force some changes in consumer behaviour and thus, in the medium term, may contribute to accelerating the energy transition. The poorest will feel this most painfully, and social pressure will probably force those in power to introduce mechanisms to compensate for or reduce the scale of energy poverty.

Poland's strategic challenge will be to achieve a high degree of diversification of energy resources, including crude oil, which, for many years to come, will continue to play an important role as a raw material for fuel production. Ultimately, the transport sector will be largely powered by electricity from distributed RES (linked to various forms of energy storage), supplemented systemically by nuclear power plants. However, such changes are likely to take several decades.

THE RETAIL MARKET OF LIQUID FUELS IN 2022 FROM POLISH ORGANISATION OF OIL INDUSTRY AND TRADE (POPIHN) MEMBERS' POINT OF VIEW

POPiHN members' trading activity in the retail area provides the basis for systematic analysis of the fuel market in Poland. For this purpose, the Organisation uses data obtained from member companies and information from other sources, including the Ministry of Finance and customs administration, on the rest of the market as regards sales to end users. This allows changes and trends in the wholesale and retail segments of liquid fuel sales to be identified annually. The representativeness of the sample, on the basis of which changes in the market are assessed, increases as new companies join the Organisation and as the network of fuel stations administered by these companies expands. In 2022, the number of such facilities reached 4488. This number includes Slovnaft's partner stations. The stations acquired at the end of the year by MOL, previously owned by LOTOS Paliwa (a company spun off from the LOTOS Group), were also treated as stations of the POPiHN group. Overall, at the end of the discussed year POPiHN stations amounted to 57% of all filling stations operating in Poland, publicly available and selling at least 2 types of fuel, i.e. petrol and diesel. POPiHN companies thus gained 1 percentage point in the total filling station market structure in the country.

To estimate the approximate actual number of outlets, information provided by POPiHN member companies and a continuously updated database of liquid fuel infrastructure maintained by the Energy Regulatory Office have been used. Typically, trends observed at the largest fuel station operators are transferred to the facilities of the other market operators and, on this basis, changes can be traced for the entire sector as regards retail market. It was assumed that

FIG. 1 FILLING STATIONS MARKET IN POLAND [%]

Source: Energy Regulatory Office's and POPiHN's own data



some minor differences occur in the sales policies of individual operators, but general trends are rather consistent, irrespective of the size of the retail network. Smaller petrol station networks, or even individual operators, in order to stay in the market and compete with the largest must follow the changes imposed by the latter. In the formula adopted for the analysis, namely stations open to the public and selling at least petrol and diesel, there were almost 7.9 thousand of such stations operating in Poland at the end of 2022. In addition to this segment, there are also stations that sell, for example, either autogas or diesel only, but these were not considered in the analysis, although locally they may have an impact on the market.

The sample selected for the analysis covers 57% of the domestic filling stations market. The remaining facilities operating on the Polish market belong to operators not affiliated to POPiHN. Obtaining information on market performance from them is quite difficult, and often impossible. The assessment of the entire market is therefore an estimate made by transferring the results and experience of the largest operators to the rest of the market. It reflects trends more than the actual activities of smaller operators, especially those not affiliated in alliances or purchasing groups.

POPiHN members (excluding SLOVNAFT PARTNER stations) sold approximately 74% of total retail sales of petrol, approximately 54% of diesel and 42% of autogas in the country in 2022 through their filling station networks. This is 1 percentage point more than in 2021 for petrol, 3 percentage points more for diesel and 2 percentage points less for autogas. Such levels of share allow us to show the fundamental trends and changes taking place in the overall market for retail fuel sales and non-fuel activities carried out at facilities serving drivers and travellers. These activities, increasingly important for operators, include sales in shops located at filling stations. They also comprise a variety of ancillary services, such as small and large catering, leisure during the journey, charging of electric vehicles, financial services, basic maintenance and servicing of motor vehicles. The standards of service and scope of non-fuel activities implemented at the stations of the market leaders serve as a model to be followed by other companies in the sector. For operators not affiliated to the large networks, a kind of independence in terms of purchasing sources, form of service and adaptation to local customer expectations is valued. Nevertheless, under franchising regime, such loosening of rules is more difficult, and often impossible.

The most significant changes observed in 2022 in the retail fuel sales market and in the operations of stations in POPiHN members' networks are shown in Figure 2. Compared to the previous year, sales of standard fuels showed a significant increase. The opposite was true of the volume of premium fuels, for which the price level was a significant brake on purchases, causing strongly negative sales results. Autogas sales increased slightly in case of POPiHN





members. For independent companies, this market grew much more, taking advantage of lower prices and lower margins on its sale. The remodelling of the market in terms of station ownership continued, yet to a much lesser extent than a year ago, when the number of stations using franchises increased much more. However, there was still an increase in the number of stations under the brand names of POPiHN member companies. Those companies expanded the franchise formula (DOFO), but also there was an increase in the number of their own stations, often built from the scratch in new locations. Thus, market consolidation around the largest operators continued. Similar movements were also recorded in the independent segment around its largest representatives.

The segment of shops at filling stations continued to develop. The number of available facilities and their turnover increased. There was an increasing range of FMCG goods and those most needed by drivers and other customers in their daily shopping. The catering segment, which was returning to normal operations after a period of pandemic restrictions with an increasingly attractive offer, was being expanded. The investments being made are intended to ensure the maintenance of the filling station and decent wages for employees in the future, when fuel sales will be increasingly restricted as a result of the energy transition underway and the replacement of traditional fuels with alternative ones.

Despite the significant reduction due to prices, it was the major oil companies that led the way in premium fuel sales. They held both the right to their name as well as their chemical composition. This is also what some independent operators do by selling high-octane petrol and preparing their own grades of diesel with higher performance characteristics. In 2022, the dynamics of premium diesel sales at POPiHN member companies' stations decreased significantly more than the dynamics of standard fuel sales. As mentioned earlier, sales of enhanced fuels were not helped by large price differences between standard and premium types. In the case of diesel, the decline was mitigated by the effect of sales of winter-type fuels with a special chemical formula facilitating starting the car at low temperatures. On average, these fuels were 25 - 35 gr/l more expensive than standard ones, but the price level of standard fuels was sufficient enough to discourage the purchase of the premium type. In the overall retail petrol sales volumes of the POPiHN members the share of of premium type amounted to about 7%, whereas in the overall petrol market in Poland it was 5%. For diesel, these results amounted to around 11% in the POPiHN companies' sales and 5% in the total national market. Compared to the previous year, POPiHN members recorded a decrease in sales of P and D by around 344,000 m³ with total sales of these two fuel types of approximately 1.5 m. m³. Nonetheless, despite rising prices, there is a group of drivers who appreciate the performance aspects of refined fuels and thus are willing to buy them even at the expense of spending more than they would on the same amount of standard fuel.

POPiHN forecasts for 2022 assumed an increase in sales of standard 95 petrol and basic diesel. For the year as a whole, the assumptions turned out to be correct, although it is worth noting that the final result was achieved thanks to positive results in the Source: POPiHN's own data



first half of the year and at the very end of the year. In 2022, more standard fuels were sold at the stations of the Organisation's member companies than in the previous year. A similar trend was also recorded at other stations in the country. For POPiHN members, there was an almost 15 per cent increase in the volume of sales of basic motor petrol and a slightly more than 13 per cent increase in sales of standard diesel. For premium fuels, volume declines were the following: for motor petrol, over 23 per cent and for diesel, almost 18 per cent. Sales of autogas in POPiHN companies increased by only 0.5 per cent.

In 2022, POPiHN member companies expanded their fuel station networks mainly through the COCO + CODO segment and through DODO umbrella stations (which are also treated as franchised stations by some companies). However, the transformation of the overall filling station market was dominated by franchising. Greenfield facilities increased the number of COCO and CODO stations in conglomerate and independent operator networks.

The increased number of filling stations operated by POPiHN members resulted in an increase of around 2.5% in the number of shops operating within these stations. The growth in the number of outlets was also accompanied by higher sales at these facilities. The increase in the scale of turnover was observed in the total number of shops as well as the statistical single shop.

Aggregate sales in the turnover segment of POPiHN companies' forecourt shops increased by more than 20%, and the individual shop recorded an increase in the turnover by an average of around 16.5%. The higher revenues were mainly due to an increase in the prices of the items offered, but also to an expansion of the assortment and greater interest in catering services.



 $\left(\frac{n}{2} \right)$

FIG. 3 SALES OF MOTOR FUELS AT POPIHN MEMBERS' STATIONS IN 2022 [M³]

Source: POPiHN's own data



FIG. 4 CHANGES IN RETAIL SALES AT FILLING STATIONS IN 2022 [MONTH/MONTH AS %]

Source: POPiHN's own data



The effectiveness of the shop depends largely on the frequency of visits to the filling station due to refuelling of the vehicle. Such activity increased in 2022, compared to the previous year.

Figure 3 presents monthly retail sales at POPiHN members' filling stations [month/month as %] The periodicity of the sales increases is clearly visible. Furthermore, it was higher than in the individual months of 2021. The highest positive growth was recorded in February, March and April, followed by August and November. The smallest was in July and June, as the previous year's base was also highest in these months. The market behaved similarly for diesel and petrol. Autogas sales grew steadily until August. Then the trend reversed with a slight stabilisation at the end of the year.

In 2022, the highest sales growth dynamics, compared to the previous year, were recorded by POPiHN members' stations operating under the COCO+ CODO formula. It was 10% for three fuel types (petrol, diesel

and autogas). For DOFO stations the drop was 4% and for DODO it amounted to 7%. In the previous year, DOFO stations dominated in terms of sales volume growth. A greater increase in the number of own stations than stations in the other groups, as well as the periodic price bonuses offered mainly by own stations, had some influence on this result. Similar growth relationships as for all fuel types combined were observed for individual fuel types. Also in this breakdown the highest growth was recorded for franchised stations.

Average annual margins generated on retail fuel sales alone were at a lower level than in the previous year. The increase in fuel turnover had only a limited effect in compensating for these declines. This situation affected the amount of revenue generated by station operators – even despite good profits on fuel sales in the final months of the year. This forced facilities to intensify their non-fuel activities. The offer was aimed at drivers and travellers and, increasingly, at non-car people (particularly in urban areas). Margins were affected by frequent changes in supply prices. In order to retain customers, these had to be compensated by lower margins. The station's shop and food and beverage services have been the main profit-making elements of the overall facility for many years.

Changes in fuel sales at the stations owned by POPiHN member companies between individual months of 2022 are presented in the diagram in Figure 4.

The highest fuel sales dynamics of POPiHN members were recorded in February 2022. This followed massive purchases following Russia's invasion of Ukraine. The Polish market reacted with a slight panic, which was quickly brought under control, but the increased sales, compared to the same months of 2021, also continued in March and April. In the following months, the dynamics were already in single digits, yet remained positive all the time. A good result was also recorded in August – the traditional month of holiday trips. At the end of the year, there were again significant increases in demand, largely due to purchases made in advance of expected price rises following the removal of anti-inflationary shields.

For the year as a whole, the average increase in fuel sales dynamics at all POPiHN member companies' forecourts was 8.4%, almost 0.5 percentage points better than in the previous year. Petrol was sold in total by 11% more than in the previous year (the same increase as in 2021), diesel by 9% (2 percentage points better than in the previous year) and autogas by 1% (1 percentage point less than the previous year).

Analysis of the data on the dynamics of motor fuel trade carried out by the Organisation's member companies and the results of the total official consumption of these fuels by all operators in the country shows that the results for POPIHN companies are significantly higher for motor gasoline and diesel than for other retail operators.

For autogas, the result is the opposite. Companies outside POPiHN sold more of this fuel was. The periodic reduction in fuel prices through the provision of fuel vouchers reducing the price of fuel by the largest market operators contributed significantly to this result.

As mentioned earlier, 2022 premium fuel sales performed significantly worse than the previous year. Motorists' purchase of these fuels is strongly determined by their prices, and these were at record high levels last year. The fall in purchases in the petrol





segment was 23.4% and in the diesel part 17.8%. Purchases in this segment, compared to the previous year, were replaced by purchases of standard fuels.

Purchasing trends observed even before the pandemic at those price levels indicated that the market for new and used car purchases should accelerate annually. Unfortunately, first the pandemic, then the large increase in fuel demand from economies emerging from the epidemic, and finally the outbreak of war against Ukraine changed everything. Fuel prices skyrocketed to new highs and this had to translate into demand for premium fuels, which are generally quite a lot more expensive. The hope for a recovery of this market can only be seen when harsh winters return to Poland or E10 standard fuel with increased alcohol content in standard fuel is introduced to the market. There may also be hope for a rebound of this fuel market when prices fall significantly, but this light at the end of the tunnel is not yet visible.

In Poland, at the end of 2022, according to information obtained from POPiHN members and the official fuel logistics database of the Energy Regulatory Office, there were ca. 7.9 thousand filling stations open to the public and selling at least 2 fuel types (P and D). The logos of member companies of the Organisation (excluding partner stations of Slovnaft - as POPiHN has no data on that network) were displayed on 4401 facilities, of which 4317 were selling fuel at the end of the year. The remainder were undergoing refurbishment or modernisation. The number of active stations therefore increased, compared to December 2021, by 1.2%. The increase resulted from new investment projects, opening some of the stations after their modernisation, but also taking over a certain number of stations from the independent sector.

FIG. 5 CHANGES IN PREMIUM FUEL SALES AT FILLING STATIONS IN 2022 [MONTH/MONTH AS %]

Source: POPiHN's own data



The group was working on optimising the location of stations and a new sales policy, already taking into account the arrival of a new operator on the market, namely the Hungarian MOL, taking over most of the stations previously owned by LOTOS Group. In the group of POPiHN members (including the stations owned by LOTOS Paliwa) the above changes resulted in an increase of own stations operating under COCO and CODO formula by 1.2%, amounting to 2959, and an increase of stations operating under franchising DOFO formula by 0.8%, amounting to 1058.





 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$

FIG. 6 MARKET OF SHOPS AT FILLING STATIONS OF POPIHN MEMBERS IN 2022 COMPARED TO 2021 [%]

Source: POPiHN's own data



FIG. 7 CHANGE IN VALUE OF SALES IN THE SHOPS AT FILLING STATIONS OF POPIHN MEMBERS IN INDIVIDUAL MONTHS OF 2022 COMPARED TO 2021 [%]

Source: POPiHN's own data



ALONGSIDE THE INCREASE IN THE NUMBER OF POPIHN MEMBERS' OWN FILLING STATIONS, WE OBSERVED GROWTHS IN THE NUMBER OF STORES LOCATED AT THOSE OUTLETS The number of stations under DODO arrangements witnessed a 3.4% increase, amounting to 300 outlets (i.e. by 10).

Alongside the increase in the number of POPiHN members' own stations, we observed growths in the number of stores located at those filling stations. Altogether, at the end of 2022 POPiHN had knowledge of the activities of 3275 shops associated with the stations of the Organisation's member companies (100 more than in 2021), and out of this number 3206 (76 more than in 2021) were engaged in commercial activities at the end of the year. The shops' turnover grew along with their number. As mentioned above, POPiHN does not have information from all the shops that operate at stations with the logo of the Organisation's members because the DOFO and DODO formula allow for a certain degree of freedom in the purchase of fuels and items for the shop. Strict and uniform sales rules apply to CODO+COCO stations and only a certain proportion of franchised stations. Therefore franchisors, followed by POPiHN's reports, do not have complete data on sales volumes from shops at outlets other than their own stations. Therefore, only information received from affiliated companies from those shops whose turnover the companies have access to and which were active at the end of 2022 was used for the analyses. The sales of this group of retail outlets increased by a total of 20.4% and amounted to approximately PLN 7.8 billion. In relation to the 12 months of 2021, this was an increase of around PLN 1.3 billion. The turnover of a single statistical shop grew by 16.5% and on average was on the level of about PLN 2.1 m. (i.e. approximately PLN 0.4 million more than in 2021).

The increases were the result of increased turnover, rising prices and more frequent visits to filling stations by customers - including those who bought new or second-hand vehicles last year. An important element in the increase in traffic at stations was the fact that around 1 million cars with Ukrainian number plates permanently appeared in the country, as well as a large proportion of such vehicles that appeared in the country periodically. A lot of cash was also left by customers from neighbouring EU countries, who, as part of fuel tourism, came to Poland to fill up their vehicles due to lower prices than in their countries. They also took the opportunity to do the shopping at petrol station shops and often used small catering services. In the vast majority of stations and the shops located at them, they were uninterruptedly operating 24/7, which allowed for the most necessary purchases even when other outlets were closed. Customers become attached to places where they get what they care about most: safety, speed and comprehensive service.

Figure 7 illustrates total fuel station shop sales by month of the year compared to the corresponding months of 2021. There is a clear increase in sales during periods of increased fuel purchases associated with the outbreak of war against Ukraine and the announcement of the withdrawal of the anti-inflation shields. In all months of 2022, shop sales were significantly higher than in the same months of the previous year. In contrast to 2021, sales dynamics were also significantly higher in the holiday months than last year.

Due to the need to handle increased traffic at the eastern border, as well as the occurrence of periodically

 $\left(\frac{1}{2} \right) = \frac{1}{2} \left(\frac{1}{2} \right)$

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significant fuel tourism at the country's western and southern borders, the geographical map of engine fuel sales in Poland has somewhat changed. Provinces such as Małopolskie, Lubelskie, Zachodniopomorskie, Lubuskie and Dolnośląskie have gained. The information shown in this graph was based on data provided by POPiHN members, yet it can most probably be applied to overall retail sales volumes of all filling stations operators across Poland. Traditionally, the province with the greatest demand for vehicle fuels was still Mazowieckie, whereas the lowest demand could be observed in the Opolskie province. Sales in 5 provinces continued to exceed the overall sales volumes in the remaining 11. POPiHN member companies' stations in the province of Mazowieckie, where sales were the highest, sold 2.3 m³ of fuels and in the province of Opolskie, where volumes were the lowest, 0.4 m³. In the provinces where total sales were the highest, premium fuels were also sold the most. The magnitude of the decline in these sales is illustrated by the Mazowieckie province, where 223,000 m³ of premium petrol and diesel were placed, almost 60,000 m³ less than in the previous year. In turn, the scale of changes in total fuel sales - as a result of the events described above - is illustrated by the examples of the Lubuskie (+20%), Podkarpackie and Podlaskie (+15% each), Lubelskie (+13%) and Zachodniopomorskie (+12%) provinces, where sales grew significantly. At the same time, the increase in the Mazowieckie province was only 7%, while for the country as a whole it was 8%.

FIG. 8 DISTRIBUTION OF RETAIL SALES OF FUELS BY POPIHN MEMBERS IN POLAND IN 2022 [%]

Source: POPiHN's own data



The graph shows total sales of petrol, diesel and autogas. For each of these fuel types separately, small deviations from the provincial distribution are noted. However, they are small enough to assume that the generalisation fully shows the distribution of retail sales of motor fuels in the country.



DOMESTIC LIQUID FUEL MARKET IN 2022 – SUMMARY

PROCESSING OF CRUDE OIL

In 2022 domestic refineries processed 8% more crude oil than in 2021. Almost 27 million tonnes were processed - exceeding the previous year's result by more than 2 million tonnes. Almost all refinery production was directed to the domestic market, but, as in previous years, this was not enough to cover demand, so supplementary imports were required. Diversification of purchases of crude oil for domestic refineries continued, more strongly than in previous years, in terms of supply directions and types of raw material used for processing. Sanctions imposed on Russian oil following the outbreak of war against Ukraine were a clear contributor to the above. High demand for finished fuels contributed to refining margins exceeding last year's figures. The systematic diversification of oil purchases has strengthened Naftoport's role in supplying the country with crude even more than in previous years. Supplies from the sea became the main source of supply for domestic refining facilities. In terms of throughput volumes, the second half of the year was better than the first 6 months of 2022. Domestic refineries processed over 1 m. tonnes of oil more than in the first 6 months of the year.

In the second half of the year, PKN ORLEN merged with Grupa LOTOS, and Aramco Fuels Poland became a shareholder in the now former Gdańsk Refinery.

Oil for domestic refineries was purchased mainly from the eastern direction. As time went on, those supplies decreased. In the course of the year, Saudi Arabia emerged as an increasingly important supplier, and in the fourth quarter it had already become the place from where most raw material was purchased. Supplementary raw material came mainly from Norway, the UK, the USA and Kazakhstan. Smaller volumes were also purchased from Nigeria and Guyana. REBCO oil's share in the country's supply was 42% compared with 61% in 2021. In the country's oil supply balance, the role of the Friendship Pipeline declined along with the diversification of supply. Nonetheless, supplies by sea and the use of PERN's storage tanks on the coast increased. Crude oil from domestic supplies (Petrobaltic, PGNiG) was used to supplement the imports. Its volume, however, still remained low. The change in the grades of crude oil that was processed forced a technological adjustment of refineries to grades other than REBCO.

Non-REBCO crude oil accounted for an increasing percentage in the refining structure. In the first half of the year it was 45%, after three quarters it was already 50%, and in the whole of 2022 it amounted to 58%. **In the fourth quarter of 2022 alone, REBCO oil already accounted for only 22% of crude processed in the country.** Following the introduction of sanctions on the supply of Russian oil by tankers, such deliveries to Polish ports ceased.

The structure of crude oil supplies to domestic refineries is presented in Figure 10. Refineries maintained a high diversification scale, using Naftoport facilities in Gdańsk.

In 2022, 11.5 million tonnes of REBCO crude oil were imported into Poland, which was approximately 3.5 million tonnes less than in the previous year. Approximately 10 million tonnes (about 1 million tonnes more than in the previous year) were transported via the eastern section of the Friendship Pipeline, owned by PERN S.A. The remaining oil was brought to Polish refineries via the port facilities in Gdańsk, and in case of domestic deposits, via rail transport.

FIG. 9 PROCESSING OF CRUDE OIL – DATA FOR 2021 AND 2022 [in m. tonnes]

Source: POPiHN's own data

	YEAR 2021	YEAR 2022	Reference 2021=100
OVERALL	24.8	26.9	108

FIG. 10 SHARE OF CRUDE OIL SUPPLIES TO DOMESTIC REFINERIES IN 2022 [%]

Source: POPiHN's own data



IN THE FOURTH QUARTER OF 2022 ALONE, REBCO OIL ALREADY ACCOUNTED FOR ONLY 22% OF CRUDE PROCESSED IN POLAND

 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$

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PRODUCTION OF LIQUID FUELS

In 2022 liquid fuel production of petrol (P), diesel (D), liquefied petroleum gas LPG, JET aviation fuel, light fuel oil (LFO) and heavy fuel oil (HFO) amounted to 28.5 m m³ (Fig. 11). The above result takes into account refinery production and blending of fuels, which, in Polish terms, is also treated as production. The increase over the previous year was 5%, which translated into a volume of 1.3 m m³. The surplus was mainly due to increased production of diesel, JET aviation fuel and motor petrol.

The vast majority of production was intended to satisfy the internal market. However, large volumes of diesel and petrol were also exported, mainly to Ukraine. Domestic demand required larger volumes of fuels than domestic refineries could supply and this difference was met by supplies from outside Poland.

The developing economy, the growing mobility of Poles, as well as the need to supply larger volumes of fuels to serve the traffic associated with refugees from Ukraine and military operations on the country's eastern borderlands, necessitated the targeting of domestic production. The structure of production indicates that domestic processing plants and production resulting from fuel blending were up to the task of this difficult period, maximising the obtaining of the most needed fuel grades. There was an increase in the production of diesel, JET aviation fuel and motor petrols. Less LPG as well as light and heavy fuel oil were produced. Demand for the latter two products was weaker than in 2021, and demand for LPG was met by higher import supplies.

Domestic production in the first and second half of the year remained at very similar levels. However, it should be noted that the rate of growth was at a lower level in the second half of the year than for the first six months of the year, when, compared to the same

FIG. 11 COMPARISON OF LIQUID FUELS PRODUCTION IN 2021-2022 [in thousand m³]

Source: POPiHN's own data

Description	YEAR 2021	YEAR 2022	Reference 2021=100
Petrols	5,699	5,856	103
Diesel	17,630	18,517	105
LPG	846	780	92
JET aviation fuel	912	1,426	156
Light fuel oil	718	639	89
Heavy fuel oil	1,374	1,253	91
OVERALL	27,179	28,471	105

months in the previous year, the growth was recorded at 13%. The effect of a higher base in the second half of 2021 was felt.

In Poland fuel blending with the use of biofuels, as well as other additives, is treated as production. In 2022 significant amounts of domestic refinery production of petrol and diesel, and also of their imports, aimed at the Polish market, were blended with biofuels in order to reach the National Biofuels Target (NBT). Blending increases the production pool in relation to fuels produced only from processing crude oil in refineries - especially in the situation of significant imports, and such was the case in the year under review. The use of biofuels improves the environmental effect of fuel combustion, but, unfortunately, worsens the economic outcome for fuel producers due to the fact that biofuels are significantly more expensive than traditional fuels made from crude oil. What is more, in 2022 there were also periodic problems with obtaining the methyl esters necessary for blending diesel. Besides, the costs of the fulfillment of the NBT grew as the biofuels



FIG. 12 BREAKDOWN OF LIQUID FUELS PRODUCTION IN 2022 [%]

Source: POPiHN's own data



target was raised from 8.7 to 8.8% by energy value of fuels sold. It is impossible to meet such a limit with the use of biofuels in standard fuels alone and thus it was still necessary to produce and sell B100 fuel, which is hard to sell in the country.

In 2022, the production of diesel increased by 887,000 m³ (i.e. by 5%). This was equal to how much the production of this fuel grade grew in 2021. Manufacturers are pleased by the intensifying demand for the high-margin product, namely JET aviation fuel. In 2022, its production grew by 56% and easily found buyers in the recovering passenger and cargo flight market. The growth rate for this fuel was the highest, with additional volumes sold of over 500,000 m³. Motor petrol production increased by 3%. A decrease in production was reported for LPG as well as light and

heavy fuel oil. For petrol, the increase translated into 157,000 m³, and as regards LPG production, it was 66,000 m³ less. The structure of fuel production in 2022 is presented in Figure 12.

At the end of the day, although with different volumes, the production balance changed insignificantly compared to last year's. Motor petrols, diesel and LPG maintained their shares, while JET fuel's share increased by 2 percentage points at the expense of 1 percentage point for light fuel oil and 1 percentage point for heavy fuel oil. Still, as in previous years, diesel was dominant in the balance of domestic fuel production. Its share of the total production spectrum was 65%, followed by motor petrols with a share of 21%.

As noted above, the production of liquid fuels also includes the process of mixing (blending) standard fuels with biofuels and additives. In 2022 the necessity to meet the requirements of the NBT (National Biofuels Target) which companies that produce fuels and import them from abroad were obliged to fulfil, forced adding alcohol and esters to virtually the entire volume of petrol and diesel introduced onto the market. Enhancers were also added in the production of premium fuels. Satisfying the legal requirements forced obliged entities to sell B100 fuel, as the mere addition of biofuels to normative fuels was still not enough to achieve the target. Preliminary data indicate that POPiHN members achieved the imposed obligations. It is estimated that in 2022 around 358,000 m³ of ethanol and around 1 400,000 m³ of methyl esters were added to fuels by these companies. These amounts are close to last year's results. The necessary additional direct sales of B100 fuel were estimated at around 256,000 m³. The companies sent 111,000 m³ directly abroad. This type of fuel was practically unavailable in retail trade, and in wholesale trade it was quite unpopular. Its vast majority was exported from Poland, also through independent operators.





IMPORTS OF LIQUID FUELS

(sum of actual imports and intra-Community acquisitions) (Fig. 13 and 14).

Domestic refineries, apart from a considerable volume of heavy fuel oil, directed practically the entire stream of their fuel production to the internal market. However, this was not enough to balance the market. As in previous years, additional purchases of fuel from abroad were necessary. In addition, imports were higher than in the previous year due to the growing economy and needs related to the war situation across our eastern border. The increase in imports and intra-Community purchases concerned the main fuel grades - apart from light fuel oil and JET aviation fuel, which was not imported from abroad at all. The largest percentage increases were recorded for motor petrol and LPG, for which the result was also the highest by volume. Increased imports were carried out by the leading players on the domestic market (refineries and international oil companies operating in Poland) and the so-called independent operators. It is worth noting that more LPG entered the country than a year ago. The main source of the increase were imports from companies other than POPiHN members, but there was also a significant increase in the so-called re-exports, i.e. shipments outside our borders of LPG already bought outside Poland. Data available at the time of preparing the report show that in 2022 foreign fuel purchases amounted to approximately 13.7 m. m³ which is almost 1.2 m. m³ above last year's level. This is a 9% increase. 2022 was the second consecutive year of growth in imports, in contrast to the previous three years when imports fell annually. This was due to the lifting of pandemic restrictions hampering the growth of the economy and the mobility of Poles, but also to large transport needs related to Ukrainian refugees or Ukraine's fuel needs for the military operations. Demand was also periodically influenced by prices in Poland, lower than those of its EU neighbours, which prompted fuel tourism. In contrast to the three main transport fuels, fuel oil imports were at low levels and JET fuel was not purchased outside Poland at all. Since 2016, diesel has remained the largest import item and this was also the case in 2022. In the year under review, as in the previous year, total imports of motor petrol, diesel, LPG and light fuel oil, realised by the so-called independent operators (companies other than POPiHN members) in volume terms, were lower than those of the largest market operators, despite the fact that these players made up a lot of the result with LPG imports. Instead, the major players made large purchases of motor petrol and diesel. Altogether in 2022, for the 4 main fuel types in total, the dynamics of foreign purchases by the largest Polish market operators was 7% higher than in the previous year, and the dynamics of foreign purchases for this product group of independent operators increased by 13%.

Diesel imports in 2022 grew by 351,000 m³. The increase for petrol equalled 248 thousand m³ and for LPG 598 thousand m³. Foreign purchases of light fuel oil fell by 22,000 m³ and increased by 19,000 m³ for the heavy grade.

The increase in the officially registered imports of liquid fuels in relation to 2021 fell by 9% and



FIG. 13 BREAKDOWN OF LIQUID FUELS IMPORTS IN 2022 [%] Source: POPiHN's own data

FIG. 14 COMPARISON OF IMPORTS AND ACQUISITIONS OF LIQUID FUELS IN 2021-2022 [in thousand m³]

Source: Ministry of Finance and POPiHN's own data

Description	YEAR 2021	YEAR 2022	Reference 2021=100
Petrols	1,443	1,691	117
Diesel	6,979	7,330	105
LPG	3,971	4,569	115
Light fuel oil	23	1	4
JET aviation fuel	3	-	-
Heavy fuel oil	133	152	114
OVERALL	12,552	13,743	109

altogether for 6 main fuel types satisfied 37% of overall market demand (i.e. 1 percentage points more compared to 2021).

In the structure of foreign purchases in 2022, the share of motor petrols increased significantly by over 2 percentage points and that of LPG grew by 1 percentage point. The share of diesel decreased by 3 percentage points.

Within the group of the 4 main fuel types described (P, D, LPG, LFO), POPiHN member companies imported around 7.6 million m³ of fuels. Compared to the whole 2021, it was about 0.5 m. m³ of fuel more that in the previous year. Independent operators increased their imports as well by almost 0.7 m. m³ bringing into the country approximately 6 m. m³ of fuel from the described product group.

Sources of imports of petrol are shown in Figure 15. This product was mainly brought from Germany and Slovakia. Significant quantities were also imported from Lithuania and the Netherlands. It was supplemented by purchases in the Czech Republic and Hungary.





FIG. 15 SOURCES OF PETROL IMPORTS [%]

Source: Ministry of Finance and POPiHN's own data



FIG. 16 SOURCES OF DIESEL IMPORTS [%]

Source: Ministry of Finance and POPiHN's own data



Imports from other countries constituted around 4% of supplies. Acquisitions from Germany gained in importance (at the expense of Slovakia and the Czech Republic).

Diesel was purchased in far more countries than petrol. As a result of the announced and implemented sanctions, the countries from which imports were made also changed. Russia remained the main source country, but supply volumes from there decreased significantly. In total imports, Russia's share decreased by 30 percentage points. Imports from Belarus were discontinued. Deliveries from Germany, the Netherlands and Lithuania increased. New purchasing locations emerged, such as Saudi Arabia, China, Belgium, India, Sweden or even Taiwan, Bahrain and the United Arab Emirates. Around 37% of the product was imported from beyond our eastern border, i.e. the territory of the non-EU countries (which was 33 percentage points less than in the previous year). Germany improved its percentage position in the pool by 5 percentage points, thus confirming the importance of this acquisition direction for our economy. The need to abandon the eastern direction poses a major challenge for domestic operators in terms of supplying the market with diesel. The necessary imports to replace those from Russia will have to be carried out mainly by sea, and there are virtually no logistical reserves there. Rail transport will be associated with higher costs, which will translate into fuel prices and thus demand levels in the coming years.







EXPORTS OF LIQUID FUELS (sum of actual exports and intra-Community supplies)

Exports of liquid fuels (Fig. 17) in 2022 amounted to over 2.6 m. m³, which was 43% more than in the previous year. At the same time, this is a reversal of the trend from 2017 to 2021, when exports were steadily declining compared to the previous year's performance. The reason for this was the need to supply fuel to Ukraine, fighting against Russia and cut off from traditional fuel supplies from Belarus and Russia. The Ukrainian direction was dominant both for the main war fuel, namely diesel, as well as for the motor fuels supplying transport to and from the battlefront as well as the transport of refugees and displaced persons. The re-export of LPG by Polish businesses also played an important role in supplying the fighting country. For other fuel grades (JET fuel, light and heavy fuel oil), lower shipments abroad were recorded than in the previous year. The slow recovery of global aviation market from epidemic-induced collapse also led to a decrease in deliveries of this product outside Poland. Besides, the situation beyond our eastern borders impacted the product structure of fuels shipped out of Poland.

The largest increase in volume and percentage of foreign shipments was recorded for diesel, with almost 900,000 m³ and a more than fourfold increase respectively. Foreign shipments of motor petrols increased significantly, i.e. by 66%. JET fuel exports declined by 5%. Heavy fuel oil seems to have lost its leading position in foreign shipments for the first time ever. This time, it was overtaken by diesel as regards exports. The share of heavy fuel oil exports decreased from last year's 66% to 42%. The share of petrol remained unchanged, while JET aviation fuel decreased by 3 percentage points.

The export deliveries of JET aviation fuel shown in Figure 9 are deliveries directly carried out by domestic producers to recipients outside Poland. Nevertheless, a significant amount of this fuel production goes to domestic intermediaries, which provide airport deliveries to domestic and international carriers. The volume of these deliveries in 2022 amounted to over 1.2 million m³, i.e. some 500,000 m³ more than in the previous year (67% more), thus strongly approaching the pre-pandemic 2019 result (1.35 million m³).

When calculating the LPG market, it should be emphasised that the so-called re-export of this grade of fuel (purchase abroad of Poland and supply also outside our borders) in 2022 amounted to approximately 800,000 m³. The above means that the volume of this activity increased by 2.5 times compared to the previous year.

In 2022 the main export destination for motor petrol was Ukraine (86%), whereas for intra-Community deliveries it was the Netherlands (14%). Diesel in the amount of 853,000 m³ (73% of foreign shipments from Poland) went to Ukraine, and in one-digit percentages also to Switzerland, the UK and Cyprus. B100 fuel, also treated as diesel in POPiHN statistics, found a market in Belgium, the Netherlands and Lithuania. The largest volumes of heavy fuel oil were supplied to the Netherlands (60%), Belgium (22%) and Denmark (18%). JET aviation fuel was mostly delivered to Sweden (43%), as well as Denmark (29%) and Estonia (28%).



FIG. 18 BREAKDOWN OF LIQUID FUEL EXPORTS IN 2022 [%] Source: POPiHN's own data

FIG. 17 STRUCTURE OF EXPORTS AND SUPPLIES IN 2021-2022 [in thousands of m³]

Source: POPiHN's own data *) direct exports without re-exporting

Description	YEAR 2021	YEAR 2022	Reference 2021=100
Petrols	70	116	166
Diesel	277	1,176	425
JET aviation fuel	188	178	95
LPG*)	92	60	65
Heavy fuel oil	1,223	1,112	91
OVERALL	1,850	2,642	143





DOMESTIC CONSUMPTION OF LIQUID FUELS IN 2022

Table 19 presents a preliminary comparison of the officially registered domestic consumption of liquid fuels in 2022 when compared to the official domestic consumption of liquid fuels in 2021. Final data, taking into account final calculations elaborated by the Customs Service of the Ministry of Finance on imports, exports and intra-Community purchases and supplies will be available in the second half of 2023. Therefore the results presented for 2022 should be treated as estimates, yet very close to final figures.

In 2022, the Polish economy grew despite the tense international situation and high inflation limiting Poles' spending. This fact, along with the war against Ukraine and high fuel prices, were the main elements defining the liquid fuel market in Poland. The mobility of Poles increased, and war activities across our eastern border required significant amounts of fuel for refugee and military supply services. On the western and southern borders, due to significant price differences, the phenomenon of fuel tourism grew periodically. This, in turn, impacted on the results of total domestic demand. Drivers from other EU countries neighbouring Poland turned up in big numbers at stations on our side of the border, filling up at lower prices than in their countries.

The result of liquid fuel consumption after 12 months of 2022 exceeded the results of the same period last year by 5%. Demand increased despite fuel prices significantly higher than in 2021. Sales of motor fuels in the first half of the year and in the final months were remarcably higher than in these periods in the previous year. At the end of the year, the purchasing stimulus was provided by announcements of price increases due to the removal of anti-inflation shields and the introduction of sanctions on Russian oil and finished fuels. An important element contributing to the increased demand for fuels in the country was the significant number of cars circulating on Polish roads with Ukrainian number plates. Holiday traffic also showed a continuation of the trend of Poles spending (to a greater extent than was the case just a few years ago) their holidays and leisure time in Poland. In this difficult time for market operators, the control of the illegal fuel trade worked effectively, which in periods of market uncertainty usually resulted in the growth of the grey market in the past. The steadily increasing wholesale and retail prices of fuels worked to the disadvantage of buyers. Market operators, however, tried to sustain demand by reducing margins. Anti-inflation shields toning down price increases at filling stations also played an important role in stimulating demand.

FIG. 19 ESTIMATED DOMESTIC LIQUID FUEL CONSUMPTION IN 2022 IN COMPARISON TO THAT OF 2021. [in thousands of m³]

Source: Ministry of Finance and POPiHN's own data

Description	1	YEA	R 2021	YEA	R 2022	Reference
		in thousand	share in	in thousand	share in	2021=100
		m ³	consumption %	m ³	consumption %	
Petrols	Consumption	6,780		7,152		105
	of which total imports	1,443	21	1,691	24	117
Diesel	Consumption	21,978		22,662		103
	of which total imports	6,979	32	7,330	32	105
LPG	Consumption	4,722		5,125		108
	of which total imports	3,971	84	4,569	89	115
Total for 3 fuel types	Consumption	33,480		34,939		104
	of which total imports	12,393	37	13,590	39	110
JET aviation fuel	Consumption	720		1,235		172
	of which total imports	3	_	-	-	-
Light fuel oil	Consumption	729		655		90
	of which total imports	23	3	1	-	4
Heavy fuel oil	Consumption	301		249		83
	of which total importst	133	44	152	61	114
OVERALL	Consumption	35,230		37,078		105
	of which total imports	12,552	36	13,743	37	109





In 2022, the country's fuel demand was met with domestic production higher than last year's, strongly supplemented by even higher than the already high imports of last year. Compared to 2021, demand for liquid fuels in Poland increased by the already mentioned 5%, with demand for automotive fuels increasing by 4%. The difference was due to a large strengthening of the non-car segment, following increasing sales of aviation fuel for the resurgent (after the collapse during the pandemic) air transport.

It is worth noting that, with high fuel prices, for long periods of time, filling stations operators supported consumption growth by squeezing their margins. This affected their economic performance, yet allowed them to maintain a high level of purchases by drivers.

In 2022, the Polish market was supplied primarily by POPiHN member companies. Other operators traditionally placed less fuel on the market than the main suppliers, but at the same time by around 13% more than in the previous year. Their share was still significant in the LPG market, but also, and this is a new trend, increased in the petrol market. As regards the diesel market, their share was, as in the previous year, around 8%.

In 2022, of all fuels, only the sales performance of light and heavy fuel oil was lower than the previous year's. Demand for petrol and diesel increased. Most spectacular, however, was the increase in demand for JET aviation fuel, whose sales had been most affected by pandemic restrictions in previous years. As in preceding years, the sales volumes of diesel on the Polish market reached the highest levels. Petrol was placed on the market about 3 times less, but its sales dynamics were higher. Good results were recorded by the LPG market, which achieved the highest percentage growth from the pool of motor fuels.

In 2022, domestic needs for liquid fuels were fully met and, apart from extremely critical situations (the outbreak of war against Ukraine and mass purchases at domestic filling stations) there were no instances of market turbulence. Crisis situations were quickly resolved, confirming the readiness of the fuel sector to counteract such events. Refineries, wholesalers and filling stations continued working to effectively supply the market, using domestically produced fuels and supplemented with purchases from abroad to meet demand.

The official consumption of diesel grew by 3% in relation to 2021, reaching the level of almost 23 m. m³. Imports accounted for 32% of the market supply of this fuel, the same as the previous year. The dynamics of market supplies by POPiHN companies increased by 3%, which is comparable to the market as a whole. Imports by members of the Organisation showed a level of 5.4 m. m³ and thus increased by 2% compared to 2021. Supplementary imports by independent importers improved by 13% and reached 1.9 m. m³. Altogether around 7.3 m. m³ of this fuel type was imported.

In volume and percentage terms, demand for motor petrol increased more than for diesel. Interest in purchasing this type of fuel showed a result 5% better than last year. The reasons for this increase were described above. It is worth emphasising once again that a factor influencing the market was the increase in the number of cars on Polish roads on a scale of around 1 million, permanently increased by vehicles

FIG. 20 DOMESTIC CONSUMPTION OF LIQUID FUELS IN 2021-2022 [in thousands m³]

Source: POPiHN's own data



with Ukrainian number plates. Periodically it was even more, as such vehicles crossed the Polish-Ukrainian border in large numbers and were filled up every time. In addition, new registrations on the domestic market were dominated by vehicles other than those with diesel engines. Last year, Polish drivers consumed around 7.2 million m³ of petrol in their vehicles, of which around 1.7 million m³ was imported. Imports supplied 24% of the total petrol market share, i.e. 3 percentage points more than in 2021.

Interest in LPG, calculated according to POPiHN methodology (not including re-exports), increased, and more so than for petrol. The result showed a growth of 8% over the previous year. It is now estimated that for the whole year LPG consumption amounted to approximately 5.1 m. m³. Re-export of this type of fuel amounted to around 811,000 m³, i.e. about half a million m³ more than in 2021. Its imports equalled 89% of the market supply, which was 5% more compared to the previous year. About 4.6 m. m³were supplied from abroad. POPiHN's calculations for LPG as usual do not take into account the so-called reexport (export of gas previously purchased outside Poland), which in 2022 was 2.5 times bigger than in 2021. Taking this relationship into account, it can be assessed that the market for this fuel grade showed slightly lower domestic dynamics than shown in the fuel consumption table. On the other hand, taking into account the domestic use of imported fuel with CN code 29 01 in the volume exceeding 200,000 tonnes, as a substitute for LPG, the final result is slightly closer to the figure shown in the table.

Demand for light fuel oil is already fairly stable in the country, with a 10% reduction last year due to high supply prices. The market needed 655,000 m³ of this type of fuel, i.e. about 74,000 m³ less than the year before. It is assumed that in the coming year the results for this type of fuel will continue to decrease. Virtually the entire supply of this fuel type to recipients in Poland was satisfied by domestic production. Official supplementary imports in 2022 amounted to only 1,000 m³.

Domestic JET aviation fuel market, mostly impacted by pandemic-driven restrictions, recorded sales almost twice as good as last year. They amounted to 1,235 thousand m³. Its growth was at the level of 515,000 m³



FIG. 21 BREAKDOWN OF LIQUID FUELS EXPORTS IN 2022 [%]

Source: POPiHN's own data



FIG. 22 BALANCE OF INTERNATIONAL TRADE

IN LIQUID FUELS IN 2022 [in thousand m³] Source: Ministry of Finance and POPiHN's own data

Source. Ministry of Finance and FOFIFINS C

*) - trade of domestic producers

Description	Imports + Purchases	Exports + Supplies	Difference (2-3)
1	2	3	4
Petrols	1,691	116	1,575
Diesel	7,330	1,176	6,154
LPG	4,569	60 *)	4,509
JET aviation fuel	-	178 *)	(-178)
Light fuel oil	1	0	1
Heavy fuel oil	152	1,112	(-960)
OVERALL	13,743	2,642	11,101

FIG. 23 BALANCE OF INTERNATIONAL TRADE IN LIQUID FUELS IN 2022 [in thousand m³]

Source: POPiHN's own data



in comparison to the previous year. A higher demand was largely satisfied by domestic production as imports were practically non-existent.

Domestic demand for heavy fuel oil continued to decline and in 2022 it was 17% below the previous year's level. The market absorbed 249,000 m³ of this type of heating fuel, out of which around 61% was imported. This fuel type is produced in Polish refineries in the amounts significantly exceeding the domestic demand and therefore for years the surplus has been sent abroad in large quantities. Nevertheless,

the above does not stop independent operators from importing some volumes of this fuel.

Total official domestic consumption of the 6 types of liquid fuels slightly exceeded 37 m. m³ and was higher by around 2 m. m³ than the one in 2021. The increase of the demand amounted to 5%, within which the imports equalled a 37% share in the total market, with the growth at the level of 9%. Almost 14 million m³ of fuels were officially imported into Poland, i.e. some 1.2 million m³ more than in the previous year.

The structure of fuel consumption in Poland has been presented in Fig. 21.

The differences in the breakdown of shares compared to 2021 are small, with a slight increase in the share of petrol, LPG (around 0.5 percentage points each) and JET aviation fuel (by around 1.5 percentage points). The change was made at the expense of a slight loss of shares by diesel and light and heavy fuel oil.

The Polish market is supplied with liquid fuels mainly through production at domestic refineries, but their capacity, despite annual growth, is not sufficient to meet total demand. Supplementation from imports is therefore necessary. In 2022, this direction of market supply has further increased, compared to the high level of the previous year. The increase in exports in the new Ukrainian direction also contributed to this, as a result of the war that had started in that country. For refineries, selling on the internal market is more profitable than exporting. At the same time such sales provide more revenues for the national budget. However, domestically produced fuels do not meet demand in its entirety, especially for products such as diesel and LPG, and more recently also for petrol. The balance of international trade in fuels for Poland is presented in Fig. 22.

In 2022 the dominance of fuel imports, understood in broad terms, over exports was fivefold. This was also a new record for net imports into Poland. A 9% increase in imports, despite a 43% activation of exports, resulted in 11.1 million m³ of a difference in the volume of fuel imports and exports from the country. This was a new record exceeding last year's result by around 0.5 million m³.

Imports were still dominated by diesel and LPG. Exports were mainly determined by diesel, although the previous leader (heavy fuel oil) held firm despite the launch of deeper processing into middle distillates at domestic refineries. If current trends in the use of domestic and imported fuels are maintained, it can again be assumed that the current ratio between fuel imports and exports will increase in favour of imports. The growing market and export needs related to the war against Ukraine will require more fuels, probably supplied only through imports (and due to the sanctions imposed on Russia) from other directions than in previous years. It can be assumed that some slowdown in demand growth may result from rising fuel prices, but as the 2022 market picture showed, this will not be a significant impact. Within the coming years even an effective increase in the number of electric cars, which have started to dynamically occur on Polish roads, is unlikely to change this. International trading balance for the Polish fuel sector will continue to be shaped mainly by diesel and LPG imports. Nevertheless, as 2022 proved, once the economy starts growing again, it may be necessary to also import greater amounts of petrol, the demand for which will increase due to the trend of moving away from diesel-fuelled vehicles.



POPIHN Polska Organizacia Przemysłu i Handlu Nafkowacia



FILLING STATIONS IN POLAND

A summary of the filling station market in Poland at the end of 2022 was based on the fuel infrastructure register maintained by the Energy Regulatory Office and information obtained from member companies of the Polish Organisation of Oil Industry and Trade. The network of facilities selling liquid fuels is constantly being modified, an example of which is the sale of part of the stations previously owned by Grupa LOTOS to Hungarian MOL. Formally, MOL is not a member of POPiHN, but is represented therein by SLOVNAFT. For the purposes of this year's study, it has therefore been assumed that stations belonging to LOTOS Paliwa (the company which is to be eventually transformed into MOL Polska) will be treated as stations of POPiHN member companies.

Based on the Organisation's recent estimates, it results that at the end 2022 domestic network offilling stations, which consists of publicly available sites selling at least petrol and diesel, comprised 7898 outlets. The above represents an increase by 46 sites compared to the end of 2021. The increase in the number of filling stations was the result of the market adapting to new operating realities through modifications in the structure of the station network, new investments, commissioning of refurbished facilities or sorting out fuel sales concessions.

The market witnessed transformations resulting from new investments or changes of the stations' brand image. As in previous years, there was an ongoing process of taking over smaller operators' facilities by larger networks, both corporate and independent ones. Stations in each of the market sectors were moving towards a convenience store model with maximisation of available services other than fuel sales, although such sales increased significantly compared to the previous year. The most noticeable increase in turnover was observed in small and large catering services at the stations and at station shops, with an increasing range of goods available, as well as the desire to use electric car chargers.

FIG. 24 NUMBER OF STATIONS OF RETAIL OPERATORS IN 2020-2022

	2020	2021	2022
Filling stations network	31.12.2020	31.12.2021	31.12.2022
DOMESTIC COMPANIES			
(2022 without LOTOS Paliwa)	2,324	2,339	1,920
FOREIGN COMPANIES			
(2022 with LOTOS Paliwa)	1,569	1,581	2,024
INDEPENDENT CHAINS			
(operating under a common brand)	1,181	1,339	1,411
OTHER INDEPENDENT			
OPERATORS (approx.)	2,478	2,414	2,372
SHOPS	187	178	171
TOTAL (approx.)	7,739	7,852	7,898





FIG. 25 FILLING STATIONS IN POLAND AT THE END OF 2022 [IN UNITS]

Source: Energy Regulatory Office and POPiHN's own calculations



FIG. 26 BREAKDOWN OF FILLING STATIONS MARKET AT THE END OF 2022 [%]

Source: POPiHN's own data



There was also an expansion of services related to leisure during the journey, the provision of financial services or the performance of simple maintenance of the vehicle. There was increasing popularity of making fuel purchases, but not only, through the use of special applications that allow transactions to be finalised without the need to visit a filling station building or use the checkout in a shop. It is worth emphasising that the stations operated with greater freedom, maintaining sanitary regime rules for shoppers and employees. This is a remnant of the pandemic, yet it is important for many filling stations' customers.

By the end of 2022, fuel companies belonging to the Polish Organisation of Oil Industry and Trade already held a 57% share of the filling station market. This means that over a year this share increased by 1 percentage point. The Organisation's member companies owned 4488 facilities, while other operators owned 3410. By ownership category (taking into account the sale of some stations of Grupa LOTOS) in the total number of stations, 24.3% belonged to PKN ORLEN, 25.6% to foreign multinationals + LOTOS stations sold to MOL, 2.2% to hypermarkets and 47.9% to private owners independent of other groups. In the latter group, 1411 filling stations belonged to operators owning a minimum of 10 facilities in their networks operating under one logo. Their share of the total filling station market reached 17.9%. The process of changing colours by stations was based, as in previous years, on franchise agreements, both for POPiHN members (the largest market operators) and for smaller private networks. New facilities were launched in virtually all market groups, although the scale of these ventures was not very large. Some operators with good station locations continued to operate on their own, even though they found the requirements of competition increasingly difficult to meet.

In 2022 PKN ORLEN had the largest number of stations, further increased by some taken over from Grupa LOTOS, following the merger of the two companies. The position of runner-up in the station market was retained by the BP network, while the next place belonged to Shell. The national leader's stations were in the process of standardising their colours and offering a uniform standard of service at all network sites. There was a decrease in the number of stations under the Bliska and OPTIMA economy brands. PKN ORLEN increased its network by 101 facilities. There was a growth in the segment of stations operating under international companies' logos in Poland. At the end of 2021, there were 2024 sites operating in their colours (including LOTOS Paliwa stations). In the independent segment, the MOYA network, owned by ANWIM, recorded the best growth dynamics. Other private networks such as Grupa Pieprzyk or AVIA also continued to develop well.

Preliminary estimates on the value of the retail market for fuel sales in Poland in 2022 oscillated around PLN 194 bn. The volume of fuels sold at filling stations was initially estimated at 29.8 bn litres (petrol, diesel and autogas). State budget revenue from taxation (VAT, excise duty, fuel surcharge, emissions fee) from fuel sales amounted to around PLN 57 bn.

Poland's increasingly complete network of national motorways and expressways means that drivers in Poland are keen to use it and no longer need to look for stations off the road in the vast majority of sections. The number of new Motorway Service Areas (MOPs) is increasing. Not only is it possible to fill up the vehicle there, but also to take a break during the journey and enjoy a meal or shopping. In 2022, there were (after final verification for the actual location next to the motorway) 85 fuel stations operating along roads marked with the ,A' symbol. PKN ORLEN had 38 vehicle refuelling outlets, LOTOS Paliwa 16, BP 16, SHELL 12 and CircleK 3. Companies with stations next to motorways were also expanding their MOPs network along the ,S' expressways.

PKN ORLEN, Poland's largest retail operator, had 1920 filling stations in its network by the end of 2022. The company is systematically reducing the number of stations operating under the BLISKA logo. At the end of last year, there were only 20, a further two facilities fewer than at the end of 2021. Most of the facilities that used to operate in green colours today have the logo of the parent company. The company expanded its network after acquiring part of the Grupa LOTOS stations.

LOTOS Paliwa, a company formed as a result of the merger between PKN ORLEN and Grupa LOTOS, held

the fourth largest position in the filling station market, operating at 414 facilities. The stations will soon operate on the Polish market under the MOL logo. The rebranding process has already begun.

In the past year the sector of stations operated by international companies on the Polish market strengthened. The position of national vice leader was still held by BP, increasing its network by 11 stations and at the end of 2022 owning 574 facilities. Shell Poland acquired additionally 18 stations and expanded its service area to 455. Circle K administered 393 stations at the end of the year, having added 16 facilities to its group. Amic Polska increased its network by one station to 117 sites. TOTAL brand was present at 23 filling stations, which means that the company lost a further 15 franchised facilities. ANWIM, whose stations operate under MOYA colours, expanded its resources dynamically last year. The company gained 33 outlets and ended the year with 401. UNIMOT, with stations operating under AVIA colours, added 21 sites and ended the year with 106 stations.

The area from which outlets are acquired for the expansion of company networks is traditionally the sector of stations of the so-called independent operators, who in the past were not associated with any of the major national companies - either within a corporation or outside of it. The main method of acquiring new facilities is through a franchise agreement. In 2021, this process also took place, depleting the number of stations operating independently. Some companies launched new facilities or revitalised older ones. Adopting the POPiHN's nomenclature (companies networks are the ones where under one logo there are at least 10 outlets), at the end of 2022 the group of independent operators had around 2370 facilities, i.e. around 40 less compared to the previous year. This also benefited the independent networks, which expanded their inventories while expanding their operational area.

At the end of 2022, there were approximately 1,400 sites classified by POPiHN as a network of independent stations. As mentioned above, the largest increases within the private networks in 2022 were achieved by the newest POPiHN members (ANWIM and UNIMOT), vet operators such as Grupa Pieprzyk and WATIS were also active. The ever-growing network of independent brands and the expansion of the area in which they operate makes them more and more attractive in terms of possible entry into such alliances by operators still acting independently. An additional impulse to choose an independent network rather than a corporate one may be the fact that such associations have somewhat looser operating rules than the networks of the largest national operators. At the end of 2022, stations grouped in networks of independent operators accounted for the second largest number of organised facilities providing retail fuel sales. As these facilities tend to offer fuel at slightly lower prices than stations in other segments of the market, they are becoming an increasingly viable alternative to the large oil companies in the face of rising fuel prices and the ever-present overpricing.

In the year under review, the process of depletion of stations owned by super and hypermarkets continued, although some chains increased their presence on the fuel market. The 'downside' change effect is due to the final withdrawal from the Polish market of Tesco, which operated a significant number of filling stations

BY THE END OF 2022, FUEL COMPANIES BELONGING TO THE POLISH ORGANISATION OF OIL INDUSTRY AND TRADE ALREADY HELD A 57% SHARE OF THE FILLING STATION MARKET

at its shops. The new owner of the shops did not take over the filling stations with them and they were taken by other operators. Thus, the total number of stations at this type of shopping facilities decreased by a further 8. Shop chains, although accounting for a small percentage of the total filling station market, sell large volumes of fuels by offering attractive prices and thus their share of the fuel retail market is significant. The leader in this group of operators is still Intermarché, which has announced further investments in new facilities. Carrefour and E.Leclerc chains have retained their positions, while Auchan has even slightly increased its inventory by 3 stations.

The described statistics focus mainly on public stations selling at least 2 fuel types (P and D). In addition to them, there are also a number of stations in the market which sell only autogas or diesel. However, they constitute a significant minority in relation to those described above and therefore have not been included in the presented analyses.

Figure 26 shows the percentage breakdown of the market for filling stations by retail operator group. No significant changes were recorded in this breakdown compared to the previous year. The most noticeable is a decrease in the share by stations with the LOTOS logo (1.5 percentage points) and an increase of 1 percentage point in the slice showing the segment occupied by PKN ORLEN. 'Other private stations' also lost one percentage point to other companies. The largest network operators virtually maintained their position and shares from the previous year in a very similar dimension.

More and more electric vehicle chargers are being installed on the Polish market, also at filling stations. For the past three years, their number has been steadily increasing in line with the number of registrations of new battery-powered cars. For stations previously selling only petroleum fuels, this is an extension of their range of services and preparation for new market challenges. According to the data provided by the Polish Alternative Fuels Association, at the end of 2022, there were a total of 2565 charging stations, out of which 752 offered fast (DC), and 1813 slow (AC) charging. POPiHN established that out of this number, 212 fast and 167 slow chargers were installed at filling stations that also sold motor fuels. Chargers are an investment in the future of petrol stations, but it seems that for a long time to come classic fuels will be the mainstay of sales.





DEMAND FORECAST FOR THE POLISH MARKET UP TO 2030

The picture of the country's fuel market observed after the COVID-19 pandemic and the outbreak of war against Ukraine, followed by the introduction of a whole series of sanctions against the Russian aggressor, remodelled the approach to formulating forecasts of liquid fuel demand in Poland. The pandemic left its mark on the entire global economy, also affecting Poland. From 2021 onwards, markets began to recover and so did the demand for energy commodities. It seemed that in 2022 this process would continue and the outlook looked promising. Unfortunately, on 24 February 2022, everything changed abruptly again. Russia's aggression against Ukraine led to numerous changes and shifts in the global energy market, including in the oil and finished petroleum products sector. The latest projection of demand scenarios prepared by the Polish Organisation of Oil Industry and Trade took into account new global trends, but also the economic situation in Poland – a country currently next to the front line with a whole range of problems related to the conflict beyond our eastern border. New scenarios have been prepared on the basis of the knowledge of experts from member companies and the Organisation's office. Available data on fuel consumption in Poland for 2022 as well as observed in previous years trends and factors shaping the current market, including the continued climate policy of the European Union, have been taken into account. The impact of the war on the market in 2022 and the associated potential for disruption to the supply of fuels or components for their production have also been analysed. Postpandemic changes observed in public habits and new elements related to the need to supply refugees and the handling of transport for war supplies have been taken into account too. The return of the domestic market to the 2019 results, or even clearly exceeding them, as well as taking into account new market realities, have resulted in visible changes in the approach to creating the scenarios. Significantly higher consumption figures than last year for petrol, diesel and LPG indicate how volatile the market is in case of crude oil derivatives.

FIG. 27 SCENARIO FOR LIQUID FUELS DEMAND

IN 2022-2030 (in m. m³)

Source: POPiHN's own data



In this context, it should be noted that POPiHN succeeded in accurately predicting the trends that were observed in the market, and the outbreak of the war further accentuated them. A recovery in the market for petrol, diesel and autogas was therefore predicted. In addition, it was rightly assumed that alongside a recovery of the world economies, the price of oil and fuel would have to rise. However, only the scale of these changes was not accurately predicted. The assumption that the fleet of internal combustion vehicles would grow also proved true, although it was not assumed that this would be mainly due to new vehicles circulating around the country with Ukrainian number plates. In 2022, there were around one million cars bought from showrooms and imported from abroad, and another one million or so vehicles were Ukrainian vehicles that refugees brought into Poland, either permanently or for the long term. The role of fuel tourism was also underestimated; its scale, due to favourable prices in Poland, compared to other EU countries, was probably the highest ever. During the analytical work on the current version of the scenarios, efforts were made to take into account the latest changes taking place in the economy, including those necessitated by the ongoing energy transition. Several variants of the scenarios were preserved to reflect the different trends in Polish economy and the needs of Polish drivers.

The new baseline and optimistic scenarios assume effective measures to reduce the magnitude of the economic slowdown and contain the scale of inflation. Furthermore, there is a continuous decline in oil refining capacity in the EU due to prolonged maintenance, unplanned breakdowns and strikes. In addition, the embargo on Russian oil (from 5 December 2022) and fuels (from 5 February 2023) will increase competition for fuel between EU countries. At the same time, Poland's independence from Russian oil and diesel supplies is the biggest logistical and technical challenge facing the fuel industry. Refineries in the former Eastern Bloc were optimised for REBCO oil. The shift to other grades will most likely result in a change in yield structure and logistical complications for marine deliveries from distant directions. This may translate into a decrease in the optimisation of domestic refineries. Some of the European plants that have switched from futures contracts to spot purchases of crude of different qualities have seen yield declines of 10 to 20%. It is difficult to forecast exactly what will happen in 2023 as there are many important and unpredictable variables (the state of the epidemiological threat, the macroand micro-economic situation, energy demand by the heating sector in the coming heating season, inflation, etc.). Market distortions can be both on the supply and demand side. It has also been assumed that in the near future, oil and finished product quotations in international markets in the next two to three years will be higher than in 2022, but that their market valuations will decline over time. This will be influenced, among other things, by possible tax regulations aimed at promoting zero- and low-emission vehicles, i.e. other than those with classic combustion engines. It was assumed that the USD-PLN exchange rate would remain similar to the one observed at the end of the

 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$



previous year. Domestically, the focus was placed on an economic downturn in 2023, followed by growth in the economy using national and European funds under the European Recovery Plan and the new budget perspective for 2021 - 2027, resulting in an increase in new investment tasks in infrastructure and the transformation of the Polish economy towards zeroemission one. The assumption was maintained that in the next few years there would be no significant changes in the drivers' preferences and that there would be more interest in buying cars with petrol engines, hybrid and electric ones rather than vehicles with diesel engines. Besides, it was assumed that heavy transport would be mostly served by dieselpowered cars by 2030. It was also assumed that inflation in Poland would remain high until the end of 2023, after which it would decline. However, this will not imply a reduction in prices, but only their slower increase. A continuation of current social benefits was also assumed, as well as an increase in the average wage of Poles and a low level of unemployment. The impact of alternative fuels on the domestic market in the next few years was assumed to be still insignificant compared to the traditional fuel market.

In addition to the assumptions presented above for the baseline scenario, additional elements were added, such as a slight further weakening of the Polish currency (not exceeding the PLN 5.00 limit for \in and \$), a decline in economic growth (S&P Global Ratings Agency lowered its forecast for Poland's GDP growth in 2023 to 0.9%), a shortage of fuels on the European market (reduced production in refineries in the east of Germany, reduced supplies from the south – the Czech Republic, Hungary, Slovakia), the continuation

of fuel exports to Ukraine, a slight weakening of the LPG market, the strengthening of domestic demand by vehicles from Ukraine and the possible supply of fuels to Poland from Russian oil supplied by pipelines to other Member States (mainly Slovakia, Hungary) on condition that the mass balance parity is maintained (production from Russian and non-Russian oil), which is in line with EC guidelines. An effective fight against the grey economy in the coming years was also assumed. Another assumption was that domestic inflation would start to decline from 2024. This option assumes that oil prices could remain between 80 and 100 USD/bbl in the long term. Unpredictable events today, such as those observed in connection with the outbreak of war against Ukraine, or possible military threats in various areas of the world, can significantly alter international demand for energy raw materials. It is anticipated, however, that the turbulence in oil demand due to this should not be higher than 20-30% of current supply, which will obviously translate into quotations, but can be compensated for fairly quickly by the actions of producing countries. Additionally, the declared energy transition in Europe, the United States of America, as well as China, further reinforced by the effects of Russian aggression and restrictions on the supply of Russian raw materials to the European market, aimed at moving away from fossil fuels to other, greener energy carriers, should force the international oil market to be fairly stable and neutralise increases in energy demand by other sources. Turbulence in the markets for energy carriers is possible, but the trend of increasing demand for petroleum fuels should be maintained (yet at a slightly lower rate) even after 2022 with an outlook to 2027-2028. In the country, the growth effect should

POPiHN



be achieved by continuing (over the next 3-4 years) to increase demand for diesel and petrol. Petrols, used in pure petrol and hybrid vehicles, should gain a larger share in the individual transport market, at the expense of diesel-powered passenger cars. Due to the increasing cost of purchasing autogas and not including this fuel in the list of alternative fuels, which allow the vehicle to enter clean air zones in cities, a gradual shift away from autogas-powered vehicles towards hybrid and electric vehicles (taxis, city supplies, car rentals) has been assumed over the next few years. In the long run, as recommended by the EU, the role of public transport, especially in medium-sized and big cities, as well as in long distance travels, is expected to grow. The above is likely to be linked to the introduction, mainly in city centres, of clean transport zones, restrictions on the movement of individual vehicles, a reduction in the number of parking spaces and an increase in parking fees, as well as the limitation of urban space to the needs of motorists. Public transport will become more and more ecological thanks to using an increasingly growing range of vehicles powered by alternative fuels. Long-distance travels will promote railway and a shift away from short-haul air travel. A further reduction in demand for heating oil is assumed, linked to a shift to other energy carriers (electricity from photovoltaics and wind, natural gas, biogas). In this variant, the official domestic market demand for liquid fuels in 2030 is currently being estimated at approximately 37 m. m³, this result being very close to the previous forecast.

When developing the optimistic variant, in addition to the main assumptions of the baseline variant, strengthening of the Polish currency was assumed (with € and \$ exchange rates at the level of PLN 4.20 - 4.40), along with economic growth in Poland above 3% p.a., reduction of the level of fuel shortages on the European market, stable fuel exports to Ukraine (potential increase possible once domestic needs are fully satisfied) and growth of the LPG market in Poland (effective solution of logistic challenges to possible difficulties on the eastern market). Due to the difficulty in purchasing new cars at present, and in view of the introduction of restrictions on the registration of vehicles with classic engines, a higher rate of imports of used cars powered by traditional fuels was assumed. Under this option, the domestic market demand for liquid fuels in 2030 would be around 40 million m³, which is around 1 million m³ less than the previous forecast.

The pessimistic variant assumes a recession of the economy in Poland with negative GDP, a deepening of the fuel shortage on the European market (reduced production in refineries throughout the EU, withholding of supplies from the south - the Czech Republic, Hungary, Slovakia), a large increase in fuel exports to Ukraine, the collapse of the LPG market in Poland due to the introduction of national sanctions or the cessation of sales by Russia, a change in the EC recommendation and the introduction of an absolute ban among EU member states on trade in fuels produced from Russian oil supplied to the EU through pipelines. It also assumes a possible return of restrictions related to the pandemic and its consequences, as well as a significant increase in inflation and a large depreciation of the Polish zloty against other currencies, which would result in higher prices at home. As a variant, but with a similar effect we may also assume a destabilisation

of the international situation and notable increments in oil quotations, resulting in a significant increase in the costs of functioning of the Polish economy and major increases of fuel prices, as well as intensified fiscalism reaching, as has usually been the case in the past, first to the fuel sector with a consequent reduction in demand. In this variant, demand for liquid fuels in 2030 is estimated at 33 million m³, which is similar to last year's scenario and at the same time significantly less than for the baseline variant.

Compared to scenarios prepared previously, there has been no significant change in the expected fuel consumption ceilings in 2030. The peak of demand is still forecast for 2027/2028. As this report is being prepared, it is already clear that the world is practically back to the pre-pandemic situation, with the global demand for crude oil amounting to ca. 100 million bbl of oil per day. Furthermore, it is estimated that demand for refinery crude will continue to increase, especially in Asian markets. Clearly, this is not the end of the traditional fuels era. The world, for the time being, cannot develop without oil and petroleum-based fuels, although it will probably try to eliminate this energy carrier more and more in the coming years. Other challenges that lay ahead of the petroleum sector are related to shifting today's industry to low-carbon economy, in line with the new requirements of the 'Green Deal'. The objectives of the sustainable environmental policy are attainable with the reasonable use of the knowledge and the capital of fuel companies. Building low-carbon economy is bound to define the new identity of the transport sector for the years to come, and thus it will set new objectives also for the petroleum industry. In the transport and communication sector, the strategy to move towards zero emissions sets a number of new targets, including: a 55% reduction in emissions from passenger vehicles by 2030; a 50% reduction in emissions from commercial vehicles by 2030; a ban on registration of passenger vehicles with internal combustion engines from 2035; the inclusion of car transport in the greenhouse gas emissions trading scheme from 2026; the inclusion of maritime transport in the greenhouse gas emissions trading scheme; the inclusion of air transport in the greenhouse gas emissions trading scheme; and, last but not least, the elimination of the current tax reliefs.

The adoption of the 'Fit for 55' strategy by EU member states confirms the aspiration to systematically reduce the use of fossil fuels by gradually phasing them out of the economy and replacing them with new energy carriers, the combustion of which will not increase greenhouse gas emissions. What remains to be decided is the direction and determination of priorities, as well as preferences with regard to the development of alternative energy sources and their markets. Their implementation will result in a long-term decrease in the consumption of petroleum fuels and oil itself. At the moment, the most likely alternatives for replacing fossil fuels in transport and communication seem to be the development of electromobility using electricity from RES, as well as the increased use of low-carbon fuels, i.e. LNG and CNG gas largely derived from biomass, or hydrogen. We are entering a period when the drivers and transport companies will have at their disposal a wide selection of fuels to choose from. Nonetheless, even though petroleum fuel will be just one of them, it will be impossible to do without it for a long time to come.

 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$





MOTOR FUEL PRICES

The Russian aggression against Ukraine turned the supply situation in the liquid fuel market upside down. Nevertheless, the assumptions made at the end of 2021 by the Polish Organisation of Oil Industry and Trade regarding increases in retail motor fuel prices in 2022 were confirmed in practice. Increases in the price of motor fuels and higher prices for diesel than for standard 95 petrol were assumed. However, the amount of these increases was not correctly predicted. Once again, life showed that in the oil market, everything is possible and changeable in a very short time. How strongly fuel prices are linked to the geopolitical situation in the world was shown by the events related to the pandemic: on the one hand, when there were record reductions in crude oil and fuel quotations and, on the other hand, when, due to the war against Ukraine, there were record increases in these quotations. Both of these events in recent years have had a huge impact on the oil market and thus on fuel prices globally and in Poland. The restrictions applied to suppress the epidemic caused a price crisis in the oil and fuel market in 2020. In 2022, however, the price levels observed on international exchanges and subsequently at filling stations in the year of the outbreak of the pandemic, and even those guoted in 2021, were guickly forgotten. Wholesale and station prices rose virtually continuously, contributing to the development of inflationary indicators. Although anti-inflationary shields were introduced to reduce the drain on motorists' wallets, the outbreak of war against Ukraine caused a significant acceleration of rises on international exchanges and, consequently, in filling vehicles up. In our circumstances, a country directly neighbouring a war zone, the value of the Polish currency weakened, generating additional impetus for rises.

Since the outbreak of the war against Ukraine, the pylons of petrol stations displayed increasingly high prices, exceeding further psychological limits. High price levels persisted until the end of the year, spurred on during the winter months by news of the planned removal of the anti-inflation shields and the introduction of new sanctions on oil and fuel supplies from Russia. At the beginning of the year, price rises followed the stimulation of global economies after the pandemic and the urgent need to meet new energy requirements. In addition, there were problems with very expensive natural gas. These led to a return to greater use of oil and the fuels derived from it for energy purposes. World oil and fuel stock levels were declining and producer countries were not significantly increasing production, receiving record revenues for their products. Reductions in OPEC+ production limits grew slowly and were not fully implemented. In Poland, the highest percentage price increases were observed for diesel and autogas, but increases for petrol were also not much lower. The following months of 2022 were increasingly less favourable for the wallets of drivers filling up their vehicles. Retail price increases did not benefit fuel sales margins, as station operators sought to sustain demand by reducing this price component.

The global fuel market operates as if it was a system of communicating vessels. This means that changes occurring on it affect all countries to a similar extent. In Poland, this was observed in wholesale and filling stations' price levels. After a brief period of decline in late January and early February, prices shot up after Russia's attack on Ukraine. We quickly had to get used to prices well in excess of 5, 6 or even POPiHN

 $n/\approx/\approx/$

FIG. 28 PRICES FOR BRENT CRUDE AND THE USD EXCHANGE RATE IN 2022



7 PLN per litre, regardless of whether it was EU95 petrol or diesel. Prices of autogas also rose sharply and reached new records. Diesel prices remained at such high levels until the end of the year, while the prices of EU95 petrol and autogas slightly decreased: for autogas from April and for EU95 petrol from July. Prices were high despite the anti-inflationary shields reducing fuel taxation. Throughout practically the whole year, buying diesel was more expensive than buying 95-octane petrol, with the price difference at the beginning of the year being just PLN 0.04/I while at the end of the year it was PLN 1.13/l. The difference started to increase significantly from the beginning of August. The record for the average domestic price of diesel was PLN 8.08/I reached in mid-October, and that of EU95 petrol was PLN 7.95/l at the beginning of June. On an annual basis, for diesel we paid on average 34% and for the basic grade of petrol for spark-ignition engines 22% more than in the previous year. High wholesale prices only periodically (mainly at the end of the year) allowed all filling station operators to maintain margins at satisfactory levels. For the most part of the year, earnings from fuel sales would not allow stations to be maintained solely on these sales. The situation was slightly better for fuel producers, whose total margins were slightly higher than those of strictly retail operators. Rising retail prices had a hampering effect on domestic demand, particularly in the second half of the year. However, in view of the increased mobility of Poles in the country, necessary handling of traffic related to military operations in Ukraine, handling of traffic related to refugees and periodical large purchases at border stations in the west and south of the country by drivers from neighbouring EU countries, the sector was not particularly affected and the final consumption result came out at a positive level.

As mentioned above, the upper limits for the average domestic prices of diesel and EU95 petrol were around PLN 8/I. For autogas, it was almost PLN 3.8/I. Last year, a litre of diesel was on average PLN 0.55 more expensive than a litre of EU95 petrol. Let us recall that in the previous year a litre of petrol was PLN 0.09 more expensive than diesel. In relation to the average prices for 2021, one litre of EU95 petrol cost

PLN 1.2 more, and diesel PLN 1.84 more. Autogas was the least expensive on average throughout the year, just by PLN 0.57/l. In 2022 the price range for 95-octane petrol was from PLN 5.19 to 7.95 per litre. For diesel the range was from PLN 5.28 to 8.08 per litre. Thus, the difference between the lowest and the highest price of both fuel types during the year amounted to approximately PLN 2.8/I. Fast and continuously growing prices at filling stations meant that their operators, in order to maintain sales volumes, had to reduce their margins. It often happened that fuel was sold at minimum margins or even without them. Such actions had a strong impact on the revenues of fuel companies and led to a situation where the maintenance of outlets was only possible thanks to shops operating at them and additional services offered. The situation for the year as a whole was somewhat improved by the maintenance of high retail margins in the final months of the year, especially for operators other than fuel producers, who were previously still able to rely on wholesale margins in accounting for their market activity.

The beginning of the year was dominated by the actions of the OPEC+ countries, which loosened production limits only slightly, achieving very high revenues from the sale of crude oil and petroleum products. The unfreezing of the global economy after the pandemic was underway. The decline in global crude stocks and the slow return to production of installations in US shale fields were also important factors affecting the price of oil on international markets. The outbreak of war against Ukraine further complicated the oil market situation. Measures were taken to sanction the import of Russian oil and fuel produced in refineries there. The price differential between Brent and REBCO, which was normally a few dollars, increased to over USD 30/bbl. At the same time, there was an intensive search for alternatives to Russian crude supplies for European refineries. In shaky market balance conditions, such actions must have raised crude quotations and introduced anxiety in terms of the availability of fuel. And it was the high demand for fuel (other than from the Russian market) that was the element driving up crude prices. Trends in global price changes as usually translated into domestic price levels. The Polish zloty's depreciation against the US dollar did not help either. At the same time, the Polish government, in an attempt to provide relief to motorists, introduced reductions in excise duties to minimum European levels back in December 2021 and, in parallel, reduced the VAT rate from 23 to 8% for motor fuels from February 2022. Retail sales tax for motor fuels was also suspended. It was announced that the shields would be in place until the end of 2022.

The main price driver in our geographic area – average annual Brent crude oil quotations – exceeded USD 101/bbl, which was 43% higher than the 2021 average. At the beginning of the year, crude quotations were at around USD 77/bbl and then, as uncertainty in the supply markets continued, there was a series of increases up to a level of more than USD 138/bbl in early March. After reaching this peak, the price of crude oil began to drop until it reached around USD 81/bbl by the end of the year. The largest oil producers, the OPEC+ countries, regulated the market by cautiously raising production limits. At the same





FIG. 29 COMPARISON OF ANNUAL AVERAGE PRICES FOR CRUDE OIL, LIQUID FUELS AND THE USD EXCHANGE RATE IN 2021-2022

Source: Prices from e-petrol.pl for Brent crude FOB Sullom VOE, for fuels CIF NWE ARA

Description	YEAF	R 2021	YEAR	Reference		
					2022 to 2021	
	Value	Units	Value	Units	2021=100	
Prices for Brent crude	70.72	USD/bbl	101.15	USD/bbl	143	
Prices for						
Premium Petrol 10 ppm S	685.5	USD/t	1,057.6	USD/t	154	
Prices for						
diesel 10 ppm S	589.6	USD/t	1,067	USD/t	181	
USD exchange rate	3.8614	PLN	4.4568	PLN	115	

time, they kept these limits at levels that would not allow refinery crude prices to fall too much. Problems with the supply of natural gas and pushing the price of this energy carrier to record levels also affected demand for oil, used as a substitute for gas to produce electricity and heat. The search for new supply routes for European refineries, other than Russia, was hampered by the fact that the pandemic had caused a backlog of new investment in oil production. This translated into the inability of some producing countries to meet their preestablished production limits. Relationships with the oil market, further strengthened by the situation with the high demand for diesel in the global economy, moved to the market for fuel, which was traded on international exchanges. The increase in diesel quotations was 38 percentage points higher than the increase in crude oil quotations. For premium petrol the increase exceeded that of crude by 11 percentage points. These figures show that it was the demand for fuel, and diesel in particular, that largely influenced the situation in oil markets. In the Polish market, net wholesale prices were shaped by changes in exchange quotations of fuel and changes in the exchange rate of the zloty against the US dollar, as well as the protective measures related to the antiinflation shields undertaken by the Polish government in 2021 and 2022. Despite these measures, drivers still had to dig deeper into their pockets.

As in previous years, the level of import parity determined the direction of wholesale prices, and, consequently, retail prices. Significant net price increases and reductions in direct and indirect tax rates caused the share of these burdens per litre of motor fuel to decrease at such record prices at the pump.

Brent crude oil prices, which determine prices for the European market, are shown in Figure 28.

The onset of warfare operations in Ukraine led to concerns about the availability of fuel at Polish stations. This significantly increased their sales levels in the country and, in a period of panic, must have caused prices to rise. It all happened as the supply situation (particularly in diesel) across the European Union also deteriorated due to restrictions on imports from the East, but also due to reduced production at European refineries, caused by numerous reasons: strikes, repairs, fires. For filling station operators, such price movements were by no means a period of good income. On the contrary, for many months their margins from the sale of fuel alone were even lower, compared to the average for the whole of the previous year. This was a result of, among other things, supply price increases at a rate where retailers could not keep up with sales of previously purchased cheaper goods, and the need to sustain demand for fuels at their station facilities with such high price ceilings. Fortunately for many operators, sales in the forecourt shops did well instead and the profitability of the services offered, mainly catering, grew. Non-fuel activities made it possible during the year to make the profits necessary to maintain the facilities and their staff.

The economic results presented by domestic fuel producers show that these operators maximised their production capacities to supply the internal market, avoiding fuel shortages in the market, despite occasional problems with over-purchasing of fuels or problems related mainly to biocomponents added to these fuels.

Factors affecting domestic wholesale and retail prices (prices of crude oil, prices of main fuels and the dollar exchange rate) were as follows in 2022 (Fig. 29).

The interdependence of crude oil prices and the USD exchange rate in the Polish market is shown in Fig. 30.

FIG. 30 FLUCTUATIONS IN BRENT CRUDE PRICES AND IN THE EXCHANGE RATE OF THE USD IN 2022 COMPARED WITH AVERAGE IN 2021 [%]

Source: POPiHN and e-petrol.pl





FIG. 31 FLUCTUATIONS IN CRUDE OIL AND FUEL QUOTATIONS IN 2022 COMPARED WITH 2021 AVERAGES [%]

Source: POPiHN and e-petrol.pl



Comparison of trends for crude oil and fuel is presented in Fig. 31.

Significant increment in crude quotations on a cumulative basis lasted from the beginning of the year until the end of the first half of the year. The trend then reversed. A similar trend to that for crude was also observed for motor petrol, while diesel quotations, after reaching a high after the first half of the year, already remained there (Fig. 31).

Events on the international markets for crude oil and finished fuels were almost automatically transferred to the Polish market, albeit with greater strength in terms of net price increases (excluding tax charges). This is largely the result of the depreciation of the zloty against the US dollar. In Poland, the national currency, or rather its reference to the North American currency, always somewhat influences prices at our manufacturers and filling stations. A 15% depreciation of the zloty against the US dollar was recorded in 2022. There was a decrease in the tax burden due to the change in the excise and fuel surcharge rates under the 2021 antiinflation shield and due to the reduction in the VAT rate from February 2022. Changes in average annual prices for spot purchases at Polish refineries are shown in the tables (Fig. 32 and 33).

The table in Figure 32 shows that net prices, i.e. exclusive of tax, of EU95 petrol at Polish producers, directly related to commodity exchange quotations, increased less than global prices of this fuel type. This was partially due to the weakening of the Polish currency and was additionally influenced by negotiated oil transaction prices, logistics costs, the level of domestic demand and the sales policy of companies dealing in fuel.

FIG. 32 COMPARISON OF ANNUAL AVERAGE WHOLESALE PRICES OF PETROL AT DOMESTIC FUEL PRODUCERS

Source: PKN ORLEN SA, Grupa LOTOS S.A., POPiHN

Description	YEA	R 2021	YEAF	2022	Reference		
					2022 to 2021		
	Value	Units	Value	Units	2021=100		
EU95 petrol gross							
(without VAT)	4,281	PLN/1000 I	5,985	PLN/1000 I	140		
Excise	1,514	PLN/10001	1,413	PLN/1000 I	93		
Fuel surcharge	165	PLN/10001	153	PLN/1000 I	92		
Emissions fee	80	PLN/10001	80	PLN/1000 I	100		
EU95 petrol net	2,522	PLN/10001	4,339	PLN/1000 I	172		

FIG. 33 COMPARISON OF ANNUAL AVERAGE WHOLESALE PRICES OF DIESEL AT DOMESTIC FUEL PRODUCERS

Source: POPiHN's own study based on data of PKN ORLEN SA and Grupa LOTOS SA

Description	YEAF	R 2021	YEAR	2022	Reference				
					2022 to 2021				
	Value	Units	Value	Units	2021=100				
Diesel with S 0.001%									
gross (without VAT)	4,270	PLN/1000 I	6,543	PLN/1000 I	153				
Excise diesel with S 0,001%	1,145	PLN/10001	1,104	PLN/1000 I	96				
Fuel surcharge	339	PLN/10001	329	PLN/1000 I	97				
Emissions fee	80	PLN/10001	80	PLN/1000 I	100				
Diesel with S 0,001% net	2,706	PLN/10001	5 030	PLN/1000 I	186				

FIG. 34 COMPARISON OF MOTOR FUELS' RETAIL PRICES

Source: POPiHN's own study based on data from e-petrol.pl and WPN

Description	YEA	R 2021	YEAF	Reference 2022 to 2021		
	Value	Units	Value	Units	2021=100	
Average retail						
price of EU95	5.44	PLN/I	6.64	PLN/I	122	
Average retail						
price of ON	5.35	PLN/I	7.19	PLN/I	134	
Average retail						
price of autogas	2.67	PLN/I	3.24	PLN/I	121	





Comparisons of diesel prices in the Polish refinery market are given in Figure 33.

Diesel also became more expensive in the country, to a greater extent than stock market quotations would indicate, but the difference here was smaller than for standard petrol (Fig. 33).

In 2022, apart from a short period just before the holidays, EU95 petrol at retail cost less than diesel. In the final settlement, the price difference between the two grades of fuel was much more significant than a year ago.

A comparison of the retail prices of EU95 petrol, autogas and diesel in the years 2021-2022 is shown in the table (Fig. 34).

The price relationship of EU95 petrol/autogas followed the same pattern as in previous years in favour of autogas, and the profitability of fuel switching remained at last year's level. The autogas to 95-octane petrol price ratio averaged around 49% in 2022. The price trends of individual fuels on the domestic market are shown by the graphs in Figures 35 and 36.

Since 2018, average motor fuel prices in Poland have been rising year-on-year, the exception being 2020, when pandemic disruption led to reductions. New price records were set in 2022, and current market realities suggest that we are facing another year with a forecast of rising fuel prices, unless something similar to a pandemic happens that leads to a crash in fuel markets. Such fuel market situations (the so-called 'black swans') do happen and are difficult to predict.

The graph in Figure 37 shows the relations between quotations on the international commodity stock exchanges and retail prices of fuels in Poland.

Due to the reasons described earlier, the average margins on diesel and EU95 petrol sales were at lower levels in 2022 than the year before. It is safe to assume that filling station operators, with the exception of the last months of the previous year, when margin ceilings were above the standard for the Polish market, will not count this period as a successful one. Many filling stations have survived only thanks to the possibility of trading in small and large catering outlets located at the stations. This was particularly the case for smaller operators without extensive networks with local or national coverage. The situation was also saved by sales of autogas, for which retail margins were higher than last year's. High prices in the market and expensive fuel, and the consequent rise in domestic inflation to levels not witnessed for a long time, forced the government to react. Back in December 2021, the first anti-inflation shield was introduced, followed by another in February 2022. These measures enabled reducing fuel prices and thus keeping stations busy.

Retail price levels in different areas of the country were still determined by demand, the scale of competition between different operators, as well as the range of in-store goods on offer and additional services available at this difficult time for operators and drivers. Only through free competition was it possible to prevent shortages in the market and keep fuel price increases to an absolute minimum.

It has already become the norm to maintain differentiated prices between certain regions of the country during the holiday or weekend travel seasons and depending on the road category at which the station is located. In 2022 the provinces which sold

FIG. 35 RETAIL PRICES OF EU95, DIESEL AND LPG IN 2006-2022 [PLN/1000 L]

Source: POPiHN's own study based on data from e-petrol.pl and WPN



FIG. 36 RETAIL PRICES OF EU95, DIESEL, LPG AND LFO IN 2022 [PLN/1000 L]

Source: POPiHN's own study based on data from e-petrol.pl, WPN and ARE



FIG. 37 CHANGES IN QUOTATIONS FOR FUELS ON INTERNATIONAL COMMODITY STOCK EXCHANGES AND IN RETAIL PRICES OF EU95 PETROL AND DIESEL IN POLAND IN 2022 COMPARED TO 2021 AVERAGE PRICES [%]

Source: POPiHN and e-petrol.pl



 $\left(\frac{n}{2} \right)$

FIG. 38 COMPARISON OF TAX BURDENS ON MOTOR FUELS IN 2021-2022 [IN THOUSAND M³]

Source: POPiHN's own data

Description	YEAF	₹2021	YEAR	2022	Reference 2022 to 2021		
	Value	Units	Value	Units	2020=100		
Total taxes for EU95							
(VAT+excise tax+fuel surchage.)	2,776	PLN/10001	2,192	PLN/10001	79		
Total taxes for D							
(VAT+excise tax+fuel surchage.)	2,565	PLN10001	2,101	PLN/10001	82		
% share of taxes							
in retail price of EU95	51	%	33	%	65		
% share of taxes							
in retail price of D	48	%	29	%	61		

FIG. 39 STRUCTURE OF RETAIL PRICE

OF MOTOR FUELS IN 2021-2022





Fuel surcharge

the most expensive fuel in the country were, just like in previous years, the following: Mazowieckie, Małopolskie, Podkarpackie and Zachodniopomorskie. There was a slight increase in prices at stations along the eastern wall due to restrictions on fuel imports from Belarus and increased traffic caused by supplying the Ukrainian market and refugee cars moving to and from Poland.

In Poland, taxes on fuel determine the level of retail prices. Figure 38 presents average tax burdens for motor fuels in 2022.

The data in the table show that in 2022, the quantitative average of taxes paid for both fuel types was lower than the value for the whole of last year. The share of taxes in the price of EU95 petrol and diesel, due to the higher net price and anti-inflation shields, decreased and reached 33% and 29% respectively. This is 18 percentage points less for fuel for sparkignition engines and 19 percentage points less for fuel for diesel engines than the average for the whole of 2021. The amount of taxes paid to the Treasury for every 1,000 litres of fuel sold was on average PLN 584 less for the basic petrol grade and PLN 464 less for diesel. For both types of fuel, the decrease in taxes paid was mainly due to the maintenance, as in December 2021, of a reduction to the minimum possible rate of excise duty and fuel surcharge and, from February 2022, a reduction to 8% of the VAT rate, i.e. the use of both anti-inflation shields. At that time there was no change to the emissions fee.

The structure of annual average retail prices for EU95 petrol and diesel is presented in Figure 39.

In terms of values, the price structure is the following.

The table below (Fig. 41) shows the comparison of prices of motor fuels in the European Union with domestic prices at the end of December 2022.

Analyses of price levels in Poland and in other EU countries have been very similar for years, showing that when converted into EUR, prices in our country are among the lowest in the EU. Such was also the situation for final retail prices in December 2022. This is confirmed by the data in the table in Figure 41 for both motor petrol and diesel. The prices presented for Poland, after conversion into EUR, include a reduced excise duty and VAT rate to counteract excessive price increases. In the case of the net price (excluding taxes), the situation was different, i.e. prices in Poland exceeded those in most European countries. The fact

Fuel surcharge





FIG. 40 STRUCTURE OF RETAIL FUEL PRICES IN 2021-2022 [IN PLN/L]

Source: POPiHN's own calculations

	Eurosuper 95 petrol							Diesel					Autogas							
	Retail	Excise	VAT	Fuel	Emis	Margin	Net	Retail	Excise	VAT	Fuel	Emis	Margin	Net	Retail	Excise	VAT	Fuel	Margin	Net
	price.			surcharge	fee.		price	price.			surcharge	fee.		price	price			surcharge		price
Average																				
2021	5.44	1.51	1.02	0.17	0.08	0.14	2.52	5.35	1.15	1.00	0.34	0.08	0.07	2.71	2.67	0.35	0.50	0.11	0.24	1.47
Average																				
2022	6.64	1.41	0.55	0.15	0.08	0.11	4.34	7.19	1.01	0.59	0.33	0.08	0.06	5.03	3.24	0.21	0.27	0.10	0.68	1.98
% change	22.1	-6.6	-45.9	-11.8	0.0	-22.9	72.2	34.4	-4.3	-41.0	-2.9	0.0	-13.7	85.6	21.3	-40.0	-45.9	-9.1	182.5	34.7

FIG. 41 AVERAGE RETAIL PRICES AND TAXES IN EU MEMBER STATES AND IN POLAND AT THE END OF DECEMBER 2022 IN EUR/1000 L 1 EUR = 4,6899 PLN

Source: Weekly Oil Bulletin ElA

	Euros	super 95			Diesel (EN 590)							
	Sale	Price without	Excise	VAT		Sale	Price without	Excise	VAT	VAT [%]		
	price	taxes		amount		price	taxes		amount			
1	2	3	4	5	6	7	8	9	10	11		
Austria	1,454.0	654.3	557.4	242.3	Austria	1,654.0	898.1	480.2	275.7	_20		
Belgium	1,634.3	750.5	600.2	283.6	Belgium	1,736.6	979.7	455.5	301.4	21		
Bulgaria	1,287.4	709.8	363.0	217.6	Bulgaria	1,524.7	940.3	330.3	254.1	20		
Croatia	1,331.2	658.9	406.1	266.2	Croatia	1,595.1	923.1	353.0	319.0	25		
Cypr	1,435.3	836.5	369.6	229.2	Cypr	1,663.7	1,057.3	340.8	265.6	19		
The Czech Republic	1,495.9	706.7	529.6	259.6	The Czech Republic	1,559.5	940.4	348.4	270.7	21		
Denmark	1,824.1	830.6	628.7	364.8	Denmark	1,810.7	1,010.8	437.8	362.1	25		
Estonia	1,711.0	862.8	563.0	285.2	Estonia	1,712.0	1,054.7	372.0	285.3	20		
Finland	1,851.0	770.3	722.4	358.3	Finland	1,985.0	1,090.3	510.5	384.2	24		
France	1,655.1	688.0	691.3	275.9	France	1,749.4	848.7	609.1	291.6	20		
Greece	1,827.0	758.0	715.4	353.6	Greece	1,791.0	1,020.0	424.4	346.6	24		
Spain	1,565.4	821.0	472.7	271.7	Spain	1,643.3	979.1	379.0	285.2	21		
The Netherlands	1,757.0	793.4	658.7	304.9	The Netherlands	1,754.0	1,024.1	425.5	304.4	21		
Ireland	1,569.2	791.4	484.4	293.4	Ireland	1,693.2	950.1	426.5	316.6	23		
Lithuania	1,492.5	767.5	466.0	259.0	Lithuania	1,654.5	995.4	372.0	287.1	21		
Luxembourg	1,485.0	742.1	527.1	215.8	Luxembourg	1,597.0	948.4	416.6	232.0	17		
Latvia	1,599.1	797.8	523.8	277.5	Latvia	1,643.3	927.9	430.2	285.2	21		
Malta	1,430.0	830.2	381.7	218.1	Malta	1,660.0	1,050.8	356.8	253.2	18		
Germany	1,747.0	813.6	654.5	278.9	Germany	1,818.0	1,057.3	470.4	290.3	19		
Portugal	1,600.0	786.6	514.2	299.2	Portugal	1,607.0	964.3	342.2	300.5	23		
Romania	1,296.2	703.4	385.8	207.0	Romania	1,532.8	934.5	353.6	244.7	19		
Slovakia	1,487.0	695.5	543.7	247.8	Slovakia	1,616.0	949.0	397.7	269.3	20		
Slovenia	1,318.3	701.1	379.5	237.7	Slovenia	1,545.0	916.4	350.0	278.6	22		
Sweden	1,695.0	774.2	581.8	339.0	Sweden	2,118.3	1,297.4	397.2	423.7	25		
Hungary	1,566.7	929.2	304.4	333.1	Hungary	1,778.4	1,120.2	280.1	378.1	27		
Italy	1,625.2	753.7	578.4	293.1	Italy	1,689.8	917.7	467.4	304,7	22		
POLAND	1,392.4	944.0	350.9	97.5	POLAND	1,633.2	1,196.3	322.6	114.3	8		
European average	1,560.5	773.0	516.8	270.6	European average	1,695.0	999.7	401.8	293.5			
Price in Poland					Price in Poland							
against average					against average							
European price	89%	122%	68%	36%	European price	96%	120%	80%	39%			

of the high margin was explained by the sector's desire to avoid a price shock and market collapse after the removal of the anti-inflation shields from 1 January 2023. At the end of 2022, the average retail domestic price of EU95 petrol was 11% and of diesel 4% lower than the average price for the entire analysed market of the 27 European countries. This, compared to December 2021, is a difference of 7 percentage points less for 95-octane petrol and 8 percentage points less for diesel.

At the end of December 2022 domestic net prices (excluding taxes and converted into EUR) of EU95 petrol were higher than the average European prices by 22%, while in case of diesel they were 20% higher.

In December 2022 for EU95 petrol the difference between the highest and the lowest net price observed in EU countries was EUR 290 (i.e. EUR 97 more than in the previous year), whereas the difference between the highest and the lowest retail price was EUR 564 per 1000 litres (i.e. EUR 206 less than in the previous year). This means a reduction in the retail price spread and an increase in the pre-tax price differential. It can be seen that a number of countries, such as Poland, took advantage of the reduction in some tax rates to lower final prices for the customer. For diesel, net prices differed by EUR 439 per 1000 litres (EUR 55 more than a year ago) and retail prices by EUR 594 per 1000 litres (21 less than a year ago). In terms of scale, for the two grades of fuel there were larger increments in the net price than in the retail price differential, which means a decrease in taxes with which the price for retail customers was regulated in each country.

From February 2022, the applicable VAT rate on fuel in Poland was reduced from 23% to 8%. At the end of December 2022 the difference between the amount





FIG. 42 RETAIL PRICES OF EU95 PETROL IN UE MEMBER STATES AT THE END OF DECEMBER 2022

Source: Weekly Oil Bulletin EIA, POPiHN



FIG. 44 SHARE OF TAXES IN RETAIL PRICE OF EU95 PETROL IN EUROPEAN COUNTRIES AT THE END OF DECEMBER 2022

Source: POPiHN's own data



FIG. 43 EX POMPA PRICES OF EU95 PETROL IN UE MEMBER STATES AT THE END OF DECEMBER 2022

Source: Weekly Oil Bulletin ElA



FIG. 45 SHARE OF TAXES IN RETAIL PRICE OF DIESEL IN EUROPEAN COUNTRIES AT THE END OF DECEMBER

Source: POPiHN's own data



of VAT paid on EU95 petrol, compared to the EU average, was 64%. A year earlier, it was 12%. For diesel, the same difference was 61%, while a year ago it was 6%. The amounts of excise tax paid (after conversion into EUR, including fuel surcharge and emissions fee) respectively for EU95 petrol and diesel were 32% and 20% lower than the European averages. Compared to the previous year, this is 4 percentage points more fore for EU95 petrol and 7 percentage points more for diesel.

The analyses show that, of all European countries, the share of taxes in the price of EU95 petrol did not exceed the level of 50% of the retail price only in 12

countries, including Poland, which is 5 more than a year ago. The average share of taxes in the price of petrol decreased to 50.5% in December 2022 from 54.2% in December 2021. The average value of the share of taxes in the retail price for this type of fuel is 41% against 48.4% a year ago. The comparison shows that Poles paid the lowest percentage of the retail price to the state budget in terms of taxes within the European countries. In addition, in December 2022, the size of the tax share spread in the retail price between the most taxed Greece and the least taxed Poland for EU95 petrol increased by 12 percentage points to 26. For diesel,



between first-ranked France and last-ranked Poland, this relationship was 25 percentage points, showing an increase of 11 percentage points. A comparison of the total tax burdens on fuels in the EU countries at the end of 2022 is presented in Figures 44 and 45.

In December 2022, the cheapest EU95 petrol in the European Union was sold at filling stations in Bulgaria and Romania. It was also not much more expensive in Poland. Diesel was the cheapest in the same countries as petrol, and the Polish price was closer to the middle of the European rate. This means that it was worthwhile for all of our immediate EU neighbours to come to Poland

and fill up their vehicles. Drivers from Germany visited Polish stations in particularly large numbers last year. Traditionally, fuels across our eastern border, in non-EU countries, were cheaper than in Poland, but journeys to get them were severely restricted by the war going on in Ukraine, where buying fuel was an extremely difficult and expensive thing to do. Every driver leaving Poland should leave with a full tank and return home with enough fuel to reach the nearest station on the Polish side of the border. Fuel tourism from neighbouring countries is also bound to do very well in the near future.

POPiHN



LUBRICATING OILS MARKET

After the breather provided by 2021, the Polish economy faced further difficulties in 2022, linked to the Russian aggression against Ukraine. Galloping inflation, shocking increases in energy prices and a loss of a sense of security had a key impact on businesses and consumers. Energy-related problems put the emergency brake on the process of moving away from fossil fuels, but there is no doubt that this is a highly ad hoc measure, while the pro-environmental direction taken by the European Union will only accelerate. The need to generate energy independently of imported raw materials is in line with the European Green Deal. Work on the regulations proposed as part of the 'Fit for 55' package is not slowing down. Draft regulations introducing the automotive emissions standards revolution are going through consecutive stages of negotiation and agreement. The lubricating oils industry is aware of the changes that the ban on the registration of internal combustion vehicles after 2035 will bring. It is, however, already facing other ongoing issues.

The energy crisis created enabling environment for the illpractice consisting in illegal disposal of waste oils, which, instead of being returned to circulation through recovery organisations, ended up in makeshift furnaces. Little likelihood of detection and low penalties were an acceptable risk in view of the potential financial benefits. Such a toxic alternative to legal fuel is not only harmful to the environment and human health, but also exacerbates the problems of the lubricating oil industry. Companies which place lubricating oils on the market are obliged to fulfil recovery and recycling obligations⁶. It is common practice to fulfil this obligation by using the services of recovery organisations, recyclers - i.e. companies professionally performing recovery and recycling of waste. Illegal combustion of waste oils, as well as their storage as a temporary supply of heating fuel, significantly hinders the activity of recovery

FIG. 46 COMPARISON OF THE STRUCTURE OF THE MARKET FOR LUBRICATING OILS IN 2021-2022

Source: POPiHN's own data



organisations and recyclers who, unable to obtain raw material from the market, are not able to fulfil the recovery obligation contracted with lubricating oil companies. The difficult situation was not remedied by the attractive high prices of raw material in purchase offers. The risky market environment in which recyclers currently operate forces them to limit the tonnage they are prepared to contract for recovery. This results in a particular hardship for those placing lubricating oils on the market. Such entities, faced with the impossibility of fulfilling their recovery and recycling obligations, either through a recovery organisation or with their own resources, will be forced to pay a product fee, which constitutes a significant financial burden. POPiHN has signalled this problem at ministerial level. The Ministry of Climate and Environment, however, has no plans to make changes to the required recovery and recycling levels, while the control authorities indicate that it is not possible to intensify controls due to limited resources. The coming year does not offer much chance of improving the situation.

In 2022 the Polish lubricating oil market reached a volume of 237,219 tonnes, which, compared to the result of 241,973 tonnes in 2021, represents a decrease in the overall sales level by 1.96% y-o-y.

Among the main reasons for the contraction of the lubricating oil market in 2022 are the energy crisis and a change in purchasing practices of large consumers. The spike in energy prices prompted many energyintensive companies to seek savings; temporarily, this often meant reducing production or stopping it altogether. The scale of electricity price increases is shown, among others, in the annual statistics presented by Towarowa Giełda Energii (TGE)⁷, where the weighted average BASE price on the Day-Ahead Market in 2022 was PLN 796.17/MWh, i.e. an increase of 98% compared to 2021. An even greater increase was observed in the futures market, where the weighted average price of the annual contract for base supply in 2023 (BASE_Y-23) was at 1,110.04 PLN/MWh in 2022, which is an increase of 189% compared to the price quoted for the BASE_Y-22 contract in 2021. The reduction or cessation of production by energyintensive companies were factors reducing demand for lubricants in the industry.

Preliminary estimates by Statistics Poland indicate a real growth of 4.9% in Polish GDP in 2022. This represents a decline in dynamics compared to 2021 (an increase of 6.8%), but it does not change the fact that, despite difficult conditions, the Polish economy was growing. The increase in demand for lubricating oils, expected in such conditions, should be juxtaposed with the observed change in stock policy at large lubricating oil recipients. Lessons were learnt from the disrupted supply chains in 2020, and even in 2021 we observed a trend of taking advantage of the availability of lubricants and building up stocks. This was intended to enable the continuation of processes consuming lubricants even

⁶ Act of 11 May 2001 on Obligations of Business Operators with respect to Managing Certain Waste and Product Fee (Journal of Laws of 2020, item 1903 and of 2019, item 1403)

⁷ Press release Summary of TGE's activities in 2022, Warsaw, 4 January 2023.





FIG. 47 COMPARISON OF THE STRUCTURE OF THE MARKET

FOR LUBRICATING OILS IN 2021-2022 [%]

Source: POPiHN's own data



in periods of market shortages. In 2022, lubricating oils were available on the market all year round. However, in the face of a deteriorating market situation, companies were looking for savings and willingly consumed their stocks, which negatively affected the market demand for lubricants.

Factors negatively impacting the lubricating oil industry in 2022 also include a significant increase in the price of base oils, particularly evident between March and September. Nevertheless, unlike in 2021, when a similar problem was observed, last year there were no difficulties related to the availability of base oils.

Data for 2022 show a slight increase in the share of the automotive segment in relation to the industrial segment compared to the proportions recorded in 2021.

There was little change in the market structure. The observed shifts rarely exceeded 0.5 p.p. The share of motor oils for passenger cars recorded an increase of 0.74 p.p., approaching 30% of the total lubricating oil market. This is due to consistently increasing sales of 0W-X and 5W-X oils, supported by the progressive replacement of the car fleet. Due to the above these oils account for 82.17% of the market demand for passenger car motor oils and on their own account for 24.25% (an increase of 1.71 p.p.) of the total lubricating oil market. 10W-X, 15W-X and 20W-X oils continue the downward trend, together accounting for only 5.26% (drop by 0.97 p.p.) of the total lubricating oil market in 2022. The share of heavy-duty engine oils shrank by 0.34 p.p. and amounted to 17.30% last year, mainly due to the decline in sales of 15W-X and 20W-X oils.

Hydraulic oils remained the most important type of oil in the industrial segment; their share of the total market was 16.58% (0.28 p.p. down). The largest increase in market share, by 0.47 p.p., was recorded for white oils, which now account for 2.33% of the market. The largest decrease in market share, i.e. by 0.38 p.p., was recorded by machine oils, reducing their share to 2.92% of the market.





FIG. 48 COMPARISON OF SALES OF CHOSEN LUBRICANT TYPES IN 2021-2022









ENGINE OILS FOR THE AUTOMOTIVE INDUSTRY

Automotive engine oils account for 48.65% of all lubricating oils sold in Poland, representing 82.36% of sales within the automotive segment. Their sales in 2022 amounted to 115,399 tonnes, i.e. 0.93% less than in 2021.

Within this segment, monograde oils (+4.19% y-o-y) recorded the highest sales growth. Passenger car motor oils accounted for almost half of the total automotive oil market, with sales of 70,010 tonnes, i.e. an increase by 0.56% y-o-y. The situation is different for heavy-duty engine oils, of which 41,040 tonnes were supplied to the market, i.e. 3.86% less than in 2021.

In a broader perspective, in 2022 the total automotive lubricating oil market amounted to 140,115 tonnes, which was a drop by 1.69% in sales compared to 2021.

Among automotive oils other than engine oils, sales declines prevailed. In 2022, 8.73% less gearbox oils were supplied to the market than in 2021, with a further decline in sales recorded by marine engine oils (- 8.35% y-o-y).

FIG. 49 STRUCTURE IN THE SEGMENT

OF THE AUTOMOTIVE ENGINE OILS IN 2021-2022

Source: POPiHN's own data



PASSENGER CARS MOTOR OILS (PCMO)

In 2022 sales of motor oils for passenger vehicles amounted to 70,010 tonnes, which constituted an increase of 0.56% y-o-y. Further growth in sales was driven by increasing demand for 0X-W and 5X-W oils, of which 5.5% more was sold than in 2021. The remaining passenger car motor oil grades recorded double-digit sales declines: 10W-X oils by 16.66% y-o-y, while 15W-X and 20W-X oils by 19.28% y-o-y. This trend is expected to continue; the progressive replacement of the car fleet in Poland will drive demand for modern passenger car lubricants.

High electricity prices outdated the argument about the cost-efficient operation of electric cars; however, the legislation designed to provide major support for their popularisation is not slowing down. In October last year, the European Commission, the Council of the European Union and the European Parliament reached an agreement on carbon dioxide emission standards for passenger and commercial vehicles. It was agreed that from 2035 passenger cars and vans could only be placed on the EU market if they met a 100% emissions reduction requirement. The formal adoption of the legislation has still not taken place, but the progress of the regulation identified as one of the biggest risk factors for the lubricating oil industry does not give grounds for optimism. FIG. 50 PASSENGER CAR MOTOR OILS WITH REFERENCE TO VISCOSITY CATEGORIES (EXCLUDING MONOGRADE OILS) - MARKET STRUCTURE IN 2021-2022





HEAVY-DUTY ENGINE OILS (HDEO)

41,040 tonnes of heavy-duty engine oils were sold in Poland in 2022, which was a decrease of 3.86% compared to 2021.

The decline in demand for heavy-duty engine oils in 2022 was primarily due to the crisis faced by the TSL industry, which is a large consumer of these lubricants. The Russian aggression against Ukraine had a very strong impact on transport companies, with rising fuel prices and the closure of some countries' markets to transport services proving particularly acute, leading to the breakdown of existing supply chains. The most affected were innovation-oriented and environmentally friendly companies that had invested in LNG-fuelled trucks; with the price of liquid natural gas rising several times in 2022, green fleets were grounded in car parks to minimise losses. Another factor negatively affecting the TSL industry was the sudden exodus of workers. Many Ukrainian nationals who had worked in Polish transport companies, upon hearing of the outbreak of war, returned to their homeland to defend it against the aggressor. The accumulation of these unfavourable factors reduced the number of transports carried out, which was reflected in lower demand for heavyduty lubricants.

Last year, only 0W-X and 5W-X oils recorded an increase in sales (by 1.57% y-o-y), but they still have the smallest share of the heavy-duty engine oil market. 10W-X oils recorded a 2.44% y-o-y drop in sales, while demand for 15W-X and 20W-X oils shrank by 6.72% y-o-y; thus the market gap between the shares of these grades narrowed again and is now only 0.80 p.p.

FIG. 51 HEAVY-DUTY ENGINE OILS WITH REFERENCE TO VISCOSITY CATEGORIES (EXCLUDING MONOGRADE OILS) – MARKET STRUCTURE IN 2021-2022









LUBRICANTS FOR INDUSTRY

97,103 tonnes of industrial lubricating oils were sold in Poland in 2022. The above means a 2.36% decline from the 99,455 tonnes sold in 2021.

Statistics Poland's data on a preliminary estimate of 4.9% y-o-y GDP growth in 2022 are not reflected in the lubricant market for industry. Business conditions were much more important. Record increases in energy prices, disrupted supply chains, a complete change in priorities in rail transport: these are just some of the factors that prompted reductions or temporary halts in production, especially for energyintensive companies.

Sales of the most important group of industrial oils, namely hydraulic oils, contracted by 3.61% y-o-y last year. A similar 3.49% y-o-y drop in sales was recorded by the second largest group in the segment, i.e. 'other industrial'. Demand for machine oils, after a very good 2021, declined by 13.25% y-o-y last year.

Few groups of industrial oils saw an increase in market demand in 2022. Gearbox oils witnessed sales increase by 2.64% y-o-y. Demand for chainsaw oils increased by as much as 32.24% y-o-y. White oils, after a record 60% increase in sales in 2021, also recorded double-digit sales growth in 2022, going up by 22.72% y-o-y. The case of turbine oils is particularly noteworthy. They were one of the few groups of industrial oils to record a decline in sales in 2021, while in the much more difficult economic year of 2022, their sales increased by 25.69% y-o-y, strongly indicating that this group of oils does not follow the main market trends, being driven rather by the maintenance calendar of large industrial installations, which periodically consume significant quantities of this lubricant.

FIG. 52 INDUSTRIAL OILS – MARKET STRUCTURE IN 2021-2022





POPiHN

 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$

PERN INVESTMENTS POLAND ON THE SAFE SIDE

The previous year, 2022, tested the capabilities of the Polish oil and fuel sector in a unique way, although, after all, earlier periods of pandemics or the chloride crisis also posed significant challenges. The war against Ukraine radically changed the energy picture in Europe. Poland is on the safe side of the jigsaw puzzle thanks to, among other things, PERN's investments. In 2023 the Company will continue to strengthen the key pillars of stability in oil and fuels.

Over the past six years, fuel capacity built by PERN has increased by nearly 0.6 million m³. PERN has constructed as many as 20 new fuel tanks during that period. Seven of these were put into operation in 2022, including one at the fuel depot in Dębogórze, whose role has significantly increased due to the geopolitical situation and the need to supply fuel to Poland from directions other than Russia. At the same time, at the end of June last year, construction of eight new tanks started. Thanks to the implementation of this part of the project, PERN will provide its Clients with as much as 256,000 m³ of new storage capacity for petroleum products. In recent years PERN's crude oil storage capacity has increased by approx. 1 million m³, making it significantly easier for Clients to diversify their supplies.











Today PERN has 19 fuel depots across the country with a potential after expansion of approx. 2.4 million m³ of petroleum products and four crude oil depots with a total capacity of over 4.1 million m³. The Company is continuously developing its storage infrastructure, increasing the storage capacity of intervention stocks and offering capacity for trading, thereby strengthening Poland's energy security.



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Today we are undoubtedly one of the pillars of Poland's energy security as regards oil and fuels as we provide raw material and fuels to our Clients. We will continue our investments to further increase the country's security buffer. This is a historic moment, as the energy market looks very different today than it did just over a year ago. We will make every effort to fulfil the strategic obligations entrusted to the Company.

Paweł Stańczyk, Chairman of PERN Management Board.

OIL WINDOW TO THE WORLD

The current energy security situation and the war in Ukraine mean that Naftoport from the PERN Group plays a key role in the current oil supply system to Poland. The reorientation of Clients in terms of choosing alternative suppliers of crude oil has increased significantly, as it has been confirmed by Naftoport's turnover. The Company once again achieved a record operating result. Crude oil and fuel transshipments amounted to 24.5 million tonnes in 2022, i.e. 37% more than in 2021, the most intensive year to date. Naftoport handled 363 tankers, i.e. 36% more than in 2021.

KEY SUPPLY DIRECTIONS

In 2022 the diversification of raw material supplies increased. This had to do with sanctions targeting the Russian oil sector due to the country's war against Ukraine. Crude oil from Saudi Arabia and Norway constituted twothirds of all sea deliveries to Poland. Significant quantities of crude oil were also imported from the UK and the USA. In total, as much as 87 per cent of crude oil delivered by sea to our country came from directions other than Russia, which was abandoned during the past year.



Today Naftoport is the window to the world when it comes to oil supplies to Poland. It is an effective tool that allows us to be independent of crude oil supplies from Russia. The Company is now faced with the key task of building another tanker berth in the shortest possible time, which will not only increase the efficiency of supply, but also the country's energy security.

FASTER LOGISTICS IN THE POMERANIAN SECTION

Given the fact that oil supplies to Poland by sea are increasing, efficient logistics seems crucial once the raw material has been taken off the vessels. PERN is currently testing a means of reducing resistance in pumping crude oil and at the same time increasing the pipeline's capacity in the Pomeranian Section. DRA, the Drag Reducing Agent, will thus enable the flow of crude oil through the trunk pipeline to be increased by up to around a third at peak times.



 $\left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(\frac{1}{2} \right)$



PERN is also analysing further investment projects that will facilitate the management of supplies by sea. Among other things, the Company is considering further expansion of its raw material depot in Miszewko Strzałkowskie near Płock and in Gdańsk. The Company is also prepared to build a second line of the Pomeranian pipeline, which delivers crude oil from the sea to Poland and Germany. However, the final decision on this will depend on the Company's Clients..

HANDLING THE LARGEST VESSELS

Last year Naftoport handled 363 vessels. Today, Naftoport can receive vessels of more than 300 metres in length (with a draught of up to 15 metres), VLCC class, which improves the efficiency of the terminal. There are 5 transshipment berths available and it is becoming increasingly common for 5 vessels to be handled simultaneously. The investment process for the construction of a new, sixth berth is currently underway. It will enable the long-term handling of raw material supplies by sea in line with the Clients' demand.

At present, Naftoport's potential enables the handling of over 36 million tonnes of crude oil and 4 million tonnes of petroleum products per year, ensuring the ability to fulfil the contracts concluded with PERN's Clients. The Company's marine terminal handles crude oil as well as petrol, aviation fuel, diesel, heating oil, condensates and components. The launch of the new transshipment berth will significantly increase the Company's transshipment capacity and strengthen the longterm operational efficiency of the Naftoport terminal.





SECURITY AGENDA FOR 2023

The fuel pipeline from Boronów to Trzebinia has just been finalised. Furthermore, by the early autumn of 2023 new product tanks with a total capacity of 256,000 m³ will have been commissioned, which PERN Clients will benefit from. Last but not least, the year 2023 will witness the expansion of the capacity to receive fuels from the sea at the Debogórze depot. These are key projects that strengthen the country's security infrastructure. The Company will allocate nearly PLN 0.7 billion for investments and renovations in 2023. What's the goal? To further strengthen Poland's energy security in the area of oil and fuels.

MEGAINVESTMENTS - THE KEY TO SECURITY

The fuel pipeline from Boronów to Trzebinia increases the possibility of supplying petroleum products to, among others, southern Poland, especially the Silesian Agglomeration. What is more, 8 new fuel tanks with a total capacity of 256,000 m³ will also come into operation in autumn 2023. PERN is building new tanks at, among others, the fuel depot in Dębogórze, which already serves as a key link in the system for supplying Poland with liquid fuels. In addition, PERN is planning to build three more tanks with a capacity of 50,000 m³ each for storing petroleum products in Dębogórze, which will facilitate offering services to Clients interested in importing fuels while using increasingly larger vessels.

INVESTMENT IN RAILWAYS

PERN will continue to invest in the rail infrastructure in Dębogórze by, among other things, modernising the tracks and loading bays of the rail filling station, which will enable the movement of tankers with larger capacities and improve logistics processes. PERN also wants to expand the rail filling station with a fourth loading site, due to market demand. These activities, combined with investments by the Port of Gdynia to modernise the Liquid Fuels Transshipment Station and deepen the waterway (to handle larger tankers), and investments by PKP to improve rail access to the Port of Gdynia, as well as the fuel depot in Dębogórze, will allow for an increase in the volumes of petroleum products received at Dębogórze and transported inland.

ECOLOGY AND RES

While ensuring the security of oil and fuel supplies, at the same time PERN is also continuously modernising its facilities to make them greener. The programme for the development of renewable energy sources will also continue, as RES reduce the Company's electricity consumption costs and are part of the diversification of operations.

PERN is also planning to carry out other programmes as regards ecology, including programmes to modernise power and lighting, water supply and sewage systems. In addition, the Company will be modernising and building vapour recovery units. During refuelling tanks and tankers petrol vapour is released and thanks to such VRUs as little of these vapours as possible escape into the atmosphere.

In 2023, PERN intends to implement further projects related to photovoltaics, wind energy as well as hydrogen. By 2028, PERN's expenditure on building its R&D project portfolio will be approx. PLN 1.5 billion.

BY 2028, PERN'S EXPENDITURE ON BUILDING THE R&D PROJECT PORTFOLIO WILL BE APPROX. PLN **1.5** BILLION

DIGITAL SERVICE FOR PERN CLIENTS

Market needs related to the digitalisation of relationships and easier access to information are causing PERN to place great emphasis on the development of IT tools to improve contact with the Company's partners.

In 2022 the Company launched the eKiosk system, which is a mobile application that allows drivers to have online access to selected information on fuel loading (instructions, preview of the current situation in the depots). The eKiosk also offers the possibility to book a pick-up time and prepare an entry ticket, bypassing the stationary multimedia kiosks that record the driver's arrival. All operations related to the preparation of data for filling can be performed on the phone without getting out of the cab.

For Clients and owners of products stored in fuel depots, the Company has also launched a new system for inventory management - the Customer Portal. It allows access to key information online anytime and anywhere. It is an excellent complement to electronic communication, i.e. B2B interfaces. The Customer Portal is a system designed by PERN employees, allowing for the generation of reports on fuel receipts and dispatches, and, thanks to integration with the Company's business systems, it allows for downloading documents issued by PERN, i.e. warehouse receipts, dispatches and laboratory certificates. The documents are available in real time just seconds after being generated.

Another novelty is the Carrier Portal with access to key data from the point of view of the transport company.

Direct access to information about instructions prepared for drivers or drivers and vehicles notified to PERN enables advance planning of pick-ups and the resolution of any problems before the fuel is collected. Given the current situation at individual fuel depots, it is also easier for the carrier to plan logistics.

The Company is also analysing development opportunities in terms of the use of modern technologies in the logistics process and management systems.



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