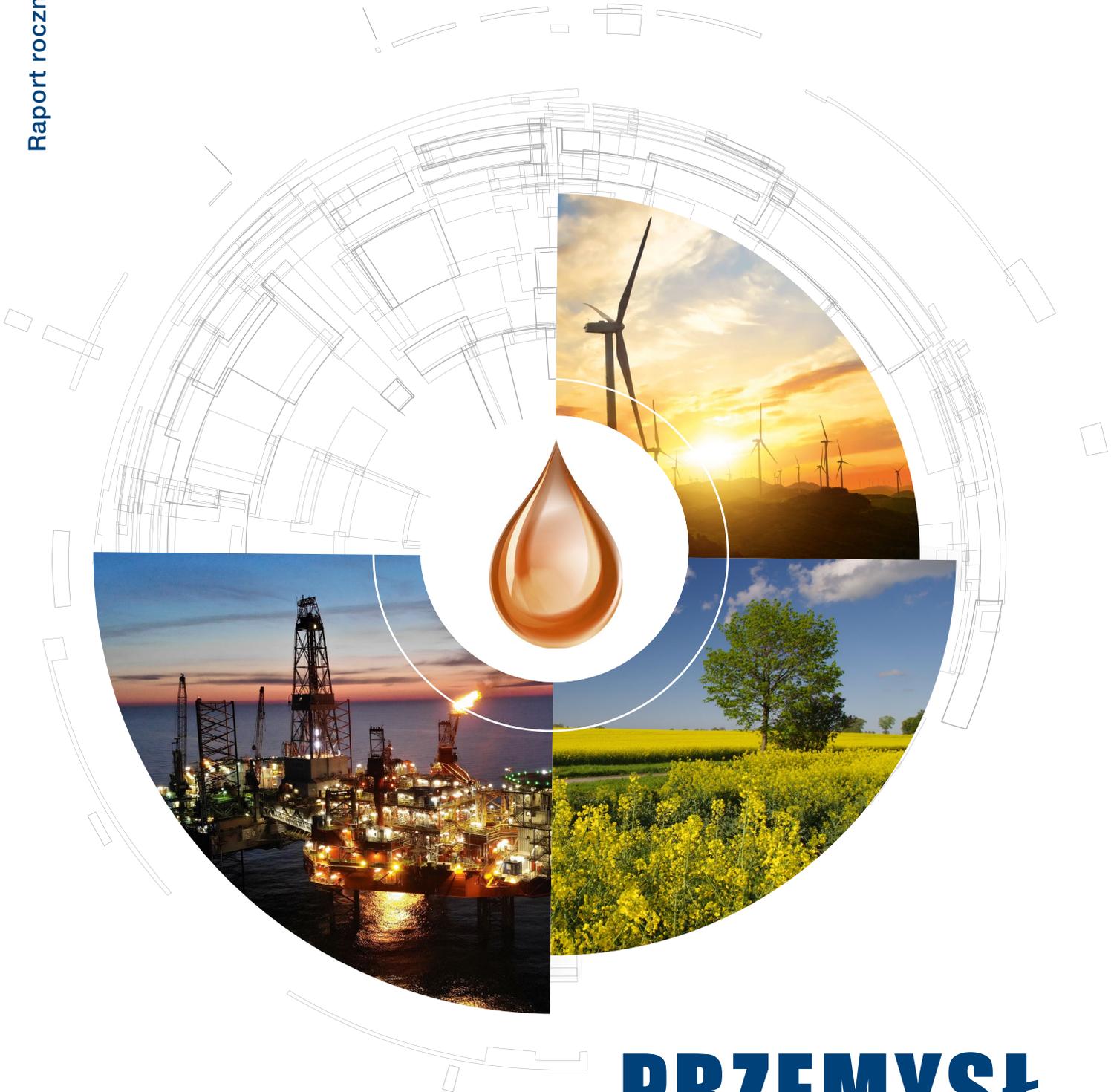


2021



PRZEMYSŁ I HANDEL NAFTOWY

OIL INDUSTRY AND TRADE

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DEAR READERS,

2021 was filled with very important economic events for the oil industry. The recovery in global oil demand after lifting pandemic restrictions, international supply chain disruptions and geopolitical factors have pushed up prices in global energy commodity markets. At the same time, as part of the EU's climate policy, on 14 July 2021 the European Commission put forward a series of legislative proposals known as „Fit for 55”. The package aims at accelerating the reduction of greenhouse gas emissions and abandoning the use of fossil fuels.

The key proposals and policy initiatives included in the package that should remodel the EU fuel market in the coming decades are:

- a mandatory 100% net emissions reduction for new passenger and commercial vehicles as of 2035. It is equivalent to banning the internal-combustion engine in the EU for vehicles dominating the automotive sector's production,
- the revision of the Energy Taxation Directive, which means an increase in the tax burden on fossil fuels, including less carbon-intensive gaseous fuels,
- the inclusion of the transport sector in the European Emissions Trading Scheme, which in practice would translate into a significant increase in the price of emission allowances, i.e. an increase in costs for the whole economy.

The EU's ambitious plans in practice mean great support for the concept of electrification of transport. Gas, biofuels and hydrogen are to play a role where, for technological reasons, it is difficult to use an electric engine (e.g. in aviation or heavy transport). For the

Polish economy, such an approach constitutes a major challenge as coal is predominant in the country's energy mix and investments in renewable energy sources or low-emission technologies are insufficient. Moreover, the low transmission capacity of electricity grids does not currently allow for more dynamic development of electromobility. Furthermore, costs of purchasing an electric car are still uncompetitive in relation to the prices of cars with combustion engines, despite the government support programme.

It is worth bearing in mind that relatively cheap fuels in recent years have been one of the important pro-development factors for the Polish economy. The above was possible thanks to the low margins applied by entities producing fuels or selling them in Poland. Last year, increases in the prices of crude oil, bio-fuels, gas and electricity, as well as the weakening of the Polish zloty against the US dollar led to exceptionally high increases in wholesale and retail fuel prices. However, from September onwards, retail price increases were much less dynamic than the increase in wholesale prices, which led to a significant decline in retail margins. On the other hand, from October most companies in the industry started to incur operating losses. In order to improve the situation and reduce prices, in December the government decided to temporarily reduce tax rates.

The impact of these events on the Polish market has been described in the POPIHN report, which we have the pleasure to present.

We wish you a pleasant reading of the report „Oil Industry and Trade 2021”.

Leszek Wiwala
President & Director General

Krzysztof Starzec
Chairman of the Board of Directors

POPIHN MEMBERS



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 May 2019 – May 2022.

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.
Jan Tar	– Grupa LOTOS S.A.
Armen Konrad Artwicz	– PKN ORLEN S.A.
Rafał Miland	– PERN S.A.
Piotr Dziwok	– Shell Polska Sp. z o.o.
Katarzyna Mazurek	– Sloznaft 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	– Director of Fuels Market Analysis
Joanna Lewandowska	– Office Manager
Nadia Rybczyńska	– Senior specialist on communication, safety and environment
Jan Strubiński	– Senior specialist tax and lubricating oils market specialist

THE REPORT USES THE FOLLOWING CONVERSION VALUES:

1 barrel of crude oil (1 bbl) = 159 liters
1 tonne of crude oil = 7.26 bbl

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 1ST QUARTER OF 2021:

Petrol	0,737 Mg/m ³
Diesel.....	0,831 Mg/m ³
Light fuel oil.....	0,827 Mg/m ³
LPG	0,545 Mg/m ³

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 2ND QUARTER OF 2021:

Petrol	0,737 Mg/m ³
Diesel.....	0,831 Mg/m ³
Light fuel oil.....	0,827 Mg/m ³
LPG	0,545 Mg/m ³

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 3RD QUARTER OF 2021:

Petrol	0,747 Mg/m ³
Diesel.....	0,835 Mg/m ³
Light fuel oil.....	0,828 Mg/m ³
LPG	0,547 Mg/m ³

PRODUCT DENSITIES USED IN MASS TO VOLUME CONVERSIONS IN 4TH QUARTER OF 2021:

Petrol	0,747 Mg/m ³
Diesel.....	0,835 Mg/m ³
Light fuel oil.....	0,829 Mg/m ³
LPG	0,539 Mg/m ³



Fot.: PKN ORLEN S.A.

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CLIMATE POLICY IN THE CONTEXT OF SOVEREIGNTY AND ENERGY SECURITY: STRATEGIC CHALLENGES FACING THE FUEL INDUSTRY IN POLAND AND THE EU

Progressive climate change is the result of human activity and requires urgent remedial action. Scientists from all over the world (including Poland) who work for the United Nations in the Intergovernmental Panel on Climate Change (IPCC) have for years recognised the threats and have been appealing for far-reaching greenhouse gas emission reductions. In order to understand the latest developments in climate policy, we have to go back a few years.

In 2015, the Paris Convention was developed. It was an international plan for long-term action aimed at slowing climate change according to IPCC guidance. The Convention took effect in 2016. As part of its implementation, towards the end of 2018 the European Commission adopted „A Clean Planet for All” in late 2018. It is a strategic document which sets out a long-term vision for a prosperous, modern, competitive and climate-neutral EU economy. The Commission recommended taking action to achieve net zero greenhouse gas emissions in 2050. The above means that emissions should be balanced by carbon capture technologies. A key tool for success was to be improved energy efficiency throughout the EU economy. One of the ways to achieve it was to abandon burning coal in power generation, heating and households, as well as to move away from the use of petroleum-based fuels and natural gas in transport.

Successive IPCC reports (the latest being „Climate Change 2022: Impacts, Adaptation and Vulnerability”) have indicated that there is very little chance of avoiding extreme weather phenomena and water shortages. The forecasts show large increases in energy consumption and emissions of CO₂ together with other greenhouse gases. According to scientists, exceeding a temperature rise of over 1.5°C by the end of the century will lead to a “cascade effect”, i.e. a sequence of events that will amplify further warming. Our planet's abilities to adapt to new conditions will not be able to keep up,

resulting in further uncontrolled increases in average temperatures and weather anomalies, tragic in their consequences. With a view to mitigating the effects of climate change, the global economy should reduce CO₂ emissions by half by 2030, net zero them by mid-century, and increase adaptation efforts.

The European Green Deal, a set of legislative and political measures prepared by the European Commission at the initiative of President Ursula von der Leyen, became a specific response to the scientists' diagnoses and at the same time a „milestone” in climate policy. The undisputed objectives of clean air and climate protection were to be achieved while respecting sustainable development and equal living standards in all EU regions. This very right assumption repeated at press conferences is supposed (at least in theory) to calm social fears related to the growing risk of energy poverty, but in practice it may prove difficult to achieve.

The Polish Organisation of Oil Industry and Trade, like industry organisations in other EU member states and FuelsEurope, supports the Paris Agreement and climate neutrality by 2050 for the EU. What is important is that the legal framework takes into account basic technological and market requirements.

„FIT FOR 55” – A VISION TOWARDS ACCELERATING THE ENERGY TRANSITION

On **14 July 2021** the European Commission announced the “Fit for 55” package, i.e. proposals for new legislation to help accelerate the pace of the energy transition. It is to be achieved, among other things, by increasing net greenhouse gas emissions reductions by 2030 to at least 55% below 1990 levels.

The proposals presented by the Commission are very broad and complex. Numerous revolutionary changes advocated within energy taxation, including the abolition of all excise exemptions for fossil fuels, imply a large increase in terms of burdens in a relatively short time. Switching the entire transport sector to low carbon fuels from an engineering perspective is both costly and difficult to implement. The changes are likely to be felt most in shipping and aviation, which might suffer the most due to loss of competitiveness against non-EU companies.

New emission standards proposals for cars and vans are likely to raise similar controversies. The introduction of an obligation to reduce net emissions by 100% as of 2035 is tantamount to a ban on the use of the internal combustion engine in the EU for new vehicles. The above means that all the cars introduced onto the EU market in 13 years' time will have to be

**„EVERY YEAR MATTERS,
EVERY CHOICE MATTERS.”**

Dr Valérie Masson-Delmotte, co-chair of the Intergovernmental Panel on Climate Change (IPCC) working group.



Fot.: GRUPA LOTOS S.A.

powered by electric engines (mainly battery-powered, partially with hydrogen). Manufacturing of such vehicles produces higher emissions and is more costly than the production of traditional combustion cars. Even if the European automotive sector manages to completely switch to the production of electric cars by that time, it is unclear whether such a choice will be acceptable to consumers, who will ultimately bear all the costs of the energy transition resulting from the implementation of the Green Deal.

A comprehensive analysis of the „Fit for 55” package goes way beyond the scope of POPIHN. In view of the fact that the projects presented by the European Commission will have a direct impact on far-reaching changes in the transport sector, with particular emphasis on the fuel industry, it is worth looking into at least some of the ideas from Brussels.

REFORM OF THE EMISSIONS TRADING SYSTEM

One of the most important and complex pieces of legislation within the package is the proposal **to reform the Emissions Trading System (EU ETS)**. It assumes a significantly higher ambition to reduce emissions from the current level of 43% to 61% by 2030 compared to 2005. This is to be achieved through a one-off reduction of the annual cap on total emissions, an almost doubling of the linear reduction factor of this cap (i.e. from 2.2% to 4.2%) and a tightening of the parameters of the Market Stability Reserve (MSR).

For market participants, the above implies a drastic reduction in the supply of allowances from 2024 onwards. The main effect of this mechanism will be a significant increase in the costs incurred by operators and the societies of EU countries (higher costs transferred to the price of electricity).

The package significantly affects the price of emission allowances, which already reached record levels in 2021. The speculative nature of the increases is distorting the market and unjustifiably increasing costs for entities who need a predictable and stable market in order to invest in low carbon technologies. The MSR allowance transfer mechanism is ideally designed to keep allowance prices systemically high despite emissions reductions. Despite reassuring promises from the European Commission, such design encourages financial institutions to speculate.

Unfortunately, the proposed reform does not provide for a change to the currently functioning, yet deeply flawed, price mechanism in the EU ETS (Article 28a of the ETS Directive). The mechanism hedging against volatility of allowance prices in the market should be systemic and long-term.

The proposal to maintain a 43% pool of free allowances for industry, with possible modification of the definitions and system boundaries of the existing product “benchmarks”, could lead to a deterioration in the international competitiveness of EU industry. Differences between sectors in their ability to reduce emissions are not taken into account. While the power generation industry has the technologies that enable

significant emissions reductions, energy-intensive industries lack in large-scale solutions. The main opportunities for the functioning of current assets in the perspective up to 2030 are mainly limited to energy efficiency improvement projects.

This is important in view of the proposals to include some sectors in the **Carbon Border Adjustment Mechanism (CBAM)**. According to the European Commission's proposal, they must expect a reduction in the number of free emission allowances received annually by 10%, starting from 2026. The withdrawal of free allowances should only take place once the practical effect of the measure has been verified and the risk of negative effects on competitiveness and prices in the export sector value chain have been addressed. CBAM and the existing instruments mitigating the risk of carbon leakage under the EU ETS (free allocations and compensation for indirect costs) should be seen as complementary as their objectives are different. CBAM should be designed to incentivise the climate ambitions of the EU's trading partners, while free allocations aim to protect European industry from the risk of carbon leakage and ensure a level playing field in export markets.

Another key element of ETS reform is the proposed support for CO₂ reductions from buildings and transport. **The extension of the ETS to the transport sector and buildings** does not take into account differences in costs and in the material situation of households across EU countries. Although buildings and transport are responsible for 1/3 of greenhouse gas emissions in Poland, over the last 30 years emissions in the building sector have remained at similar levels, while in transport they have more than doubled. Reducing emissions in both sectors requires access to significant financial resources for both protective measures and required infrastructure investments.

RED III

Under „Fit for 55”, the European Commission has proposed far-reaching changes to the directive on the promotion of the use of energy from renewable sources (RED II). Modifications to existing obligations

were presented and new requirements were introduced for renewable liquid and gaseous transport fuels of non-biological origin. The Commission proposed a change in the very definition of such fuels, stipulating that **“renewable fuels of non-biological origin”** will mean liquid and gaseous fuels whose energy value comes from renewable sources other than biomass (hereinafter: RFNBO).

The Commission's proposal is to add Article 22a to the directive. The said article requires that **by 2030 50% of the hydrogen used in industry for final energy and non-energy purposes should be renewable hydrogen** (or RFNBO). In this respect, these fuels should therefore replace the non-renewable hydrogen used in industry. This requirement applies, among others, to the refining and petrochemical industries. The authors' intention is that neither hydrogen nor RFNBO used as intermediate products in the production of conventional transport fuels will be taken into account in calculating this share. In other words, this means that the time for developing a hydrogen economy based on renewable sources will be considerably shortened.

It is worth noting that the Commission has also proposed to amend Article 25 of the directive, providing, inter alia, that **each Member State shall impose an obligation on fuel suppliers to ensure** that:

(a) renewable fuels and renewable electricity are supplied to the transport sector in quantities that will lead to a reduction of greenhouse gas intensity of at least 13% by 2030 compared to the baseline as referred to in Article 27(1)(b), in accordance with an indicative trajectory defined by individual member states;

(b) the share of advanced biofuels and biogas produced from the raw materials listed in Part A of Annex IX in energy supplied to the transport sector shall be at least 0.2% in 2022, 0.5% in 2025 and 2.2% in 2030, while the share of renewable fuels of non-biological origin (i.e. RFNBO) shall be at least 2.6% in 2030.

This proposal introduces an **RFNBO target in transport for 2030**, set at **2.6%** of energy supplied to the transport sector. It is also provided that, for the purpose of calculating the reduction referred to in point (a) and the share referred to in point (b), member states shall take into account non-biological renewable fuels (RFNBO) also when they are used as an intermediate product in the production of conventional fuels.

Moreover, the proposed Article 29(a) states that **the energy from RFNBO will be counted towards the above-mentioned goals only in the case when the reduction of greenhouse gas emission resulting from the use of these fuels is at least 70%**. In this context, a significant problem is the lack of delegated acts, which the European Commission has been authorized to adopt in Article 27(3) and Article 28(5) of the RED II directive. They should properly regulate the requirements that have to be met by operators during the production of RFNBO so that the hydrogen produced by them could be recognized as renewable within the meaning of the directive. In practice, it is also important to specify the methodology for calculating reductions in greenhouse gas emissions achieved by

THE COMMISSION'S PROPOSAL IS TO ADD ARTICLE 22A TO THE DIRECTIVE. THE SAID ARTICLE REQUIRES THAT BY 2030 50% OF THE HYDROGEN USED IN INDUSTRY FOR FINAL ENERGY AND NON-ENERGY PURPOSES SHOULD BE RENEWABLE HYDROGEN.



RFNBO, which will make it possible to count these fuels towards the goals set for the industry. The availability of renewable hydrogen in sufficient quantities to meet the above requirements is also problematic. The possible requirements for RES-E used to produce such hydrogen are also important, in view of the potential requirements for “additionality” of RES-E (in principle, only new RES-E installations, commissioned at a time close to that of hydrogen production, will be taken into account for the requirements) and the time and geographical correlation between hydrogen production and the production of RES-E.

NEW REQUIREMENTS FOR AVIATION

As part of “Fit for 55” package, the Commission has presented a draft **regulation to ensure a level playing field for sustainable air transport**. This regulation will introduce mandatory shares of so-called *Sustainable Aviation Fuel* (hereinafter SAF), including synthetic aviation fuels (which are the RFNBOs used in aviation) in all aviation fuel supplied by aviation fuel suppliers to aircraft operators at EU airports.

According to the Commission’s proposal, the required SAF content of blended aviation fuels will gradually increase. It should be at least 2% in 2025, up to 63% in 2050, while taking into account the sub-target for synthetic fuels (the share of RFNBO in aviation fuels will increase from 0.7% in 2030). At present, the availability of these fuels is limited, among others, due to much higher production costs than for conventional aviation fuels.

Given the drop-in requirement in the definition of SAF, RFNBO, which is an intermediate product in the production of conventional aviation fuels, will not count towards these targets. Some proposals made during the legislative process seek to limit the sources of carbon dioxide used in the production of synthetic fuels to Direct Air Capture technology only. There are also difficult proposals to limit the sulphur and aromatic content of aviation fuels. There have been proposals to use a “book and claim” mechanism to implement the obligations imposed on aviation fuel suppliers, instead of the transitional period suggested in the proposal for a regulation.

The new requirements for sustainable air transport put forward by the European Commission may lead to a worsening of the already weak post-pandemic condition of the airline industry.



Fot.: PKN ORLEN S.A.

European carriers will be burdened with high costs, with passenger and cargo planes refuelling outside the EU for medium distances. Over short distances, planes are to be replaced entirely by rail transport.

SELECTED CHALLENGES FACING THE FUEL INDUSTRY IN IMPLEMENTING THE GREEN DEAL

Today, the question still remains whether the discussed elements of the "Fit For 55" package have been optimally adapted to the long investment cycles of the industrial and energy sectors, the non-linear nature of the development of breakthrough technologies or the potential for modernisation and expansion of infrastructure. To ensure the credibility of achieving such an ambitious emissions reduction target within a time horizon of less than a decade, the top-down regulatory targets of the "Fit for 55" proposal should not be divorced from market and technological realities.

The success of achieving the reduction target depends on a number of factors and assumptions that are difficult to determine at the moment. Transformation in one sector affects the possible development of other sectors of the economy, household consumption and GDP value. In order to achieve the target by 2030,

it is necessary to intensify and strategically coordinate activities in many areas of the economy simultaneously, e.g. through the development of renewable energy sources, improvement of energy efficiency, electrification, use of alternative fuels (hydrogen), implementation of systemic mobility solutions and changing the production structure in the agricultural sector.

Investments in the development of a low-emission economy, in particular the development of RES or facilities for the production and storage of "green" hydrogen, require predictability and a stable legal framework. Without strong financial support for green technologies, it will be difficult to develop the production of low-emission fuels. The high variability of EU law in this area to date hinders the strategic development of the sector. Investments in modern biofuels or synthetic fuels with a high emission reduction factor, namely a direction recommended for years by the European Commission, now appear to be largely outdated. As electrification is to be the main tool for greening transport, countries with a „black“ (coal-based) energy mixes are automatically at a disadvantaged position.

In this context, it is essential to carry out appropriate educational measures, as well as to research social acceptance of the pace and scope of change. It is



obvious that climate policy cannot be made on the basis of opinion polls, but it is necessary to take into account what the EU citizens are prepared to accept. Taxes and other expensive requirements may discourage consumers from choosing vehicles powered by fossil fuels. Nonetheless, the above does not mean that most of them will opt for cleaner solutions. After all, one of the objectives of the energy transformation declared by representatives of the European Commission was that there would be no increase in energy poverty.

It seems that in recent years there has been a growing public awareness that the planet on which we live is our common home. People all over the world, including Poland, want increasingly better climate protection so that the earth will be a friendly place to live for future generations. It is worth bearing in mind that these positive effects may come to an end when, as part of the implementation of the "Fit for 55" package, it results that Europeans will have to spend more and more on transport or electricity. It is important that the requirements laid down in the legislation are technologically feasible and that there is sufficient time for their implementation.

We cannot hide the fact that climate policy is not only a matter of concern for future generations, but also a fight for the economic weight of the European Union in the world and the internal power distribution of individual member states. According to a well-known saying, if you do not know what it's all about, it's about money. From this point of view, it is worth bearing in mind that the behaviour of some member states may result in an increase in negative public mood.

THE GERMAN MODEL

For Poland, the natural reference point is the energy policy of our western neighbour. At the end of 2021, half of the 6 nuclear reactors operating in Germany were shut down, with the remaining reactors to be shut down by the end of the following year. As a result, with the current increase in energy demand, coal-fired power generation will increase significantly. It will directly translate into an increase in the carbon intensity of the entire economy. Such actions seem strongly inconsistent with the Green Deal.

In Germany's previous climate and economic doctrine, offshore wind energy was to play the dominant role, while cheap Russian gas was to be the transitional fuel ensuring a smooth and efficient energy transition. The attack on Ukraine by troops subordinate to the Kremlin has changed the situation, and Berlin is frantically searching for a new strategy. Although the debate over the use of nuclear power in Germany has resumed, it seems that Robert Habeck, the German Minister for the Economy and Climate (Bundesministerium für Wirtschaft und Klimaschutz), will not allow nuclear power plants to operate beyond the Oder for much longer. His ministry said that delaying the shutdown of the country's last three nuclear power plants (with a total capacity of

4.2 GW) would not result in a significant improvement in Germany's energy security.

Germany is one of the European economies most dependent on Russian energy resources and is therefore most strongly opposed to far-reaching economic sanctions. At the same time, Germany does not have its own nuclear technologies. In order to extend the operation of the existing nuclear power plants, a safety review would be necessary, which, according to government experts, would be time-consuming and could prove to be too expensive.

Simultaneously, the German Ministry of Economy is working on a plan to build energy independence based on diversification of energy supply sources, gradual reduction of oil and gas imports from Russia and accelerated development of RES. The authorities in Berlin are expected to present Germany's new energy strategy soon. If the position presented by the Ministry gains the approval of the German government, the abandonment of nuclear energy by our western neighbour will become a fact. In the short term, the Russian attack on Ukraine may cause a delay in the closure of coal-fired power plants, accelerate investment in wind farms, and the main transitional fuel will probably be gas, yet imported from outside Russia by means of newly built gas ports for LNG shipments.

THE BRITISH MODEL

Although the UK is outside the EU, it is worth paying particular attention to that country in light of the challenges facing the energy transition of the fuel industry in Poland. The British are one of the leading nations committed to tackling climate change. Building a low-carbon economy is part of the political and social consensus. The preparations for COP26 in Glasgow already shown divergences over the optimal pace and cost of the energy transition. French-British tensions over the UK's electricity supply, as well as the Russian-Ukrainian war, have brought energy security to the forefront of the UK's public debate on climate policy.

Over the past year, the UK fuel industry has experienced significant logistical challenges. Panic ensued after news of a shortage of licensed fuel drivers became public in the first half of September. Drivers were filling up for fear of running out of fuel. Immediately, long queues of vehicles formed at filling stations, waiting to fill up. Although petrol and diesel were plentiful in refineries and fuel depots, most stations' tanks were empty. The multiplied sales could not be replenished for a fortnight at many stations. Moreover, towards the end of the year, Gazprom's speculation in the European gas market upset the stability of the UK energy market. As a result, the role of gas as a transition fuel in the energy transition was called into question in the public debate. At the same time price volatility drove many of the intermediaries selling gas on the British Isles into bankruptcy. The target energy mix is to be based on offshore wind farms and nuclear power stations.

An important element of British energy policy is the promotion of self-sufficiency and diversification of energy supply sources. Just before the Russian attack on Ukraine, the government in London announced the issuing of new concessions for the exploitation of oil and gas fields in the North Sea. Moreover, the British strategy is to reduce electricity prices in order to maintain high support for the energy transition.

RUSSIA'S ATTACK ON UKRAINE AND THE FUEL MARKET IN POLAND

Russia's attack on Ukraine triggered a sudden reaction from markets worldwide. Brent crude oil futures contracts recorded their highest prices in several years, approaching USD 130 per barrel. This was due to the fact that the market assumed the introduction of far-reaching sanctions against Russia, which were also to cover imports of energy raw materials. It is worth noting that in 2020, Russian oil accounted for approximately 25% of EU demand. In the short term, replacing this supply would be a major logistical challenge. There are, however, many oil fields around the world from which production can be intensified within a few months.

Russia and its neighbouring states (the so-called Commonwealth of Independent States) have oil reserves of nearly 150 billion barrels, while the Persian Gulf states have reserves estimated at nearly 850 billion barrels and North America has reserves of around 250 billion barrels. The United States of America together with OPEC are in a position to calm the market.

At the US initiative, decisions have been taken to increase production in some countries (e.g. the USA, the UK, Norway). Furthermore, the reopening of the world market for oil from Iran and Venezuela is being considered. Nevertheless, such measures take time. Talks are ongoing and the results will be felt by consumers around the world.

The events described above had a clear impact on the situation in Poland. In the first days after

the start of Russia's invasion of Ukraine, there was a sudden increase in demand for fuel. We had to deal with queues and even temporary shortages of petrol and diesel at filling stations. Countersteps were undertaken, commercial stocks were released, production at refineries was increased and supplies were intensified. The availability of petrol and diesel at filling stations has been maintained.

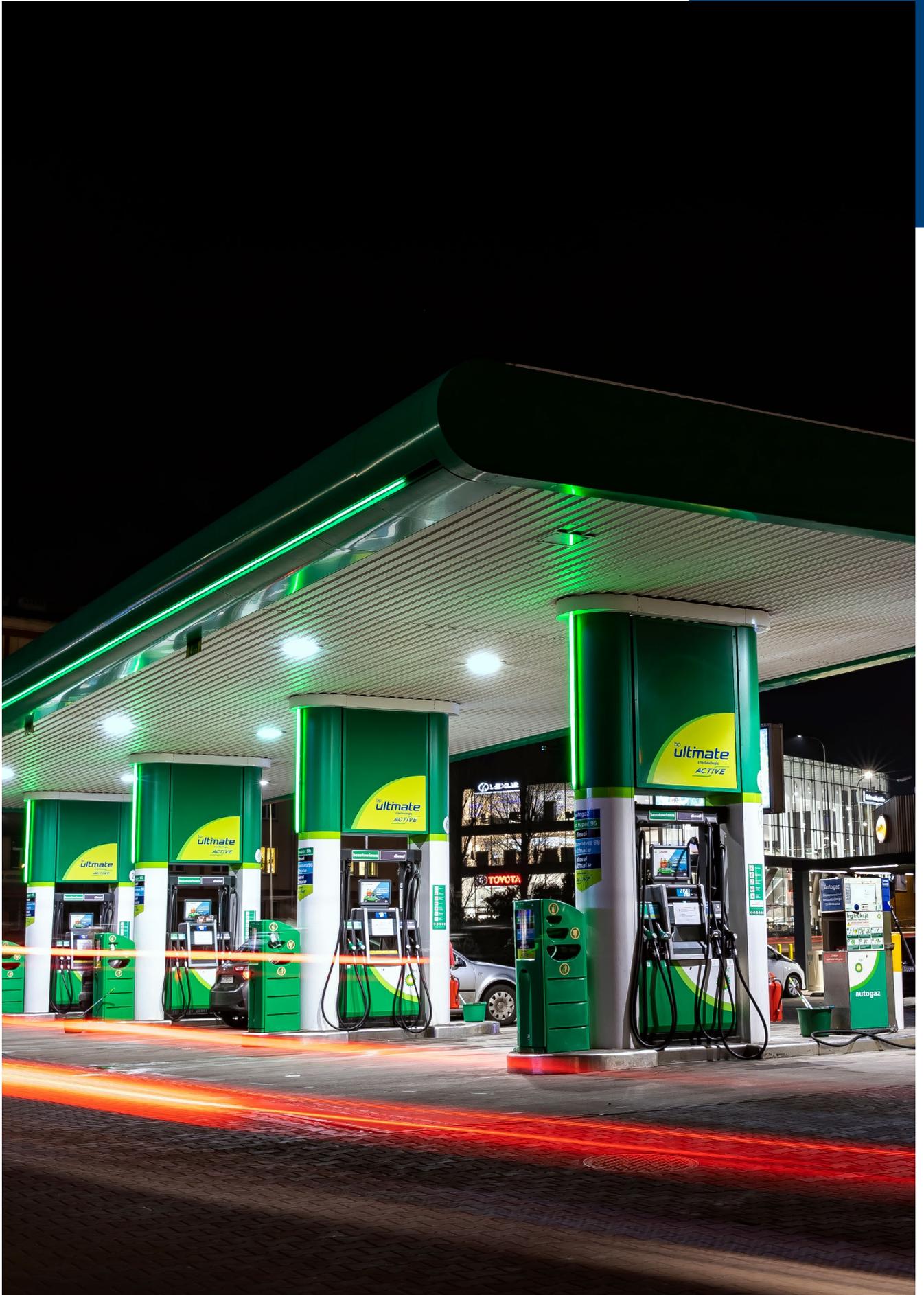
The Russian attack has caused anxiety among very many Polish drivers. Queues of cars formed in front of stations across Poland. The motivation to spend several hours waiting for access to the pumps was not only fear of the sudden unavailability of fuel, but also rumours of an expected price spike. In this exceptional case, rumours outstripped facts: a sudden increase in the price of crude oil contracts, accompanied by the weakening of the Polish currency against the dollar, resulted in a rapid rise in wholesale fuel prices, which, in turn, triggered a sharp increase in retail fuel prices.

In the face of growing panic, some drivers were stocking up for fuel. It was risky and often in breach of regulations governing the transport and storage of hazardous materials, which include fuel. The fuel supply chain is complex and the effect of the mass panic disrupted the market for a short while. The situation was quickly brought under control. Similar behaviour had already occurred during the 2020 sales spike, yet on a much smaller scale. In order to secure the availability of fuel for all customers, filling stations decided to limit the number of liters to be purchased by one driver.

This sudden panic among consumers calls for a firm comment: all rumours of a possible reduction in fuel availability are untruthful. In Poland there is a lot of fuel and storage sites at fuel depots are full. Domestic stocks are sufficient for over three months. Crude oil is still flowing through the pipeline from the east, and thanks to the oil terminal we are able to cover the entire domestic demand with oil supplied by tankers.

Opinions are being expressed that work on the Green Deal should be suspended because of the war in Ukraine. It seems more reasonable that work on EU energy policy should take greater account of elements relating to common security, energy security included. Looking at the words of Dr Masson-Delmotte quoted at the beginning of this text, today we could add that every day matters. And even if it is not in terms of climate protection, then certainly for the protection of peace and our common security, which must not be forgotten when planning EU climate policy. As the Saudi sheikh Ahmed Zaki Yamani once said, the Stone Age did not end because they ran out of stones, and thus the age of fossil fuels will not end because we run out of them. The reasons will be significantly different. Nonetheless, we are running out of time for change.

COUNTERSTEPS WERE UNDERTAKEN, COMMERCIAL STOCKS WERE RELEASED, PRODUCTION AT REFINERIES WAS INCREASED AND SUPPLIES WERE INTENSIFIED. THE AVAILABILITY OF PETROL AND DIESEL AT FILLING STATIONS HAS BEEN MAINTAINED.



Fot.: BP EUROPA SE

THE RETAIL MARKET OF LIQUID FUELS IN 2021 FROM POLISH ORGANISATION OF OIL INDUSTRY AND TRADE (POPiHN) MEMBERS' POINT OF VIEW

Based on data obtained from POPiHN members and the results of the entire end-user market, the Organisation analyses changes and trends in the liquid fuel retail segment on an annual basis. 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. Thus in 2021 the network of such outlets, including partner stations of Slovnaft, grew to 4404 outlets and at the end of the year in question amounted to 56% of all filling stations operating in Poland, publicly available and selling at least 2 types of fuel, i.e. petrol and diesel.

The main tool for analysis is the information provided by POPiHN member companies, while the entire picture of the market is supplemented by the continuously updated database of liquid fuel infrastructure carried out by the Energy Regulatory Office. Based on these two sources, a reasonably accurate determination of the actual number of filling stations was made. This allowed trends observed at the largest operators to be applied to the entire station market in Poland. It was assumed that some minor differences occur in the sales policies of individual operators, but general trends are consistent, irrespective of the size of the retail network. The above was also due to the fact that smaller networks continuously follow the trends observed in the biggest shareholders on the retail market. In the formula adopted for the analysis, namely stations open to the public and selling at least petrol and diesel, there were just over 7.8 thousand of such stations operating in Poland at the end of 2021.

The sample selected for the analysis covers 56% of the filling station market. The remaining outlets belong

to the independent operators, from whom it is quite difficult to obtain any information on their market data. Therefore the overall market can only be assessed by transferring the results and experiences of the biggest operators onto the remaining part of the market. Besides, it is rather more indicative of trends than of the actual activities of smaller operators, especially those who are not linked in alliances or purchasing groups.

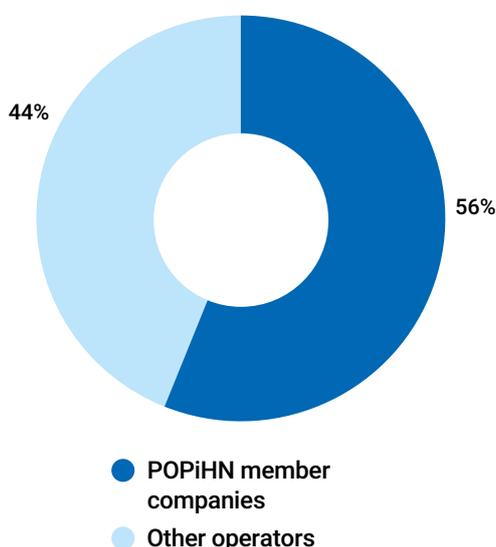
THE STATIONS RUN BY POPiHN MEMBER COMPANIES IN POLAND IN 2021 PERFORMED AROUND 73% OF OVERALL RETAIL SALES OF PETROL, ABOUT 51% OF DIESEL AND 44% OF AUTOGAS. THIS IS 1 PERCENTAGE POINT HIGHER THAN IN 2020 FOR PETROL AND DIESEL AND 1 PERCENTAGE POINT FOR AUTOGAS.

Such share levels allow us quite precisely to show the trends and changes taking place in the overall market for retail fuel sales and non-fuel activities for these facilities. What we mean is, namely, non-fuel retail operations, which are becoming increasingly important, carried out at the station shops as well as other services such as fast food outlets, relax during the journey or basic services related to vehicle maintenance. 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. It should be noted, however, that in this group of operators the following are appreciated: a certain degree of freedom and greater adaptation to local expectations as regards fuel sales and shop supplies. Nevertheless, under franchising regime, such loosening of rules is more difficult, and often impossible.

The most important changes observed in 2021 in the retail sales market for fuels in POPiHN members' station networks are shown in Fig. 2. Compared to the previous year, which was a crisis year due to the development of the COVID-19 pandemic, sales of standard fuels showed a significant increase. There was also an increase in the sale of premium fuels, especially diesel, which was a record breaker in terms of the percentage increase in demand. The reason was probably the price of this type of fuel, which for a long period of time was very close to the price of standard fuel. The lowest progress in recovering from the crisis suffered in 2020 was observed for autogas, which recorded the largest drops in demand the year before. Ownership redevelopment of the market continued in the station area. As a consequence of the above, the number of stations under POPiHN members' logos grew. Those companies expanded the franchise formula (DOFO), but also increased the number of their own stations, often built from the scratch in new locations. Thus, market consolidation around the largest operators continued. The above is also confirmed by a decrease in the number of stations operating under DODO formula. Similar

FIG. 1 FILLING STATIONS MARKET IN POLAND [NUMBER/%]

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



movements were also recorded in the independent segment around its largest representatives.

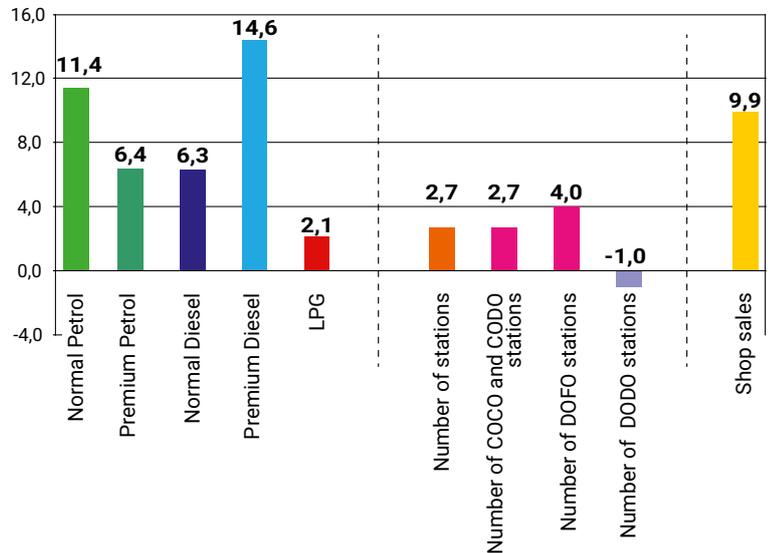
The segment of shops at filling stations developed well. The number of available facilities and their turnover increased. In addition to car accessories, a growing assortment of FMCG goods and those most needed in everyday life, especially during the ongoing epidemiological threat, appeared in the offer. The food segment was also expanding, returning to normal activity after a period of restrictions in the previous year, and partly also in the described year. Drivers, but also increasingly non-motorised customers, were attracted by the comprehensive and regionally tailored range of trade and services, which was continuously expanded. In the future, for many years to come, in which traditional fuels will not be substituted by other types of propulsion, the investments made should ensure the maintenance of filling stations and decent earnings for their staff.

The largest oil companies sold the largest volumes of premium fuels at their stations. They held both the rights to their name as well as their chemical composition. It should be noted, however, that independent companies are also entering this segment by selling high-octane petrol and preparing their own types of diesel with higher performance parameters. In 2021, the dynamics of premium diesel sales at stations of POPiHN member companies increased significantly more than the dynamics of standard fuel sales. In the case of petrol, the relationship was the opposite. Sales of enhanced fuels were favoured by smaller price differences between standard and premium types than in previous years and, in the case of diesel, there was also the effect of longer periods with lower temperatures on winter days than in previous years. On average throughout the year such fuels were more expensive than the standard ones by 0.25 – 0.35 PLN per liter, yet their price, for a long time remaining below the level of 5 PLN per liter, was a major incentive to buy them. In the overall retail petrol sales volumes of the POPiHN members the share of premium type amounted to about 10%, whereas in the overall petrol market in Poland it was 8.5%. The market share for premium diesel amounted to slightly over 14% in the overall retail market for POPiHN members, which translated to 5.5% of the overall domestic sales. Compared to the previous year, POPiHN member companies recorded an increase in sales of these fuels (total of P and D by around 200,000 m³) and there was an increase in their share of total fuel sales. It therefore appears that, despite rising prices, drivers increasingly appreciate exploitation aspects related to purchasing better quality fuels and are willing to buy them in larger volumes, even at the expense of spending more than they would on the same amount of standard fuel.

As in 2020 there was a huge crisis due to COVID-19, the POPiHN forecasts prepared for 2021 assumed an increase in the sales of standard EU95 petrol and standard EU95 petrol and standard diesel. The assumptions turned out to be correct, despite the fact that there was a real risk associated with periodic recurrence of successive epidemic waves. Although the year started with a period of lower sales, subsequent months brought increasingly better results from the market – comparable to those of pre-crisis 2019. As a result, more standard fuels were sold at stations

FIG. 2 CHANGES IN RETAIL SALES OF FUELS, IN NUMBER OF FILLING STATIONS AND IN SALES AT STATION SHOPS IN 2021 COMPARED TO 2020 [%]

Source: POPiHN's own data



owned by oil companies throughout 2021 than the year before. A similar trend was also recorded at other stations in the country. Altogether filling stations owned by POPiHN members recorded a growth of over 11% in standard petrol sales and an increase of over 6% in standard diesel. For premium fuel, the leader was diesel, the demand for which increased by almost 15%, while for premium petrol the percentage increase was half of that. POPiHN companies also sold more autogas than in the previous year, but in the case of this fuel type the dynamics were no longer so impressive – all the more so as purchases fell by almost 12% in 2020.

In 2021, POPiHN member companies expanded the franchise and own station segments while increasingly abandoning the DODO formula. Franchising dominated the way new facilities were acquired. New investments were also incorporated into the network, increasing the number of stations operating under the COCO and CODO formula.

For other companies operating outside POPiHN, franchising – as in previous years – was the main means of brand development, although this group of companies also recorded the construction of completely new sites.

The increased number of filling stations operated by POPiHN members resulted in an increase of around 3% 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 concerned the total number of outlets as well as every statistical individual outlet.

Aggregate value of sales in the segment of shops at POPiHN members' stations increased by almost 10%, whereas an individual shop on average increased its turnover by over 6%. Such results were due to the lifting of Covid restrictions, as well as purchases made at stations on days when large retail outlets were closed. Maintaining an anti-epidemic offer

FIG. 3 SALES OF MOTOR FUELS AT POPIHN MEMBERS' STATIONS IN 2021 [M³]

Source: POPIHN's own data

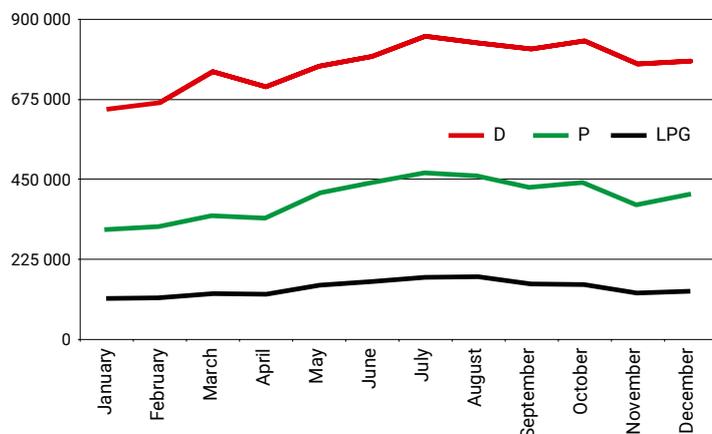
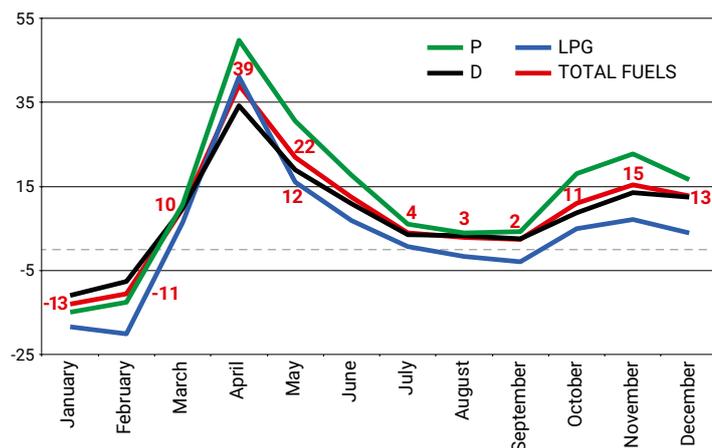


FIG. 4 CHANGES IN RETAIL SALES AT FILLING STATIONS IN 2021 [MONTH/MONTH AS %]

Source: POPIHN's own data



(e.g.: protective and personal hygiene products) and expanding the range of products on offer also helped. The effectiveness of the shop depends largely on the frequency of visits to the filling station due to refuelling of the vehicle. Such activity in 2021, compared to the previous year, increased significantly.

Fig. 3 presents monthly retail sales at POPIHN members' filling stations [month/month as %]. There is a clear return of sales at levels similar to those observed in 2019 and significantly exceeding (apart from January and February) sales volumes in the individual months of 2020. For example, monthly sales of diesel in 2020 reached 800,000 m³ only in July and August, while in 2021 such demand was observed as early as June and remained above this size until October. The market behaved similarly in the case of petrol, although it was obviously at lower levels. On the other hand, sales of autogas followed a similar pattern in 2021 and 2020 (with the exception of the critical April in 2020). In the case of this fuel, the demand corridor between 100 and 200 thousand m³ did not change.

In 2021, the highest sales growth dynamics, compared to the previous year, were recorded by

POPiHN member companies' stations operating under the DOFO formula. It was 10% for three fuel types (petrol, diesel and autogas). For COCO and CODO stations the drop was 7% and for DODO it amounted to 9%. A greater increase in the number of franchised stations than in the other groups 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 did not compensate for these declines. Such results had an impact on the amount of revenue generated by station operators and forced them to intensify non-fuel operations at facilities available to drivers. Margins were affected by continuously increasing fuel prices throughout the year, which had to be compensated by lower margins to retain customers. The station shop was again the main profit centre for the entire facility, and loosened pandemic restrictions allowed for increased revenues in the shop, small and large food outlets and additional services segments.

Changes in fuel sales at the stations owned by POPIHN member companies between individual months of 2021 are presented in the diagram in Fig. 4.

After the first two months of the year, which were slightly worse in relation to 2020 (recall that these in 2020 were historically record-breaking), there was an increase in April sales of 39% and, for some fuels, even of 50%. In the holiday months dynamics declined, but was still positive in y/y comparisons. At the end of the year there were again significant increases in demand.

For the year as a whole, the average increase in fuel sales dynamics at all POPIHN members' stations amounted to nearly 8%, which compensated for declines recorded at a similar level in 2020. Petrol was sold in total by 11% more than in the previous year, diesel by 7% and autogas by 2%.

Analysis of data on the dynamics of trade in motor fuels at the Organisation's member companies, and the results of total official consumption of these fuels by all entities in the country, indicates similar levels of growth. Perhaps only autogas sold slightly better at independent stations than at the largest operators.

As mentioned earlier, premium fuels sold well in 2021. Their purchase growth in the petrol segment was 6% and in the diesel segment it was even higher, namely 15%. Premium fuels are usually more expensive than standard fuels and thus more sensitive to price changes, hence the change in their sales dynamics is always more pronounced than for standard fuels.

Back in the 2019 report POPIHN assumed that with the price levels and trends on the market of new and second-hand cars observed at the time, the growth dynamics of enhanced fuels market should accelerate. The pandemic dramatically changed the market in 2020, but the 2021 results fully confirmed previous expectations. It can be assumed that once the pandemic is fully contained and the restrictions associated with it are lifted, and as a result of the impact of anti-inflation shields, fuel prices will not increase very significantly, which should lead to the expansion of the premium fuel market. All the more so as severe winters may return to Poland, the introduction of E10

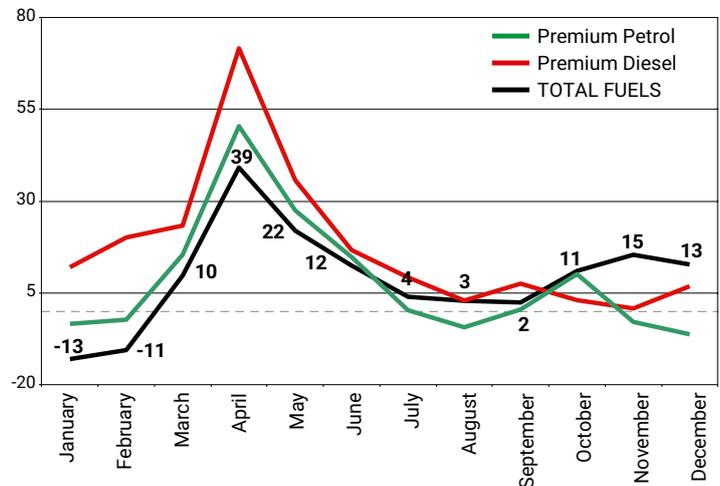
petrol with increased alcohol content in standard fuel is getting closer and Poles are paying more attention to the ecology and economy of the vehicles they use. As long as prices, regarded as a litmus test for the sale of premium fuels, do not significantly increase, one can assume an increasingly growing demand for this type of fuel.

In Poland, at the end of 2021, according to information obtained from POPiHN members and the official fuel logistics database of the Energy Regulatory Office, there were ca. 7.8 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 – because POPiHN has no data on that network) were displayed on 4323 facilities, of which 4,264 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 2020, by almost 3%. 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. Within the group at the same time work was underway on optimising the localisation of stations in the network and post-pandemic sales policy. In the group of POPiHN members the above changes resulted in an increase of own stations operating under COCO and CODO formula by 2.7%, amounting to 2924, and an increase of stations operating under franchising DOFO formula by 4%, amounting to 1050. The number of stations under DODO arrangements witnessed a 1% decline, amounting to 290 outlets.

Alongside the increase in the number of POPiHN members' own stations, we observed an increase the number of stores located at those filling stations.

FIG. 5 CHANGES IN PREMIUM FUEL SALES AT FILLING STATIONS IN 2021 [MONTH/MONTH AS %]

Source: POPiHN's own data



Altogether, at the end of 2021 POPiHN had knowledge of the activities of 3175 shops associated with the stations of the Organisation's member companies (98 more than in 2020), and of this number 3130 (97 more than in 2020) were engaged in commercial activities at the end of the year. As the number of shops increased, so did their turnover. 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 allows for a certain degree of freedom in the purchase of items for the shop and certain deviations from the sales policy implemented in the case of shops



Fot.: AMIC POLSKA SP. Z O.O.

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

Source: POPIHN's own data

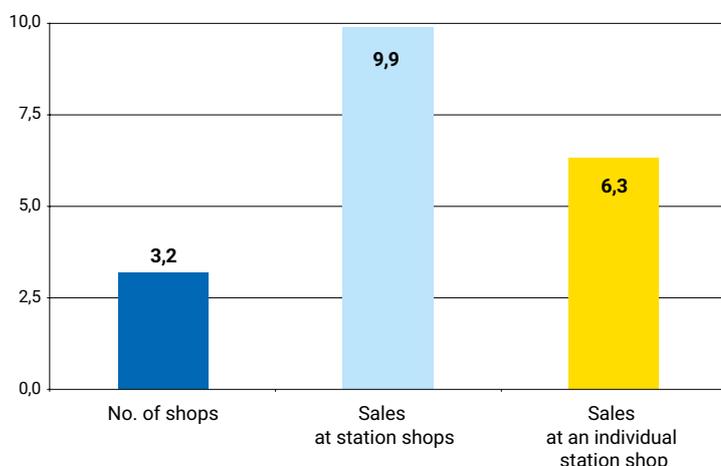


FIG. 7 CHANGE IN VALUE OF SALES IN THE SHOPS AT FILLING STATIONS OF POPIHN MEMBERS IN INDIVIDUAL MONTHS OF 2021 COMPARED TO 2020 [%]

Source: POPIHN's own data

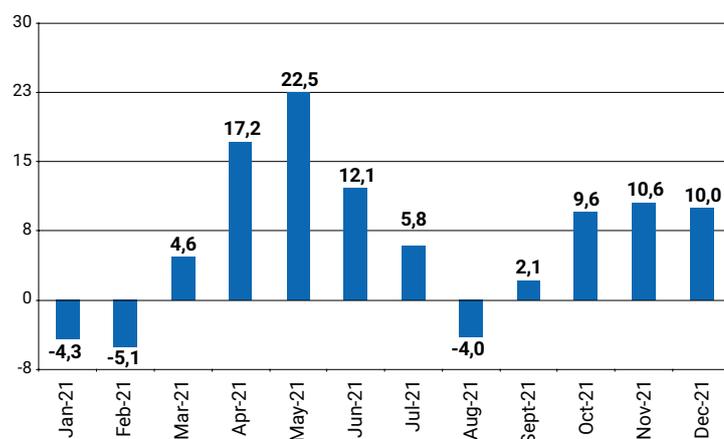
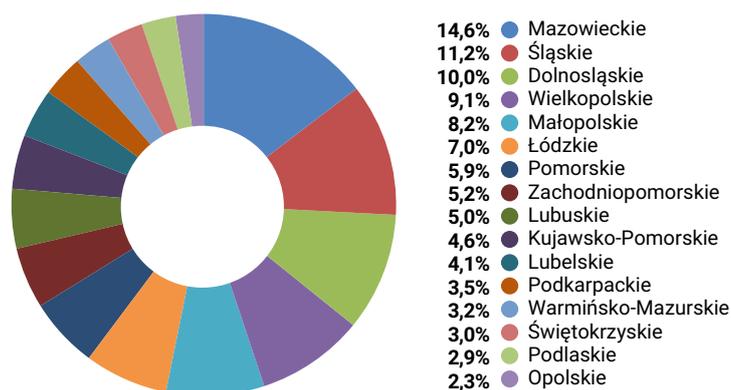


FIG. 8 DISTRIBUTION OF RETAIL SALES OF FUELS BY POPIHN MEMBERS IN POLAND IN 2021 [%]

Source: POPIHN's own data



at CODO and COCO stations. Therefore franchisors 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 2021 was used for the analyses. The sales of this group of retail outlets increased by a total of 9.9% and amounted to approximately 6.5 billion PLN. The turnover of a single statistical shop grew by 6.3% and on average was on the level of about 2.1 m PLN.

Higher sales are the result of the lifting of epidemic restrictions (particularly in the case of small catering), an increase in the range of products on offer and more frequent customers' visits to filling stations, including those who contributed to the growth of the car fleet in Poland by purchasing a new or second-hand vehicle. During the accumulation of pandemic restrictions, filling stations, especially in smaller towns, were the only points to provide the population with the most necessary items, including sanitary protection. Filling stations and their shops operated non-stop, providing their employees and clients with adequate anti-pandemic protection, both outside at the pumps and inside shops. These measures at the time also had an effect in 2021, when the epidemic restrictions were already much less noticeable. Customers become attached to places where they get what they care about most: safety, speed and comprehensive service.

Figure 7 illustrates the total shop sales at filling stations in individual months of the year compared to the corresponding months of 2020. It clearly shows a not-so-good beginning of the year – in 2020, turnover was at historic highs in these two months, a very good period in the months comparing to the first lockdown, slightly weaker turnover in the holiday months (as this is when in 2020 Poles set off in big numbers to visit the country as part of the unwinding of restrictions) and a very good end of the year, comparing to the return of partial covid restrictions in 2020.

Market recovery after the period of epidemic restrictions only marginally changed the geographical distribution of motor fuel sales in Poland. 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 fuels in 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 record was set by Mazowsze with a result of 280,000 m³. In comparison, only 43,000 m³ of such fuels were sold in Opolskie.

The graph shows total sales of petrol, diesel and autogas. Separate sales of each of these fuel types present minor discrepancies from the presented graph, however, they are so small that the general scheme is assumed to fully display the retail sales trends in Poland.



Fot.: UNIMOT S.A.

Domestic liquid fuel market in 2021 – summary

PROCESSING OF CRUDE OIL

In 2021 Polish refineries processed 4% less of crude oil compared to the results in 2020. Total refining production amounted to almost 25 m tonnes, which was 1 m tonnes less than in the previous year. The main reason accounting for the reduction was the planned overhaul of production facilities at Grupa LOTOS in the first half of the year. Almost all refinery production was directed to the domestic market. However, this was not sufficient to cover the demand, and therefore supplementary imports were necessary, higher than in the previous year. Diversification of purchases of crude oil for domestic refineries continued, in terms of supply directions and types of crude oil used for processing. Refining margins were shaped at slightly lower levels than the year before. The main reason for this was the continually rising crude oil quotations in international markets. The high level of diversification of oil purchases strengthened the role of Naftoport in supplying the country with crude oil. In terms of throughput volumes, the second half of the year was better than the first 6 months of 2021. Domestic refineries used 13.7 m tonnes of oil in the second half of the year, compared with only 11.1 m tonnes in the first half.

Processing of crude oil by PKN ORLEN in its refining facilities in 2021 amounted to 14.8 m tonnes (0.8 m tonnes less than in 2020), whereas Grupa LOTOS needed 10 m tonnes of raw material (0.2 m tonnes less than in the year before).

Oil for domestic refineries was purchased mainly from the eastern direction. The supplementary transports, apart from Russia, mostly came from Saudi Arabia, Nigeria and Norway. Smaller amounts were also purchased from Kazakhstan, the UK and Lithuania. The share of REBCO

oil in the domestic supply reached 61% compared to 70% in 2020. The progressive diversification was caused by limitations in the use of long-distance pipelines of the „Przyjaźń” system and forced the technological adaptation of refineries to oil types other than REBCO. In 2021, there were no problems with contaminated raw material, but there were temporary interruptions in the operation of the pipelines on the Belarusian side, which affected the level of pumping. This increased deliveries by sea and the use of storage tanks on the coast. Crude oil from domestic supplies (Petrobaltic, PGNiG) was used to supplement the exports. Its volume, however, still remained low.

Crude oil other than REBCO in the structure of supplies of PKN ORLEN constituted 45% (10 percentage points more than in the previous year), whereas for Grupa LOTOS it was around 16% of supplies (5 percentage points more than in 2020). For both Polish oil companies overall crude oil other than REBCO constituted 37% of supplies.

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

Almost 15 million tonnes of REBCO crude oil was imported into Poland in 2021 and this was around 3 million tonnes less than the previous year. Approximately 9 million tonnes (about 6 million tonnes less than in the previous year) were transported by pipelines belonging to PERN S.A. from the eastern direction. The remaining oil was brought to Polish refineries via the port facilities in Gdańsk, and in case of domestic deposits, via rail transport.

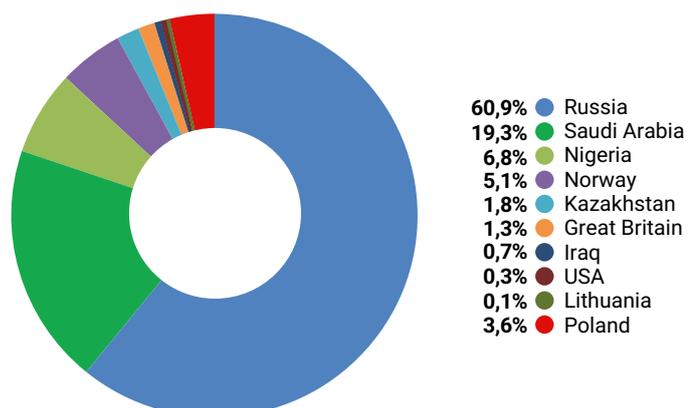
FIG. 9 PROCESSING OF CRUDE OIL – DATA FOR 2020 AND 2021 [in m tonnes]

Source: POPiHN's own data

Description	2020	2021	Reference 2020=100
OVERALL	25,8	24,8	96

FIG. 10 SHARE OF CRUDE OIL SUPPLIES TO DOMESTIC REFINERIES IN 2021 [%]

Source: POPiHN's own data



25
m tonnes

crude oil was processed in 2021

Fot.: ANWIM S.A.



PRODUCTION OF LIQUID FUELS

Liquid fuel production in 2021 (Fig. 3) of petrol (P), diesel (D), liquefied petroleum gas LPG, JET aviation fuel, light fuel oil (LFO) and heavy fuel oil (HFO) amounted to 27.2 m³ (Fig. 11). The above result takes into account refinery production and blending of fuels, which in Polish conditions is also treated as production. Annual growth of 3% over the previous year's result was achieved. An increase in market supplies from this source equalled approximately 870,000 m³. Recovery from the market downturn caused by the pandemic in the previous year resulted in increased production of major middle distillate grades.

Basically, all domestic production of the most important fuel types for the economy was directed to the domestic market, and its shortfall was supplemented by supplies from outside Poland.

The booming economy and greater mobility of Poles required more fuels. The production structure indicates that domestic processing plants and output resulting from the blending of fuels were oriented towards these needs. There was an increase in the production of diesel, JET aviation fuel and light heating oil. Petrol production remained at the previous year's level. Conversely, less LPG and heavy fuel oil were produced, the demand for which was weaker than in 2020 or, as in the case of LPG, it was met by higher import supplies. The data for middle distillates clearly show an increase in the conversion of a barrel of crude into petroleum products with a higher commercial value.

FIG. 11 COMPARISON OF LIQUID FUELS PRODUCTION IN 2020 AND 2021 [in thousand m³]

Source: POPIHN's own data

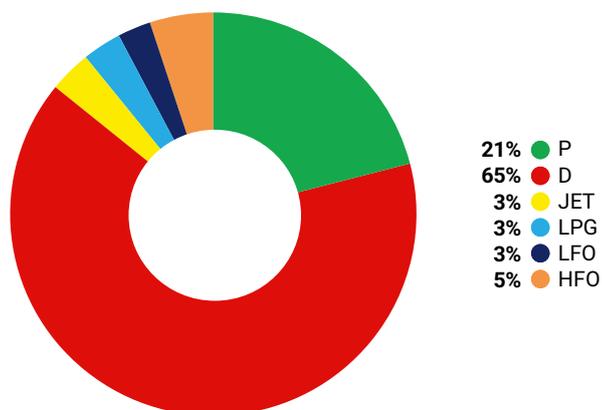
Description	2020	2021	Reference 2020=100
Petrols	5,671	5,699	100
Diesel	16,848	17,630	105
LPG	898	846	94
JET aviation fuel	738	912	124
Light fuel oil	660	718	109
Heavy fuel oil	1,496	1,374	92
OVERALL	26 311	27 179	103

In the second half of 2021 the domestic production was over 2 m³ higher than in the first half of the year. Insignificant part of products was exported. Nonetheless, their volumes were much smaller than in the previous year.

In Poland fuel blending with the use of biofuels, and also other additives, is treated as production. In the year in question significant sections of domestic refinery production of petrol and diesel, as well as of 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 the processing

FIG. 12 BREAKDOWN OF LIQUID FUELS PRODUCTION IN 2021 [%]

Source: POPIHN's own data



of crude oil in refineries, especially in the situation of significant imports, which was the case in 2021. The use of biofuels improves the environmental effect of fuel combustion, but, unfortunately, worsens the economic result of fuel producers due to the fact that biofuels are much more expensive than traditional fuels produced from crude oil. In 2020 the costs of the fulfilment of the NBT grew even more as the biofuels target was raised from 8.5 to 8.7% by energy value. This is a high limit and impossible to meet only by using biofuels in standard fuels. It was therefore still necessary to produce and sell B100 fuel, for which it is very difficult to find a customer in the country.

In 2021, the production of diesel, the main fuel of the Polish economy, increased by 780,000 m³ (by 5%). Light fuel oil was also produced by 58,000 m³ more. We are particularly pleased to witness the return of growth in JET fuel production. 174,000 m³ of this profitable product was produced compared to the previous year. Thus, the growth rate for this fuel was the highest and equalled 24%. A decrease in production was reported

for LPG and heavy fuel oil. The former was down by 52,000 m³ and the latter by 122,000 m³. There was only a slight increase in petrol production in the volume of 28,000 m³. The structure of fuel production in 2021 is presented in Fig. 12.

The production balance has changed little from the one observed a year ago. Petrols and heavy fuel oil each lost 1 percentage point of their share, while diesel and light fuel oil each gained one point. Still, as in previous years, diesel was dominant in the balance of domestic fuel production. Its share of the total production spectrum amounted to 65%. The second position was taken by 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 2021 the necessity to meet the requirements of the NBT (National Biofuels Target) act, which companies that produce fuels and import them from abroad were obliged to fulfil, forced adding alcohol and esters to the majority of petrol and diesel introduced onto the market. Enhancers were also added in the production of premium fuels. The implementation of the law forced obliged entities to sell the necessary amount of B100 fuel, as the mere addition of biofuels to normative fuels was still not enough to achieve the goal. Preliminary market information shows that POPIHN members achieved the imposed NBT. It is estimated that in 2021 around 333,000 m³ of ethanol and around 1 440,000 m³ of methyl esters were added to fuels by these entities. These amounts are similar to last year's results for alcohol and about 35% higher for esters. Direct sales of B100 fuel were estimated at about 270,000 m³, which means that there was an increase by approximately 54,000 m³ in comparison to the previous year. The companies sent 112,000 m³ directly abroad. This type of fuel was practically unavailable in retail trade, and in wholesale trade it was quite unpopular. The vast majority was exported from Poland, also through independent operators.



Fot.: CIRCLE K POLSKA SP. Z O.O.

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, the increase in domestic demand had to be met by imports that were higher than in the previous year, complementing the offer of domestic producers. It was at a significantly higher level than in 2020 – especially for petrol and diesel. Increased imports of the main fuel of the Polish economy, i.e. diesel, were carried out by both the main domestic market players (refineries, international oil companies operating on the Polish market) and the so-called independent importers. The increase in petrol imports was mainly a consequence of increased purchases carried out by POPiHN members outside Poland, i.e. the largest market operators. The country also received more LPG than last year, but here the main source of growth was imports from companies other than POPiHN members. Data available at the time of preparing the report shows that in 2021 foreign fuel purchases amounted to approximately 12.3 m³ of fuels, which is almost 2.5 m³ above last year's level. This is a 25% increase. Thus, after three consecutive years in which less fuel was imported into the country, the trend has changed. The above was due to the removal of pandemic restrictions inhibiting the movement of Poles and the good growth dynamics of the domestic economy. In addition, inspection services have been effective in nullifying attempts at illegal sales and it can be assumed that the vast majority of products entering the country were officially declared and registered. Decreases in foreign purchases were recorded for both grades of heating oil, and Jet fuel imports were only marginal. Among the main fuels, purchases of petrol increased most dynamically outside Poland. However, in terms of volume, diesel was the leader. Since 2016, diesel remains the largest import item and this was also the case in 2021. In the past year – as in the previous year – total imports of petrol, diesel, LPG and light fuel oil by so-called independent operators (companies other than POPiHN members) were lower than imports by the largest market operators. This is the result of the latter's large purchases of diesel and petrol. Not even the much higher imports of LPG and light fuel oil by independent operators helped in this comparison. Altogether in 2021, for the 4 main fuel types in total, the dynamics of foreign purchases by the largest operators of the Polish market was 35 percentage points higher than in the previous year, and the dynamics of foreign purchases for this product group of independent operators increased by 25 points.

In 2021 the imports of diesel increased by 1.7 m³. The increase for petrol equalled 574 thousand m³, and for LPG 200 thousand m³. Foreign purchases of light fuel oil decreased by 29 thousand m³, whereas the heavy type dropped by 12 thousand m³.

The increase in the officially registered imports of liquid fuels in relation to 2020 fell by 25% and altogether for 6 main fuel types satisfied 35% of overall market demand (i.e. 5 percentage points more compared to 2020).

FIG. 13 BREAKDOWN OF LIQUID FUELS IMPORTS IN 2021 [%]

Source: POPiHN's own data

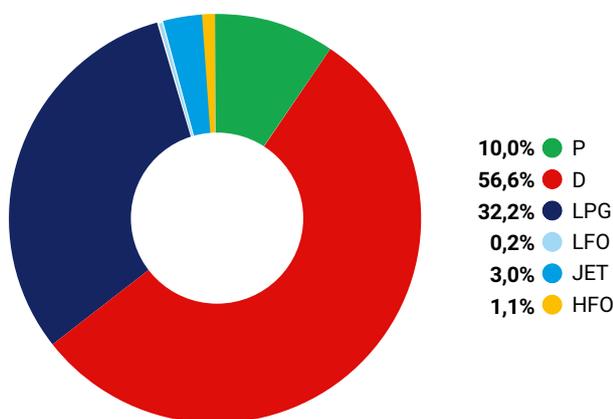


FIG. 14 COMPARISON OF IMPORTS AND ACQUISITIONS OF LIQUID FUELS IN 2020 AND 2021 [in thousand m³]

Source: Ministry of Finance and POPiHN's own data

Description	2020	2021	Reference 2020=100
Petrols	655	1,229	188
Diesel	5,284	6,983	132
LPG	3,770	3,971	105
Light fuel oil	52	23	44
JET aviation fuel	0	3	-
Heavy fuel oil	145	133	92
OVERALL LIQUID FUELS	9 906	12 342	125

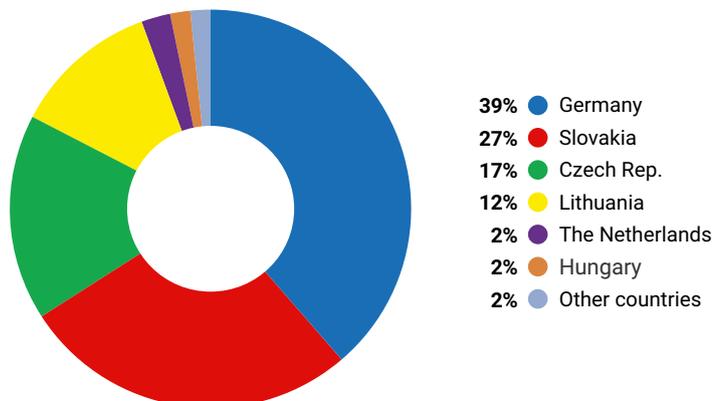
In the structure of foreign purchases in 2021, the share of diesel increased significantly by 3.5 percentage points and that of petrol also grew by 3.5 points. This was mainly realised at the expense of the share of LPG and light fuel oil.

Within the group of the 4 main fuel types described (P, D, LPG, LFO) POPiHN members, in relation to the 12 months of 2020, imported around 7.2 m³ of fuels and it was around 2 m³ more than the year before. Independent operators increased their imports, but only by 0.5 m³, bringing into the country approximately 5 m³ of fuel from the described product group.

Sources of imports of petrol are shown in Fig. 15. The most substantial amounts of this fuel type were imported to Poland from Germany, Slovakia and the Czech Republic. Supplementary supplies came from Lithuania, the Netherlands and Hungary. Imports from other countries constituted around 1% of supplies. Purchases from the Czech Republic and Lithuania gained in importance at the expense of Germany and Slovakia.

FIG. 15 SOURCES OF PETROL IMPORTS [%]

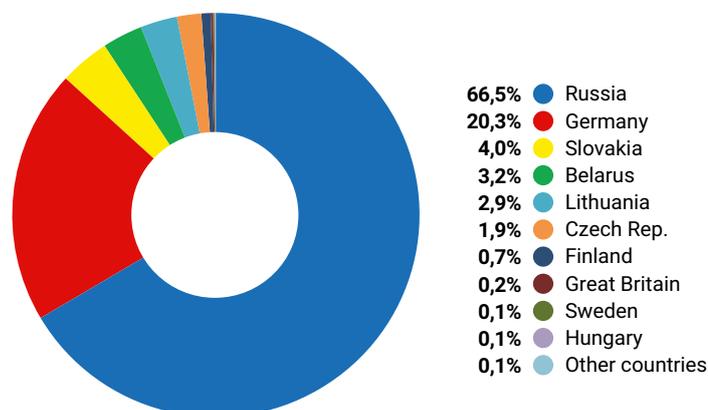
Source: Ministry of Finance and POPiHN's own data



Imports of diesel traditionally showed a larger variety of source countries than petrol. As before, main suppliers were Russia, Germany and Slovakia. Belarus. Other important source countries for importing diesel were also Lithuania and the Czech Republic. Purchases from Belarus fell significantly following the introduction of economic sanctions. Around 70% of the product was imported from beyond our eastern border, i.e. the territory of the non-EU countries (which was 2 percentage points more than in the previous year). Altogether, the East, including Lithuania, provided around 73% of the whole diesel imports (1 percentage point more than in the year before). Germany maintained its share in the pool.

FIG. 16 SOURCES OF DIESEL IMPORTS [%]

Source: Ministry of Finance and POPiHN's own data



7.2 m m³

The amount of fuel imported by POPiHN members, in relation to up to 12 months of 2020.



Fot.: PKN ORLEN S.A.

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

Exports of liquid fuels (Fig. 17) in 2021 amounted to 1.85 m m³. The above result was 23% lower than in the previous year and it was the continuation of the trend from 2017-2020, when we also observed a decrease in exports in comparison to the previous year. In 2020 the decrease was 30%. The general reason for the reduction in exports was the production situation of Polish refineries and a significant increase in demand for the main motor fuels, associated with the lifting of restrictions conditioned by the pandemic, which reduced domestic and cross-border traffic. The slow recovery of the global aviation market from epidemic induced collapse also led to a decrease in deliveries of this product outside Poland. In the last year, air traffic started to recover, but the domestic production stream of this fuel type has been primarily directed to internal market customers. In fact, the same applied to other types of fuel. Besides, aiming at allocating domestic production in Poland and decreasing the production of heavy fuel oils led to changes in the structure of products sent abroad, although it should be noted that the volume of these shipments was insignificant.

The reduction in exports continues to be facilitated by the effective maintenance of the grey market in fuels – for which the pandemic situation might otherwise be a good time to increase market share.

The largest decrease in volume and percentage of foreign shipments was recorded for petrols – 217,000 m³ and 76%. Foreign shipments of diesel have decreased significantly, i.e. by 43%. This is almost a twofold reduction. JET aviation fuel exports were the least depleted, but – as described above – already in the previous year there was a solid bump in shipments outside Poland of this fuel type. Despite the further reduction, heavy fuel oil remained the largest export product in this group of petroleum products.

Its share of exports was a significant 66%, which basically means that it went up 5 percentage points alongside the reduction in foreign shipments of other fuels.

The share of petrol decreased by 10 percentage points to 4%.

The share of diesel and JET aviation fuel increased by 1 percentage point, whereas LPG's share grew by 3 percentage points.

The export deliveries of JET aviation fuel shown in Fig. 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 2021 amounted to 720,000 m³, which was about 145,000 m³ more than in the previous year (by 25%) and came close to the 2019 result.

While calculating the market of LPG, one should note that the so-called re-export of this fuel type (buying it outside Poland and then sending it outside Poland) in 2021 amounted to about 315,000 m³, which means that the volume of this activity increased by about 29,000 m³ compared to the previous year.

The main destinations of exports and intra-Community supplies for petrol in 2021 were the Netherlands (68%) and Belgium (21%). Diesel oil in the amount of 104,000 m³ went entirely to the Czech Republic, while the remaining 173,000 m³, as B100 fuel – also treated as diesel oil in POPIHN statistics, was sent to the Netherlands, Lithuania, Germany and Slovakia. The largest volumes of heavy fuel oil were supplied to the Netherlands (55%) and Belgium (20%). JET aviation fuel was mostly delivered to Denmark (45%) and Finland (21%).

FIG. 18 BREAKDOWN OF LIQUID FUEL EXPORTS IN 2021 [%]

Source: POPIHN's own data

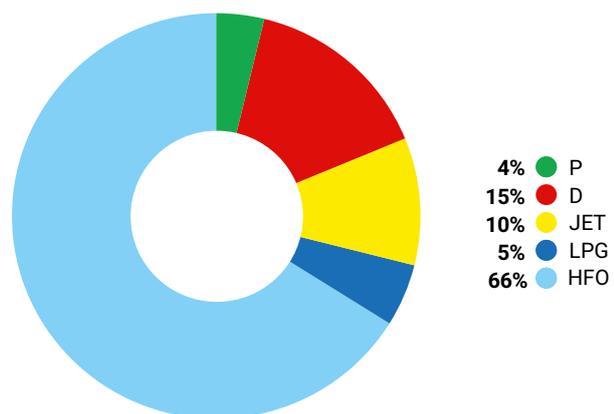


FIG. 17 STRUCTURE OF EXPORTS AND SUPPLIES IN 2020 AND 2021 [in thousands of m³]

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

Description	2020	2021	Reference 2020=100
Petrols	287	70	24
Diesel	487	277	57
JET aviation fuel	194	188	97
LPG*)	137	92	67
Heavy fuel oil	1,290	1,223	95
OVERALL	2 395	1 850	77

DOMESTIC CONSUMPTION OF LIQUID FUELS IN 2021

Table 19 presents a preliminary comparison of the officially registered domestic consumption of liquid fuels in 2021 when compared to the official domestic consumption of liquid fuels in 2020. 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 2022. Therefore the results presented for 2021 should be treated as estimates, yet very close to final figures.

The trend of the economy returning to growth trajectories ongoing from June 2020 continued in 2021 despite the epidemic regimes still in place, which was linked to higher demand for liquid fuels. In addition – Poles travelled more and spent their holidays and days off more often in the country than they did before the outbreak of the pandemic. Demand for fuel was significantly higher than a year before, despite the fact that fuel prices were rising steadily. Current estimates of domestic fuel consumption indicate that the full-year result was firmly in line with the state of the fuel market in 2019, and was only around 90,000 m³ short of breaking the sales record of liquid fuels. In 2021, increases in official demand were recorded for all

traction fuel grades and for light fuel oil. Only the heavy fuel oil market score recorded a reduction. Demand for petrol and diesel has significantly increased. The JET fuel market, which was most affected by the pandemic restrictions, was also recovering, albeit still at a low level. As in previous years, the sales volumes of diesel, main fuel type for Polish economy, reached the highest levels. The volume of petrols placed on the market was about 3.5 times less, but their sales growth significantly exceeded the interest in LPG. The market for this fuel type grew at the lowest rate compared to other motor fuels.

For all types of motor fuels (petrol, diesel and autogas) the market grew by 7% when compared to 2020. The entire liquid fuels sector also recorded positive growth at a similar level to transport fuels alone. Additional fuel sales volumes were also influenced by an increase in the fleet of motor vehicles – mainly used and with spark-ignition engines and hybrids. Sales of electric cars were also significant, yet still at a low level across the fleet. The return to normality in the economy resulted in the LPG market recording positive growth, but to a much lesser extent than the other two types of fuel used to power

FIG. 19 ESTIMATED DOMESTIC LIQUID FUEL CONSUMPTION IN 2021 IN COMPARISON TO THAT OF 2020 [in thousand m³]

Source: Ministry of Finance and POPiHN's own data

Description		2020		2021		Reference 2020=100
		in thousand m ³	share in consumption %	in thousand m ³	share in consumption %	
Petrols	Consumption	5 995		6 566		110
	of which total imports	655	11	1 229	19	188
Diesel	Consumption	20 551		21 983		107
	of which total imports	5 284	26	6 983	32	132
LPG	Consumption	4 524		4 722		104
	of which total imports	3 770	83	3 971	84	105
Total for 3 fuel types	Consumption	31 070		33 271		107
	of which total imports	9 709	31	12 183	37	125
JET aviation fuel	Consumption	575		720		125
	of which total imports	0	–	3	–	–
Light fuel oil	Consumption	722		729		101
	of which total imports	52	7	23	3	44
Heavy fuel oil	Consumption	325		301		93
	of which total imports	145	45	133	44	92
OVERALL	Consumption	32 692		35 021		107
	of which total imports	9 906	30	12 342	35	125

vehicles. Lower temperatures in the winter months also helped somewhat, intensifying supplies of this type of fuel for heating purposes. The calculations for LPG, as usual, do not take into account the so-called re-exports (exports of gas previously purchased outside Poland), which last year were 12% higher than in 2020. Also taking this relationship into account, it can be estimated that the market for this fuel type showed even slightly lower domestic dynamics than shown in the fuel consumption table.

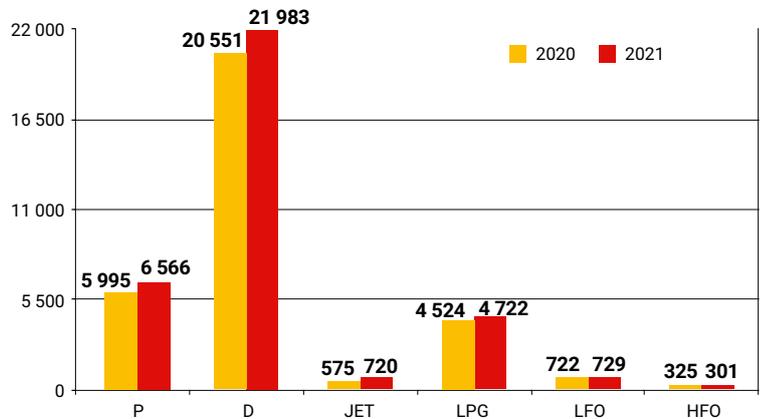
The data available to POPiHN at the time of preparing this study clearly show that the largest increases were recorded in sales of diesel and petrol, although the most favourable result in percentage terms was shown for JET aviation fuel. This market, which was thriving before the pandemic period, collapsed completely for a few months and in 2021 tried to return to previous levels. Nonetheless, the process of regaining popularity among travellers will still take some time, although it should be noted that the air freight market has recovered much faster. Domestic demand for liquid fuels was fully met and there were no instances of market turbulence. There have been, however, some worrying situations, such as difficulties in obtaining an appropriate amount of ingredients for bio-fuels, or periodic inconveniences related to the certification of the latter. Refineries, wholesalers and petrol stations did not stop work for an hour, adapting their activities to the pandemic requirements still in force. In order to meet demand, domestic production was supplemented by fuel imported from abroad, in quantities greater than in 2020, and export shipments of fuel from Poland were also reduced.

The official consumption of fuels for Diesel engines grew by 7% in relation to 2020 and reached the level of 20 m m³. The share of official imports in the diesel market supplies reached the level of 32%, i.e. increased the by 6 percentage points in relation to the previous year's. The dynamics of market supplies carried out by POPiHN members increased by 6%, which was slightly less than the overall market. Imports by member companies of the Organisation reached the level of 5.3 m m³ and thus increased by 35% compared to 2020. Supplementary imports by independent importers also improved by 24% and reached 1.7 m m³. Altogether almost 7 m m³ of this fuel type was imported.

Demand for petrol also increased measurably and in percentage terms more than for diesel. Interest in purchasing this type of fuel showed a result 9.5% better than last year. The reasons for this increase have been described above, although it is worth emphasising again that the factors influencing the market were the changes in Poles' travel destinations to domestic ones, and among new registrations the dominant ones were vehicles other than those with diesel engines. The reason for greater interest in petrol than in autogas (let us recall that the latter is often a substitute for petrol in spark-ignition engines) was price relations. More expensive autogas drove the interest of drivers with dual petrol systems towards petrols. For these two fuels, price relations have always to some extent determined the proportion of purchases. Last year Polish drivers used about 6 m m³ of petrol in their vehicles, out of which slightly over 1.2 m m³ came from imports. Imports supplied 19%

FIG. 20 DOMESTIC CONSUMPTION OF LIQUID FUELS IN 2020 AND 2021 [thousand m³]

Source: POPiHN's own data



of the total petrol market share, i.e. 8 percentage points more than in 2020.

There was an increase, yet for the reasons described above, less than for petrol, in interest in LPG, calculated according to POPiHN methodology (not including re-exports). The result showed an increase of 4.4% over the previous year. It is now estimated that for the whole year LPG consumption amounted to 4.7 m m³. Re-export of this type of fuel amounted to almost 319,000 m³, i.e. about 33,000 m³ more than in 2020. Its imports equalled 84% of the market supply, which was 5% more compared to the previous year. Almost 4 m m³ were supplied from abroad.

Demand for light fuel oil in Poland is already fairly stable and showed a 1% increase last year. The market needed 729,000 m³ of this type of fuel, i.e. about 7,000 m³ more than the year before. It is assumed that next year the results for this type of fuel will decrease. A vast majority of the supplies of this fuel type for domestic recipients (97%) was satisfied by domestic production. Official supplementary imports in 2021 decreased by almost 30,000 m³ and amounted to as little as 23,000 m³.

Domestic JET aviation fuel market, mostly impacted by pandemic-driven restrictions, recorded the sales level of 25% more than the previous year's. It amounted to 720,000 m³. Its growth was at the level of 145,000 m³ 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 2021 was 7% below the previous year's level. The market absorbed 133,000 m³ of this type of heating fuel, out of which around 44% was imported.

FIG. 21 BREAKDOWN OF LIQUID FUELS EXPORTS IN 2021 [%]

Source: POPiHN's own data

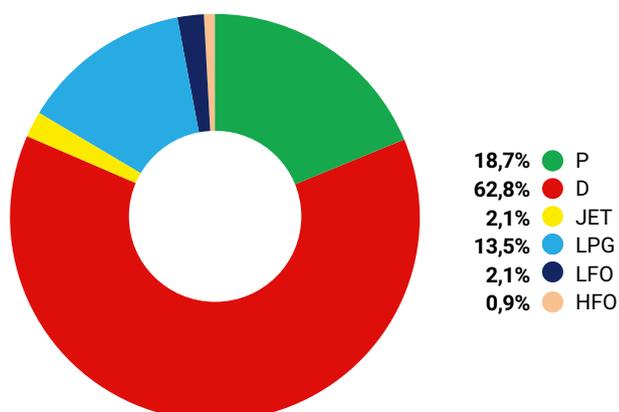


FIG. 22 BALANCE OF INTERNATIONAL TRADE IN LIQUID FUELS IN 2021 [in thousand m³]

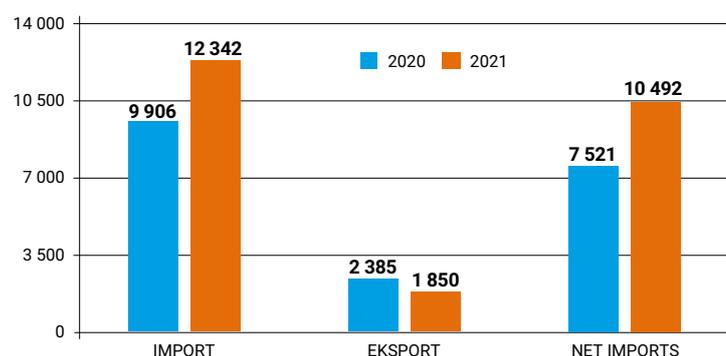
Source: Ministry of Finance and POPiHN's own data

*) – trade of domestic producers

Description	Imports + Purchases	Exports + Supplies	Difference (2-3)
1	2	3	4
Petrols	1 229	70	1 159
Diesel	6 983	277	6 706
LPG	3 971	92 *)	3 879
JET aviation fuel	3	188 *)	(-185)
Light fuel oil	23	0	23
Heavy fuel oil	133	1 223	(-1 090)
Overall	12 342	1 850	10 492

FIG. 23 BALANCE OF INTERNATIONAL TRADE IN LIQUID FUELS IN 2021 [in thousand m³]

Source: POPiHN's own data



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 35 m m³ and was higher by 2.3 m m³ than the one in 2020. The increase of the market amounted to 7%, within which the imports equalled a 35% share in the total market, with the growth at the level of 25%. The official imports of fuels supplied to the Polish market amounted to 12.3 m m³, which was almost 2.5 m m³ more than in the previous year.

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

The differences compared to 2020 are small with a slight increase in the share of petrol and jet fuel (about 0.5 percentage points each). The position of diesel has remained virtually unchanged and continues to dominate the overall market. Very small shifts were recorded among the other fuels.

The supply of liquid fuels to the Polish market is mainly through production at domestic refineries, but in 2021 demand also required an increase in imports and intra-Community acquisitions and a decrease in exports and intra-Community supplies. 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. The domestic production alone, however, does not satisfy the whole demand, especially for such fuels as diesel or LPG. The balance of international trade in fuels for Poland is presented in Fig. 22.

In 2021 the dominance of fuel imports, understood in broad terms, over exports was almost sevenfold. Let us remind that in 2020 this advantage was only fourfold. Due to a 25% increase in imports and a 23% decrease in exports resulted in the fact that the difference between fuel supplies from abroad and foreign shipments amounted to almost 10.5 m m³.

Imports were still dominated by diesel and LPG. Exports were mainly determined by heavy fuel oil, although foreign shipments of this fuel type started to fall since launching deeper processing of middle distillates at the EFRA installation at Grupa LOTOS. If the growth of the Polish economy is maintained at the level of at least the one from 2021, if there are no new significant pandemic waves and if the fleet of vehicles circulating on Polish roads continues to grow at the rate of recent years, it can again be assumed that the current proportions between fuel imports and exports will increase in favour of imports. A growing market will require more and more fuels, and the only way of satisfying this demand will be through imports. 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. However, as 2021 has shown, once the economy returns to growth, it may be necessary to also import petrol, the demand for which will increase due to the growing trend of moving away from diesel-fuelled vehicles.



Fot.: TOTAL ENERGIES MARKETING POLSKA SP. Z O.O.

FILLING STATIONS IN POLAND

A summary of the fuel station market in Poland in 2021 was based on statistics maintained by the Energy Regulatory Office and information obtained from member companies of the Polish Organisation of Oil Industry and Trade. The database of the country's infrastructure dealing in liquid fuels has been continuously modified and it is becoming more and more accurate year after year. However, there are still reports of stations operating without a licence, although this number is definitely decreasing year by year. Based on the Organisation's recent estimates, it results that at the end of the previous year the network of filling stations, which consists of publicly available sites selling at least petrol and diesel, comprised 7,852 points. Compared to the data from the end of 2020, this number grew by 113 stations. The increase in the number of fuel 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 was once again adapting to customers' requirements after a period of restrictions related to changes in the sales model caused by the epidemiological situation in the country. There have been transformations resulting from new investments or changes to the stations' brand image. A spectacular example was Grupa Pieprzyk's stations joining the AVIA alliance and the consequent change of their logos to a brand recognised throughout Europe. As in previous years, there was a continuation of the process of taking over smaller operators' facilities

by larger networks, both corporate and independent, operating on an increasingly large scale. In each market sector, stations were moving towards the convenience store model, allowing the clients not only to fill their cars up, but also to use the shop located next to the pumps to do basic shopping, rest during journeys, perform financial services, have a meal or carry out simple maintenance work on the vehicle. The process of such transformations did not stop even in the difficult situation of pandemic restrictions and in the described year it was possible to record additional income from the work done previously. 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. Fully unmanned stations, where prices were usually slightly lower,

FIG. 24 NUMBER OF STATIONS OF RETAIL OPERATORS IN 2019-2021

Source: POPiHN's own data

	2019	2020	2021
Filling stations network	31.12.2019	31.12.2020	31.12.2021
Domestic companies	2 306	2 324	2 339
Foreign companies	1 543	1 569	1 581
Independent chains (operating under a common brand)	1 116	1 181	1 339
Other independent operators (approx.)	2 467	2 478	2 414
Shops	196	187	179
TOTAL (approx.)	7 628	7 739	7 852

FIG. 25 FILLING STATIONS IN POLAND AT THE END OF 2021

Source: Energy Regulatory Office and POPIHN's own calculations

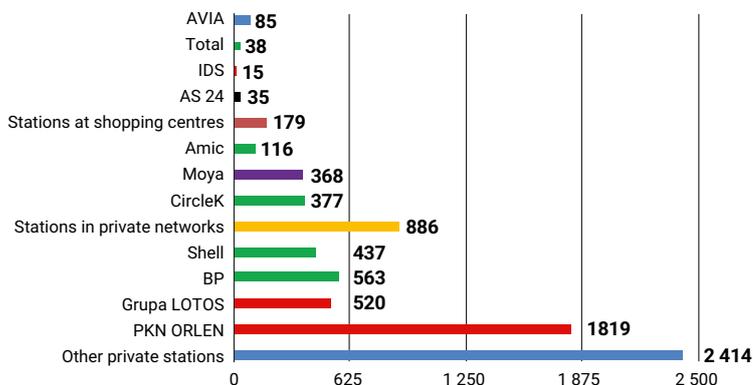
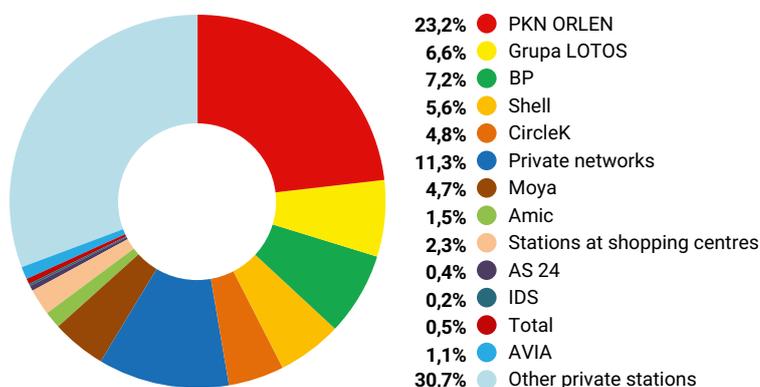


FIG. 26 BREAKDOWN OF FILLING STATIONS MARKET AT THE END OF 2021 [%]

Source: POPIHN's own data



were becoming increasingly popular, especially during periods of high price rises. Such habits learnt during the pandemic period will probably become an everyday occurrence. The small and large food outlets operating at stations also came back to life. Filling stations operated with greater freedom, but with a sanitary regime for shoppers and staff. The availability of necessary disinfectants in the facilities and in distribution to station customers was ensured.

By the end of 2021, POPIHN members already held a 56% 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 4,404 facilities, while other operators owned 3,448. In breakdown by category of owners of the overall number of stations, the following can be identified: 29.8% belonged to domestic companies, 20.1% to international ones, 2.3% to hypermarkets and 47.8% to private owners. In the latter group, 1,390 filling stations belonged to operators having a minimum of 10 facilities in their networks operating under one logo. Their share of the total filling station market reached nearly 18%. The process of changing colours by stations was mainly based on franchise agreements, both for POPIHN members (the largest market operators) and for smaller private networks. New facilities were opened – although the scale of these undertakings was not very impressive – by virtually all market sectors. Quite a large group of operators

with stations in good locations continued to run their businesses by themselves and did not undergo a consolidation of the market.

PKN ORLEN had the highest number of stations in 2021 – similar to previous years. The BP network continued to be in the number two position, whereas Grupa LOTOS occupied the third place. The measures aimed at harmonising the colours and offering a uniform standard of service at all filling stations within the network continued to develop in domestic companies. There were fewer and fewer so-called economy brand stations on the market. Both national concerns expanded their networks – by a total of 15 facilities. There was a growth in the segment of stations operating under international companies' logos in Poland. At the end of 2021 there were 1581 such outlets, i.e. 12 more than in the previous year. In the segment of independent stations the best dynamics in terms of network development was witnessed by the MOYA network, owned by ANWIM, which joined the POPIHN members' family in mid-2019. 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 2021 oscillated around 142 bn PLN. The volume of fuels sold at filling stations was initially estimated at 28.4 bn liters (petrol, diesel and autogas). State budget revenue from taxation (VAT, excise duty, fuel surcharge, emissions fee) from fuel sales amounted to around 68.5 bn PLN. Overall, taking into account direct sales to the business sector, the estimated amount of the levies paid by the fuel sector amounted to over PLN 75.1 billion.

Poles are increasingly willing to use the country's motorways and expressways, and there are more and more new places on these roads where you can refuel your vehicle or take a break during your journey. In 2021 there were 92 filling stations located along Polish roads marked with 'A', i.e. 2 more than in the previous year. These two new facilities were launched by PKN ORLEN, which eventually had 38 vehicle refuelling points located mainly at Motorway Service Areas (MOPs). The other motorway operators made no new investments, retaining the following numbers of MOPs: Grupa LOTOS: 23, BP: 16, SHELL: 12 and CircleK: 2. The development of expressways and the increasing number of stations located along them are changing the geography of vehicle fuelling. Domestic and transit drivers who do not want to waste time during their trip prefer to pay a little more than to look for alternative (cheaper) stations located near the main road. The stations, which until recently were natural refuelling points filling up shortages of stations on motorways and operating on alternative roads at the time when express routes were still incomplete, are losing customers.

Poland's largest retail operator, PKN ORLEN, in 2021 increased its filling stations network by a total of 8 facilities and at the end of the year had 1,819 stations. The company is systematically reducing the number of stations operating under the BLISKA logo – at the end of last year they were only 22, another 3 facilities fewer than at the end of 2020. Most of the facilities which in the past operated in green colours now carry the logo of the parent company. The company gained 2 stations located at MOPs along motorways.



The second national company, Grupa LOTOS, held the third largest position on the filling station market, operating 520 facilities, i.e. it increased its resources by 7 filling stations compared with the end of 2020. This company is also replacing the economic logo of LOTOS OPTIMA with the colours of the main company. This group of stations lost 3 sites during the year and ultimately the old logo was still visible at 183 facilities.

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 even though it reduced its network by 7 stations and at the end of 2021 had 563 facilities. Meanwhile, Shell Polska acquired additionally 14 stations and expanded its area of operation to 437 stations, 14 of which operated in the unmanned format. Circle K administered 377 stations at the end of the year and thus added 9 facilities to its group. Amic Polska maintained its position from previous years, still managing only 116 stations. TOTAL brand was present at 38 filling stations, which means that the company reduced its network by 5 franchised outlets. The most dynamic expansion of its resources was presented last year by ANWIM, whose stations operate under the MOYA colours. The company increased the number of its facilities by 65 and ended the year with 368 stations under its logo. Another POPiHN member, UNIMOT, with stations operating under AVIA colours, added 24 locations where drivers could refuel their vehicles and ended the year with 85 stations.

The area from which stations are acquired for the expansion of company networks using franchise deals is traditionally the sector of stations of so-called independent operators, who in the past were not associated with any of the major national networks – either within a corporation or outside of it. In 2021, this process also took place, depleting the number of stations operating independently. In addition, a number of such companies have closed down. In some cases the companies' concessions were reviewed either positively or negatively. Some companies launched new facilities or revitalised older ones. Changes of colours – often to network colours – were not unusual. Adopting the POPiHN's nomenclature (companies networks are the ones where under one logo there are at least 10 outlets), the group of independent operators in 2020 had around 2,480 facilities. At the end of 2021, their number decreased to 2,410. The change thus affected around 70 sites. The situation was also changing in the independent networks themselves, which were expanding their inventories while increasing the area in which they operated. For some of them it was the territory of the whole country or its considerable part. At the end of 2021 there were approximately 1,340 facilities classified by POPiHN as a network of independent stations, i.e. the number of sites of this group increased by approximately 160 locations. As mentioned above, the largest increases within the private networks in 2021 were achieved by the newest POPiHN members (ANWIM and UNIMOT), but operators such as Grupa Pieprzyk, WATIS and OLKOP were also active. The development of independent brands makes them more and more attractive in the context of possibly joining such alliances of operators still operating independently. An additional impulse to choose an independent network rather than a corporate network may be the

fact that such associations have somewhat looser operating rules than the networks of the largest national operators. For many private operators it is a significant argument to consider while changing the logo on their stations. At the end of 2021, stations grouped in networks of independent operators accounted for the second largest number of organised facilities providing retail fuel sales. In the light of rising fuel prices and omnipresent overpricing, their stations are increasingly becoming a real alternative to large oil companies – all the more so as they usually offer fuel at slightly lower prices than in other segments of this market.

The number of stations owned by super- and hypermarkets is decreasing. The decrease in 2021 amounted to 8 facilities and the balance at the end of the year was 179. This is due to the withdrawal from the Polish market of TESCO, whose network has already been partially taken over by other operators, and new owners are being sought for the remaining stations. Although shop chains represent a small percentage of the overall filling station market, by offering drivers lower prices than their competitors, they sell large volumes of fuel and thus their share of this retail market is significant. In 2020, the importance of these facilities – due to the numerous and prolonged pandemic restrictions on sales in large retail outlets – declined slightly, but increased again in 2021, when the restrictions were significantly eased. The leader in this group of operators is still Intermarche, but Carrefour, Auchan or E. Leclerc also maintained the number of their stations.

The described statistics focus mainly on public stations selling at least 2 fuel types (P and D). In addition to such facilities, 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.

Fig. 25 shows the percentage breakdown pie of the filling stations market in Poland, divided into groups of retail operators. No significant changes were noted on it in relation to the previous year, and the most noticeable change is the increase by 2.5 percentage points of the slice showing the segment „Other private stations”, taking away small portions of percentage points from several other companies. The largest network operators virtually maintained their position and shares from the previous year in an unchanged dimension.

More and more chargers for electric vehicles are being installed at filling stations. For the past two 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 2021 there were a total of 1,932 charging stations, out of which 587 offered fast (DC), and 1,345 slow (AC) charging. POPiHN established that out of this number, 159 fast and 75 slow chargers were installed at filling stations that also sold motor fuels. This represents 27% of fast chargers and 6% of slow chargers nationwide. Chargers are generating new opportunities in the operation of facilities serving drivers, but it seems that for a long time to come the sale of classic fuels will be the primary activity of such sites.

DEMAND FORECAST FOR THE POLISH MARKET UP TO 2030

The actual picture of the country's fuel market observed after the COVID-19 pandemic in 2021 forced changes in the approach to formulating demand forecasts for liquid fuels in Poland. The pandemic left its mark on the entire global economy, but in 2021 the markets rebounded and so did the demand for energy commodities. This also applied to the market for crude oil and finished petroleum products. The annual 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. The member companies' and the Organisation's staff's expertise was used for this purpose. Available data on fuel consumption in Poland for 2021, the trends from the previous years as well as the new European Union climate policy have been taken into account. The impact of a pandemic on the market in 2020 and the potential for disruption to the supply of fuels or components for their production have been analysed, at the same time taking into account changes in public habits that may carry on even in the absence of epidemic threats. The return of the domestic market to 2019 conditions, as well as new market realities have resulted in visible changes in the approach to the development of scenarios. Significantly higher consumption of petrol, diesel, LPG and light heating oil compared to last year's figures indicate how delicate the matter is in regards to petroleum fuels market. Already last year POPIHN accurately predicted the trends that should follow once the development of the pandemic has been controlled. A recovery in the market for petrol diesel and autogas was therefore predicted and, in addition, it was rightly assumed that, as the world economies recover, the price of oil and finished fuels would have to rise. Assumptions that the fleet of combustion vehicles will grow have also proved true. In 2021 a total of ca. 1 million cars were either purchased from dealerships or imported from abroad. During analytical works on the current version of the scenarios, an effort was made to take into account the latest changes in the economy, forced by the ongoing energy transition and the new realities of the European Green Deal. Several

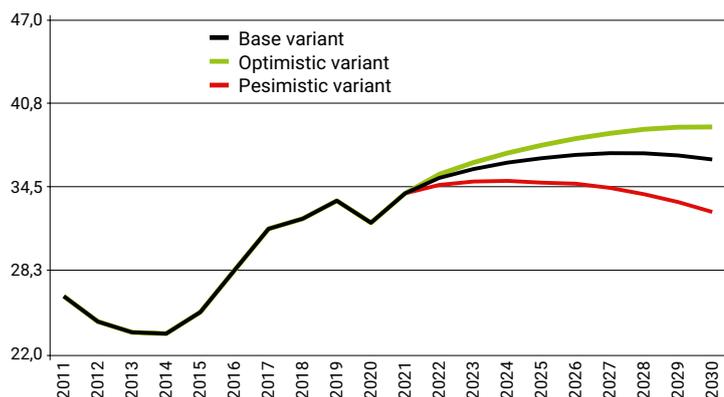
variants of the scenarios were preserved to reflect the different trends in Polish economy and the needs of Polish drivers.

The new baseline and optimistic scenarios assume effective measures to reduce the size of pandemic constraints and increase public resilience to COVID-19. 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 2021, 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 previous year. Domestically, the focus has been placed on the economy's growth 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 zero-emission one. The assumption was maintained that in the next couple of 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. It was also assumed that heavy transport will be mostly served by diesel-powered cars by 2030. The approach was maintained that current social benefits will continue, that the average wage of Poles will gradually increase and that unemployment will remain at a low level. A new element to be taken into account was the inflation rate forecast for the coming years, which according to the National Bank of Poland may initially exceed 10% y/y, but is expected to moderate over time. This heralds possible increases in domestic fuel prices. 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 that the Polish economy from 2021 onwards will again grow at an annual rate of over 4% of GDP, the effectiveness of the fight against the grey economy will be maintained in the coming years, the range of changes in the PLN/US dollar exchange rate will not exceed 10% of the level observed at the end of 2021 and domestic inflation will start to decline from 2024. This option assumes that oil prices could remain between 80 and 100 USD/bbl in the long term. Admittedly, unpredictable events today – as has been observed, for example, in connection with the pandemic or possible military threats in various areas of the world, including Europe – can significantly alter international demand for energy raw materials. It is assumed, however, that the turbulence in oil demand due to this should not be higher than 20-30% of current supply, which will of course translate into quotations, but can be compensated for fairly quickly by the actions of producing countries. Thus it was assumed that crude oil prices should remain stable for about two years.

FIG. 27 SCENARIO FOR LIQUID FUELS DEMAND IN 2021 – 2030 (in m m³)

Source: POPIHN's own data





After this date, increases in average annual values to around USD 80/bbl are possible. Additionally, the declared energy transition in Europe, the United States of America, and China, aimed at phasing out petroleum fuels and replacing them with more ecological energy carriers, should translate into a stable situation on the international oil market and neutralise increases in energy demand by other sources. However, the trend of increasing demand for petroleum fuels should be maintained, yet with a slightly lower dynamics, also after 2022 with an outlook to 2030. In the country, the growth effect should be achieved by still (for the next 3-4 years) increasing 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 growing cost of purchase of liquid petroleum gas and not including LPG in the list of alternative fuels, which allow the vehicle to enter clean air zones in the cities, it is that over the next several years, LPG-powered cars will be assumed gradually substituted with hybrid or electric vehicles (e.g. taxis, city supplies, car rentals). It is likely that, for a time, lingering pandemic-induced habits will positively contribute to using passenger cars for holiday and business travels. 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 will be possibly related to the implemented, especially in city centres, limitations on using individual vehicles, restrictions in the number of parking spaces, increases in parking fees, as well as limiting urban space, adapting to the needs of motorists. Public transport, together with car-sharing, 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 scenario the domestic market demand for liquid fuels in 2030 is currently estimated at around 36.5 m³, i.e. approximately 1 m³ less than it was forecast in 2021.

In addition to the main assumptions of the baseline option, the optimistic variant is based on the full removal of pandemic restrictions, a slightly lower level of oil and finished fuel quotations (by about 20% compared to the values presented above) and, due to the difficulty of purchasing new cars, a higher import rate of second-hand cars running on traditional fuels. Moreover, it is predicted that there will be a potential increase in the growth rate of the domestic economy, with a GDP of over 5% per year. This would significantly increase the need to use bigger volumes of diesel. In this scenario the domestic market demand for liquid fuels in 2030 is estimated at around 39 m³, i.e. approximately 2 m³ less than it was previously forecast.

The pessimistic scenario assumes possible return of restrictions related to pandemic and its consequences, lower prospect for growth of the Polish economy on the GDP level below 3%, and economic slowdown in the EU. Besides, it forecasts a significant increase in inflation and a fundamental depreciation of the Polish zloty (PLN) compared to other currencies, which would result in an increase in domestic prices. As a variant, but with a similar effect, we can assume a destabilisation of the international situation and marked increases in oil prices, causing a significant increase in the costs of functioning of the national economy and major increases in fuel prices, as well as intensified fiscalism reaching, as has usually been the case in the past, first to the fuel sector with the effect of reducing demand. An increase in fiscal burdens and high fuel prices could, once again, get the grey fuel market moving. Taking into consideration these pessimistic assumptions, the demand for liquid fuels

in 2030 is estimated at 32.6 m m³, which is 1 m³ less than in last year's scenario and at the same time much less than in the baseline version of the scenario.

Compared to scenarios prepared in 2020, there has been a significant reduction in expected fuel consumption ceilings in 2030. However, the peak of demand is still in 2027/2028. As this report is being prepared, it seems that the world in 2021 has returned to the 2019 situation, with the global demand for crude oil amounting to ca. 100 m bbl per day. Furthermore, it is estimated that demand for refinery crude will continue to increase. This is not, however, the end of the fossil fuels era. The world cannot exist without energy, nor can it grow. Meanwhile, new sources, i.e. other than crude oil, are too scarce in the global scale to put oil out of the game. 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. An important factor that will shape the domestic fuel market is the EU and Polish environmental policy. It has been defined at the level of EU countries, among others, by Directive 2016/2284 of the European Parliament and of the Council (EU) on the reduction of national emissions of certain atmospheric pollutants, [...] and Directive 2001/81/EC of the European Parliament and of the Council on national emission ceilings for certain atmospheric air pollutants, aimed at the implementation of measures to reduce air pollution. The latter defines the so-called emission limits as the basis for national obligations to reduce harmful emissions. In addition, the legal acts adopted within the framework of „The Clean Air Policy Package” (Clean Air) defined long-term objectives and instruments of the European Union policy in the scope of improvement of air quality to such a state that will not cause significant negative effects or threats to human health and the environment. The Strategy also provides for appropriate legislative actions aimed at tightening the existing emission standards and air pollution ceilings. Within the national limits, Poland has committed to reduce emissions by 2029, compared to 2005, of, among others: nitrogen oxides, non-methane volatile organic compounds, and particulate matter PM2.5. At the national level, achieving emission reductions of the above-mentioned compounds will be possible through the implementation of, among others, the „National Air Pollution Reduction Programme”, adopted by the Council of Ministers on 29 April 2019. In December 2019 the European Commission presented an initial „European Green Deal”, and in April 2020 the European Parliament and Member States reached an agreement on the entry into force of the European Climate Law, which became the basic piece of legislation to start advanced work on a comprehensive climate strategy. The European Commission, announcing in July 2021 the European Union's climate strategy called „Fit for 55”, decided to accelerate and increase efforts

to reduce greenhouse gas emissions. Within the framework of the presented document, the basic goal of combating global warming, i.e. accelerating the reduction of greenhouse gas emissions by at least 55% in relation to the greenhouse gas emissions emitted by the EU countries in 1990, was changed. In the transport and communication sector, the strategy assumes a number of new goals, including: reduction of emissions from passenger vehicles by 55% until 2030, reduction of emissions from commercial vehicles by 50% until 2030, a ban on registration of combustion-engine passenger vehicles from 2035, inclusion of motor transport in the greenhouse gas emission allowance trading scheme from 2026, inclusion of maritime transport in the greenhouse gas emission allowance trading scheme, inclusion of air transport in the greenhouse gas emission allowance trading scheme, and elimination of the current tax reliefs.

According to the European Commission, the proposed new concept of combating global warming is at the same time the foundation for a new model of development of the EU economy based on zero emission. Implementation of the assumed goals is to ensure the development of new sectors and areas of the economy. Adoption by Member States of the „Fit for 55” strategy confirms the European Commission's aspiration to systematically reduce the consumption of fossil fuels by gradually phasing them out of economic circulation 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. Taking into account the objectives adopted in „Fit for 55” in the field of transport and communication, it is assumed that their implementation will result, in the long run, in a decrease in the consumption of petroleum fuels and crude oil. It is also assumed that in order to maintain the present level and quality of life of EU inhabitants, the decrease in consumption of traditional fuels and oil should be compensated by proportional increase in consumption of other, alternative energy carriers, the use of which will not contribute to emission of greenhouse gases and will ensure at least comparable energy value. It seems that at the moment, the most likely alternative to replace fossil fuels in transport and communication is the development of electromobility with the use of electricity from RES, as well as increasing the use of low-emission fuels such as LNG, CNG 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. Thus the future of transport is looking ever greener, yet the costs of this transformation will be enormous. All hope is that they will be spread over time and calculated proportionally for the EU Member States, with financial safeguards for the public to avoid energy and transport exclusion. The future is, however, that with time petroleum-fuelled engines will be effectively eliminated from the market either by technology or by fiscal solutions.



Fot.: GRUPA LOTOS S.A.

MOTOR FUEL PRICES

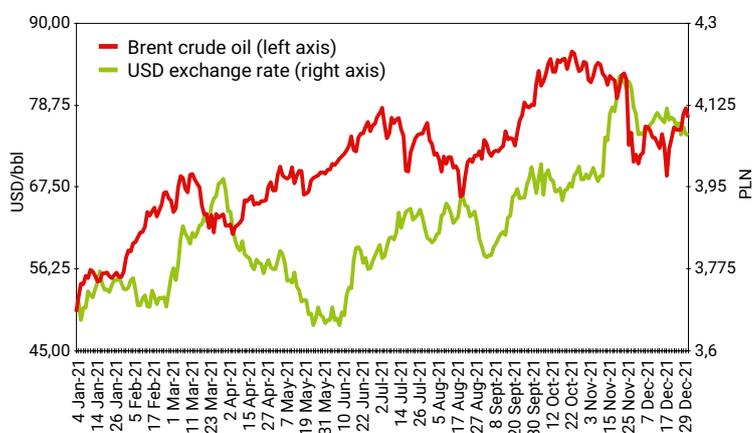
Price estimates by the Polish Organisation of Oil Industry and Trade for 2021 assumed increases in retail prices of motor fuels compared to 2020, and a higher average retail price for EU95 petrol than for the basic diesel type. Both assumptions were confirmed in reality, albeit at a slightly higher scale than assumed by the Organisation. The rebuilding of the global fuel market after the pandemic restrictions must have affected the quotations of crude oil and finished fuels on international markets. 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 fuel station price levels. The process of price rises on the domestic market began in mid-May 2020 and continued practically throughout 2021. Only in the period from March to June last year, the prices remained stable, practically not changing their level. This was followed by another wave of increases, which was only halted by excise duty reductions to the lowest possible levels introduced under the first anti-inflation shield. This resulted in a significant reduction in price levels at the very end of the year. From the beginning of the year until mid-October, retail prices of EU95 petrol were higher than prices of diesel, but from the beginning of the year until the end of June the difference between the prices of the two fuel types was minimal. Since the beginning of the summer holidays, the difference started to increase and was most pronounced at the end of August. Subsequently, the difference decreased again and by mid-October diesel was already more expensive than basic petrol but again the price difference was minimal. From mid-November both fuel types

cost more than 6 PLN per liter. In annual terms, average prices for fuels were over 20% higher than in the previous year. Continuously increasing wholesale prices only temporarily allowed filling station operators to maintain margins at a satisfactory level. For the most part of the year, earnings from fuel sales would not allow facilities to be maintained solely on fuel sales. The situation was slightly better for fuel producers, whose margins were slightly higher than those of strictly retail operators. Rising retail prices had an inhibitory effect on domestic demand – especially at the end of the year when filling station pylons showed a further breach of the psychological barrier of 6 PLN/l – but given the increased mobility of Poles in the country, this was not particularly felt by the sector. The demand was also sustained by the reluctance to use public transport and opting for individual vehicles.

From mid-2021 until the end of the March the prices of diesel at filling stations did not exceed the level of 5 PLN/l. Further increases stopped at the end of the year only at the level of 6.05 PLN per liter – on average in Poland – only due to the introduction of an anti-inflation shield in the form of a reduction in excise duty and, consequently, lower VAT. A liter of EU95 petrol was on average 1.03 PLN more expensive last year, and of diesel 0.92 PLN more expensive than in 2020. Autogas rose the least on average in the year, by 0.64 PLN/l, but at the end of the year its percentage increases were the highest, which effectively stopped drivers from making further purchases. The annual average difference between the retail price of a liter of EU95 petrol and diesel amounted to 0.09 PLN in favour of petrol. In 2020, diesel was on average 0.02 PLN/l more expensive than EU95 petrol. In 2021 the price range for 95-octane petrol was from

FIG. 28 PRICES FOR BRENT CRUDE AND THE USD EXCHANGE RATE IN 2021

Source: e-petrol.pl, POPIHN



4.54 to 6.05 PLN/l. For diesel the range was from 4.49 to 6.05 PLN/l. Thus, the difference between the lowest and the highest price of both fuel types during the year exceeded 1.5 PLN/l. Fast and continuously growing prices at filling stations meant that their operators, in order to maintain sales volumes, had to reduce their margins and 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 facilities was only possible thanks to shops operating at them and additional services offered.

Prices quoted at the pylons on Polish filling stations were influenced by the fluctuations on international crude oil and fuel markets and the changes in the ratio of the PLN against the USD. In both cases we could observe the effects of recovering world economies from the period of pandemic restrictions and increased demand for energy carriers, including crude oil. To the disadvantage of Polish drivers, there was a significant increase in the price of crude and finished fuels on international markets. A slight appreciation of the PLN against the US dollar did not help either and there was a permanent trend towards rises in domestic prices. The main price driver in our geographic area – average annual Brent crude oil quotations – reached 70.7 USD/bbl and it was 70% higher than in 2020. At the beginning of 2021, oil prices were at the level of 50 USD/bbl, and then, as global demand continued to increase, there was a series of increases up to a level of around 86 USD/bbl at the end of October.

After this peak, crude began to fall, reaching 69 USD/bbl in mid-December, before another wave of rises pushed the year-end price up to 78 USD/bbl. The largest oil producers, OPEC+ countries, regulated the market by allowing for monthly increases in production limits, but at the same time maintaining these limits at levels that prevented refinery crude prices from falling too much. Initiatives consisting in releasing a part of strategic reserves by the largest oil consumers, including the US, China and Japan, also had an inhibiting effect on the markets. These measures only temporarily halted the process of oil price increases. At the end of the year, problems with natural gas supplies and the fact that prices of this energy carrier had risen to record levels also affected demand for crude oil, which is used as a substitute for gas in energy production. The situation was also not helped by a post-pandemic backlog of new investment in oil production. This translated into the inability of some producing countries to meet their established production limits. Phenomena similar to the ones observed in the case of oil were recorded for fuels traded on the international commodity stock exchanges. The increase in diesel quotations was 12 percentage points lower than the increase in crude oil quotations. For premium petrol the increase exceeded that of crude by 5 percentage points. This suggests that demand for this type of fuel was largely influenced by the situation on oil markets. On the Polish market net wholesale prices were shaped by the changes in stock market quotations of fuels and the changes in the PLN-USD exchange rate, and at the end of the year also protective measures related to anti-inflation shield, undertaken by the Polish government. Besides, there were increases in fuel surcharge, not fully compensated by lowering the excise rate. The increase in average annual prices benefited the state budget while drivers unfortunately had to dig deeper into their pockets.

As in previous years, the fuel prices on the Polish market were shaped by producers and traders on the basis of the so-called import parity, the main components of which are commodity market prices of fuels and the PLN exchange rate against the US dollar. Fiscal levies that had to be contributed to the state budget are also taken into consideration. The changes in the import parity determined the direction of changes in wholesale and, consequently, retail prices.

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

The restrictions on oil production by OPEC+ countries, introduced in 2017 and continued in 2018 – 2020, were adhered to quite strictly. In 2021, there

FIG. 29 COMPARISON OF ANNUAL AVERAGE PRICES FOR CRUDE OIL, LIQUID FUELS AND THE USD EXCHANGE RATE IN 2020 AND 2021

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

Description	2020		2021		Reference 2021 to 2020 2020=100
	Value	Units	Value	Units	
Prices for Brent crude	41,71	USD/bbl	70,72	USD/bbl	170
Prices for Premium petrol 10 ppm S	392,3	USD/t	685,4	USD/t	175
Prices for diesel 10 ppm S	373,6	USD/t	589,6	USD/t	158
USD exchange rate	3,9046	PLN	3,8614	PLN	99

was a monthly easing of these production limits and, at the same time, US shale oil production increased.

Such actions resulted in an increase in the amount of oil available on the market, but at the same time – after the earlier elimination of the market surplus of crude oil – they were not sufficient to stabilise the level of quotations.

According to the latest EIA and OPEC forecasts, a significant improvement in oil supply is expected only in the first half of 2023. At that time, a reduction in quotations may also be expected, but under the condition that political-economic-military factors do not lead to significant market disturbances.

The economic results presented by domestic fuel producers show that these entities have done their best to avoid fuel shortages in the market, despite occasional problems, related mainly to biofuels added to these fuels. The national budget has benefited from higher direct and indirect tax revenues.

Factors affecting domestic wholesale and retail prices (prices of crude oil, prices of main fuels and the dollar exchange rate) were as follows in 2021 (Fig. 29).

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

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

Significant increment in crude quotations in cumulative terms lasted from the beginning to the end of the year. Identical trends as for crude were also observed for diesel and premium petrol, while the growth dynamics for petrol was higher than for crude oil, and for diesel it was lower (Fig. 31).

Events on the international markets for crude oil and finished fuels were almost automatically transferred to the Polish market, albeit with slightly less upward momentum. In Poland, the domestic

FIG. 30 FLUCTUATIONS IN BRENT CRUDE PRICES AND IN THE EXCHANGE RATE OF THE USD IN 2021 COMPARED WITH AVERAGE IN 2020 [%]

Source: POPIHN and e-petrol.pl

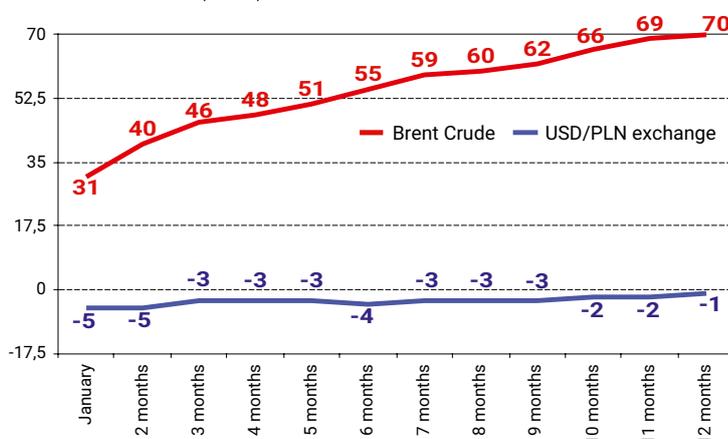


FIG. 31 FLUCTUATIONS IN CRUDE OIL AND FUEL QUOTATIONS IN 2021 COMPARED WITH 2020 AVERAGES [%]

Source: POPIHN and e-petrol.pl

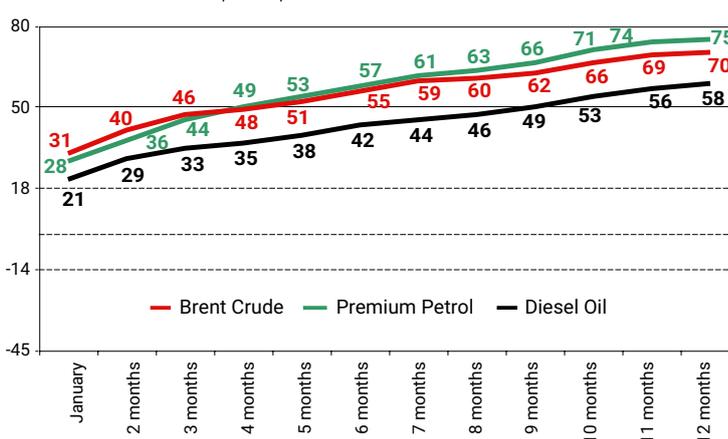


FIG. 32 COMPARISON OF ANNUAL AVERAGE WHOLESALE PRICES OF PETROL AT DOMESTIC FUEL PRODUCERS

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

Description	2020		2021		Reference 2021 to 2020 2020=100
	Value	Units	Value	Units	
EU95 petrol gross (without VAT)	3 386	PLN/1000 l	4 281	PLN/1000 l	126
Excise	1 523	PLN/1000 l	1 514	PLN/1000 l	99
Fuel surcharge	153	PLN/1000 l	165	PLN/1000 l	108
Emissions fee	80	PLN/1000 l	80	PLN/1000 l	100
EU95 petrol net	1 630	PLN/1000 l	2 522	PLN/1000 l	155

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	2020		2021		Reference 2021 to 2020 2020=100
	Value	Units	Value	Units	
Diesel with S 0.001% gross (without VAT)	3 410	PLN/1000 l	4 270	PLN/1000 l	125
Excise diesel with S 0,001%	1 154	PLN/1000 l	1 145	PLN/1000 l	99
Fuel surcharge	321	PLN/1000 l	339	PLN/1000 l	106
Emissions fee	80	PLN/1000 l	80	PLN/1000 l	100
Diesel with S 0,001% net	1 855	PLN/1000 l	2 706	PLN/1000 l	146

FIG. 34 COMPARISON OF MOTOR FUELS' RETAIL PRICES

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

Description	2020		2021		Reference 2021 to 2020 2020=100
	Value	Units	Value	Units	
Average retail price of EU95	4,41	PLN/l	5,44	PLN/l	123
Average retail price of ON	4,43	PLN/l	5,35	PLN/l	121
Average retail price of autogas	2,03	PLN/l	2,67	PLN/l	132

currency, or rather its reference to the US dollar, always has some impact on prices at our producers and filling stations. In 2021, a 1% appreciation of the PLN against the USD was recorded, and this somewhat slowed the scale of rises in the domestic market. On average, in 2021 – fuel prices increased compared to the previous year, but at the same time – as mentioned above – the Polish currency gained

a little. There was an increase in the tax burden due to a change in the fuel surcharge offset to some extent by a reduction in the excise duty rate. Changes in average annual ex-refinery prices for Polish oil companies are shown in tables 32 and 33.

The chart in fig. 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 only partially due to appreciation of the Polish currency and was additionally influenced by negotiated oil transaction prices, logistics costs, level of domestic demand and sales policy of fuel companies.

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

Similarly as in the case of petrol, the increase in domestic diesel fuel prices was less than one might expect, looking at quotations in international stock markets (Fig. 33).

In 2021 until mid-October 95-octane petrol retail price was higher than diesel's, whereas in the remaining months of the year it was lower. In the final analysis, however, its price was above diesel's.

A comparison of the retail prices of EU95 petrol, autogas and diesel in the years 2020-2021 is shown in the table (Fig. 34).

The price relations EU95 petrol/autogas favoured, like in previous years, the latter one, yet the profitability of switching to a different fuel diminished even more than in the previous year. In 2021 the autogas to 95-octane petrol price ratio was on average around 49% all year round, while in the previous year it was 46%. The price trends of individual fuels on the domestic market are shown by the graphs in Fig. 35 and 36.

From 2013 to 2017, average motor fuel prices decreased year-on-year, followed by a reversal to an upward trend, also observed in 2021. The exception was 2020, when pandemic disturbances led to price reductions.

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 collapses fuel markets.

Graph in Fig. 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, fuel sales margins in 2021 were at significantly lower levels than last year's.

It is safe to assume that filling station operators will not treat this period as a successful one. In addition, if it were not for the possibility of trading in shops at filling stations and the relaunching of

FIG. 35 RETAIL PRICES OF EU95, DIESEL, LPG AND LFO IN 2006-2021 [PLN/1000 L]

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

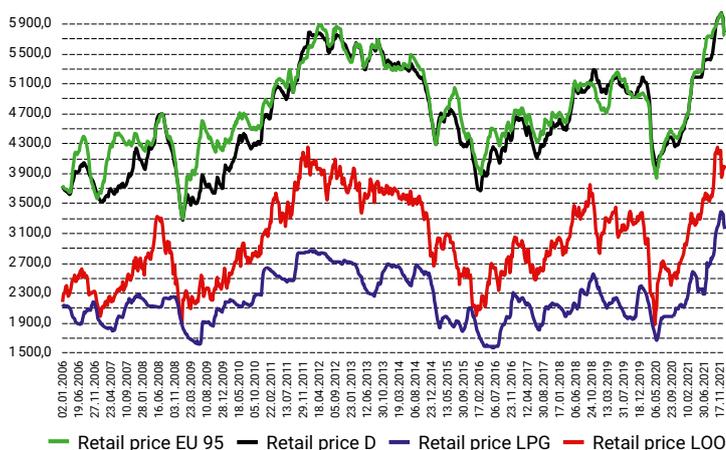
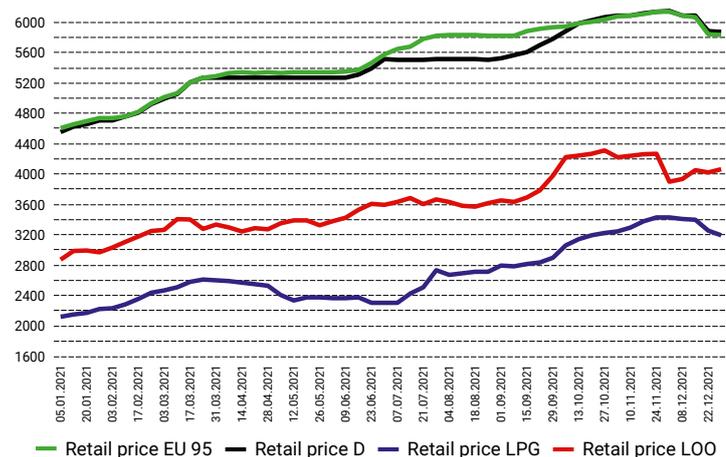


FIG. 36 RETAIL PRICES OF EU95, DIESEL, LPG AND LFO IN 2021 [PLN/1000 L]

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

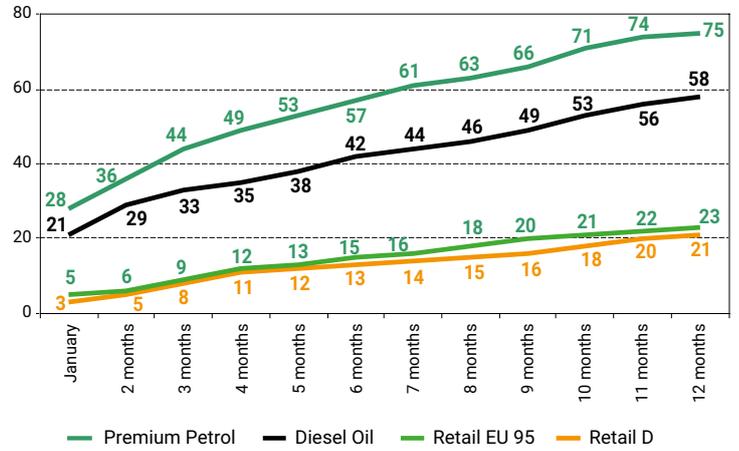


small and large catering outlets located at stations, maintaining facilities for drivers would border on a miracle. It would especially impact smaller operators without extensive local or national networks. High prices in the market and expensive fuel, and the consequent rise in domestic inflation to levels not seen for a long time, forced the government to react. The first anti-inflation shield was introduced, allowing fuel prices to come down and at least slightly make up for the losses incurred by filling station owners.

At one point, the national authorities began to consider introducing official prices for fuel to counteract its continued rise. Fortunately for the market, but also for fuel buyers, retail price levels in different regions of the country were still determined by demand, the scale of competition between different operators, as well as the range of goods on offer in shops and additional services available for the operators and drivers at this difficult time. Only the principle of free competition prevented market shortages and, at the same time, an excessive increase in fuel prices.

FIG. 37 CHANGES IN QUOTATIONS FOR FUELS ON INTERNATIONAL COMMODITY STOCK EXCHANGES AND IN RETAIL PRICES OF EU95 PETROL AND DIESEL IN POLAND IN 2021 COMPARED TO 2020 AVERAGE PRICES [%]

Source: POPiHN and e-petrol.pl



Fot.: BP EUROPA SE

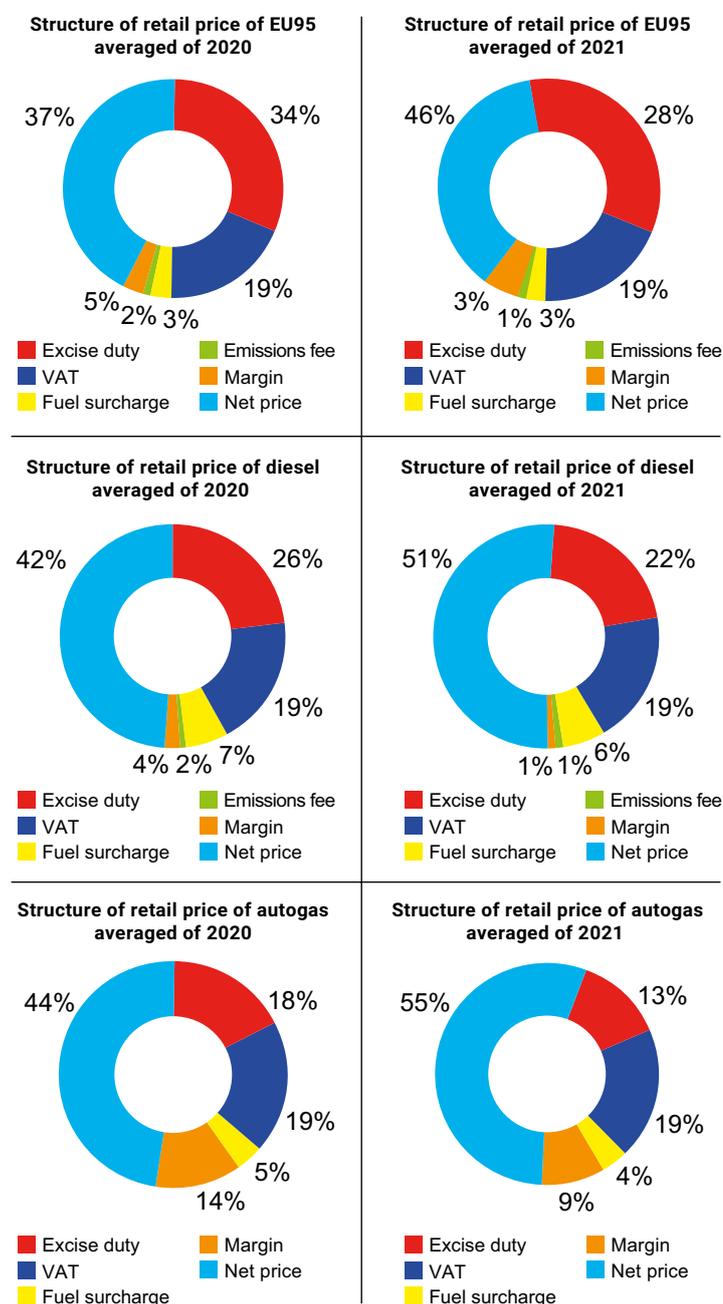
FIG. 38 COMPARISON OF TAX BURDENS ON MOTOR FUELS IN 2020 AND 2021 [in thousand m³]

Source: POPIHN's own data

Description	2020		2021		Reference
	Value	Units	Value	Units	2020=100
Total taxes for EU95 (VAT+excise tax+fuel surcharge+emissions fee)	2 580	PLN/1000 l	2 776	PLN/1000 l	108
Total taxes for D (VAT+excise tax+fuel surcharge+emissions)	2 383	PLN/1000 l	2 565	PLN/1000 l	108
% share of taxes in retail price of EU95	59	%	51	%	87
% share of taxes in retail price of D	54	%	48	%	89

FIG.39 STRUCTURE OF RETAIL PRICE OF MOTOR FUELS IN 2020 AND 2021

Source: POPIHN's own calculations



In the previous couple of years, with the development of expressways and motorways, increasing purchases of fuel at stations along these roads were observed. Epidemic factors in 2020 halted this trend somewhat and drivers began to refuel their vehicles more frequently near their homes, but in 2021 fuel trading at such facilities definitely revived, allowing prices to rise – at these operationally most expensive facilities – on a more modest scale than during much less traffic. It was possible to observe that the price difference between stations in cities or along national roads narrowed, compared to prices at stations along expressways. This was also supported by an appropriately adjusted sales policy, in particular of the largest market operators.

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 2021 the provinces which sold the most expensive fuel in the country were, just like in previous years, the following: Mazowieckie, Małopolskie, Podkarpackie and Zachodniopomorskie. Prices were slightly increased at stations along the eastern border due to restrictions on fuel imports from Belarus.

The factors which determine retail prices in Poland are taxes imposed on fuels. Figure 38 presents average tax burdens for motor fuels in 2021.

In the discussed year, and in the case of all motor fuels, the fuel surcharge was raised. At the same time, the rate of excise duty was reduced. Emissions fee rates for petrol and diesel did not change. The VAT did not change either, remaining at the level of 23%. In the case of fuels, VAT is a tax on the net price increased by specific taxes (excise, fuel surcharge, emissions fee). From 20 December 2021 until the end of the year, the excise duty rate was reduced to the minimum levels required by the European Union as part of the anti-inflation shield. On average throughout the year the tax burdens included in fuel prices rose in relation to 2020. In monetary terms, it was 196 PLN more for the basic grade of petrol and 182 PLN more for diesel to pay to the state for every 1,000 liters of sold fuel.

With net prices higher by about 50% compared to the previous year's, there was a decrease in the share of taxes included in the price of liquid fuels for

the end user. The decrease was 8 percentage points for EU95 petrol and 6 percentage points for diesel. On average, in 2021 taxes represented 51% of 95-octane petrol and 48% of diesel retail price.

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

In terms of values, the price structure is the following in Fig. 40.

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 2021.

The picture of the analysis of price levels in Poland and in other European Union countries has been very similar for years and shows that when converted into EUR, prices in our country are among the lowest in the EU. This was also the situation in December 2021. This is confirmed by the data in the table in Fig. 41 for both petrol and diesel. Prices presented for Poland

already include a reduced excise tax rate aimed at counteracting excessive price increases. At the end of 2021 average domestic retail prices of EU95 petrol were 18 19% lower and those for diesel 12% lower than the average prices for the whole analysed European market. Compared to December 2020, this is 1 percentage point less for EU95 petrol and no change for diesel.

At the end of the year domestic net prices (excluding taxes and converted into euro) of EU95 petrol were lower than the average European prices by 5%, while in case of diesel by 6%. Net prices in all discussed countries are quite similar, and the differences in retail prices are mainly caused by taxes applicable in different countries and levels of margins.

In December 2021, for EU95 petrol the difference between the highest and lowest net price observed in European countries was 193 EUR (17 EUR less than a year before) and between the highest and

FIG. 40 STRUCTURE OF RETAIL FUEL PRICES IN 2020 AND 2021 (IN PLN/L)

Source: POPIHN's own calculations

	Eurosuper 95 petrol							Diesel							Autogas					
	Retail price	Excise	VAT	Fuel surcharge	Emis. fee	Margin	Net price	Retail price	Excise	VAT	Fuel surcharge	Emis. fee	Margin	Net price	Retail price	Excise	VAT	Fuel surcharge	Margin	Net price
Average 2020	4,41	1,52	0,82	0,15	0,08	0,21	1,63	4,43	1,15	0,83	0,32	0,08	0,21	1,85	2,03	0,37	0,38	0,10	0,28	0,90
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
% change	234	-07	234	133	00	-305	546	208	00	208	79	00	-663	465	315	-49	315	100	-148	633

FIG. 41 AVERAGE RETAIL PRICES AND TAXES IN EU MEMBER STATES AND IN POLAND AT THE END OF DECEMBER 2021 IN EUR/1000 L 1 EUR = 4,5994 PLN

Source: Weekly Oil Bulletin EIA

	Eurosuper 95				Diesel (EN 590)					
	Sale price	Price without taxes	Excise	VAT amount	Sale price	Price without taxes	Excise	VAT amount	VAT [%]	
1	2	3	4	5	6	7	8	9	10	11
Austria	1 398,0	675,7	489,3	233,0	Austria	1 389,0	752,4	405,1	231,5	20
Belgium	1 615,1	734,6	600,2	280,3	Belgium	1 627,0	744,4	600,2	282,4	21
Bulgaria	1 192,9	631,0	363,1	198,8	Bulgaria	1 216,4	683,3	330,4	202,7	20
Croatia	1 485,7	674,9	513,7	297,1	Croatia	1 478,0	775,2	407,2	295,6	25
Cypr	1 323,8	672,8	439,6	211,4	Cypr	1 423,1	785,2	410,7	227,2	19
The Czech Republic	1 435,3	677,3	508,9	249,1	The Czech Republic	1 398,6	761,5	394,4	242,7	21
Denmark	1 764,3	785,2	626,2	352,9	Denmark	1 535,7	792,5	436,1	307,1	25
Estonia	1 512,0	697,0	563,0	252,0	Estonia	1 333,0	738,8	372,0	222,2	20
Finland	1 794,0	724,4	722,4	347,2	Finland	1 651,0	820,9	510,6	319,5	24
France	1 634,6	670,9	691,3	272,4	France	1 531,6	667,3	609,0	255,3	20
Greece	1 737,0	688,1	712,7	336,2	Greece	1 477,0	769,4	421,7	285,9	24
Spain	1 476,5	747,5	472,7	256,3	Spain	1 344,4	732,0	379,1	233,3	21
The Netherlands	1 963,0	801,2	821,1	340,7	The Netherlands	1 597,0	790,1	529,7	277,2	21
Ireland	1 699,3	724,8	656,7	317,8	Ireland	1 597,7	743,5	555,4	298,8	23
Lithuania	1 458,8	739,6	466,0	253,2	Lithuania	1 359,8	751,8	372,0	236,0	21
Luxembourg	1 440,0	714,5	516,3	209,2	Luxembourg	1 338,0	739,2	404,4	194,4	17
Latvia	1 461,9	689,8	518,4	253,7	Latvia	1 302,2	651,9	424,3	226,0	21
Malta	1 340,0	586,2	549,4	204,4	Malta	1 210,0	553,0	472,4	184,6	18
Germany	1 659,0	739,6	654,5	264,9	Germany	1 518,0	805,2	470,4	242,4	19
Portugal	1 664,0	704,9	647,9	311,2	Portugal	1 503,0	718,6	503,4	281,0	23
Romania	1 218,2	654,5	369,2	194,5	Romania	1 214,9	682,5	338,4	194,0	19
Slovakia	1 465,0	677,2	543,6	244,2	Slovakia	1 369,0	743,2	397,6	228,2	20
Slovenia	1 286,1	608,7	445,5	231,9	Slovenia	1 397,5	681,6	463,9	252,0	22
Sweden	1 671,3	732,8	604,2	334,3	Sweden	1 829,0	1 035,8	427,4	365,8	25
Hungary	1 293,7	680,1	338,6	275,0	Hungary	1 288,1	702,7	311,6	273,8	27
Italy	1 722,5	683,4	728,5	310,6	Italy	1 587,1	683,5	617,4	286,2	22
POLAND	1 247,9	659,9	350,9	237,1	POLAND	1 256,7	695,4	322,5	238,8	23
European average	1 517,0	695,4	552,4	269,2	European average	1 436,0	740,8	440,3	255,0	
Price in Poland against average European price					Price in Poland against average European price					
European price	82%	95%	64%	88%	European price	88%	94%	73%	94%	

FIG. 42 RETAIL PRICES OF EU95 PETROL IN UE MEMBER STATES AT THE END OF DECEMBER 2021

Source: Weekly Oil Bulletin EIA

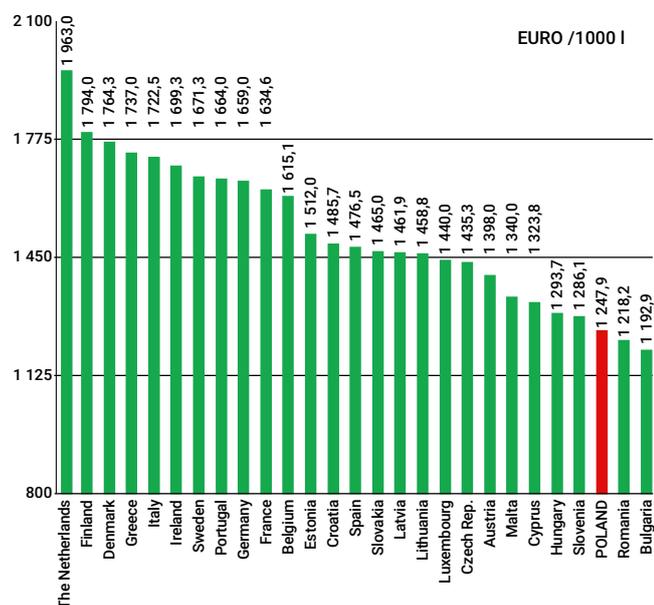


FIG. 43 EX POMPA PRICES OF EU95 PETROL IN UE MEMBER STATES AT THE END OF DECEMBER 2021

Source: Weekly Oil Bulletin EIA

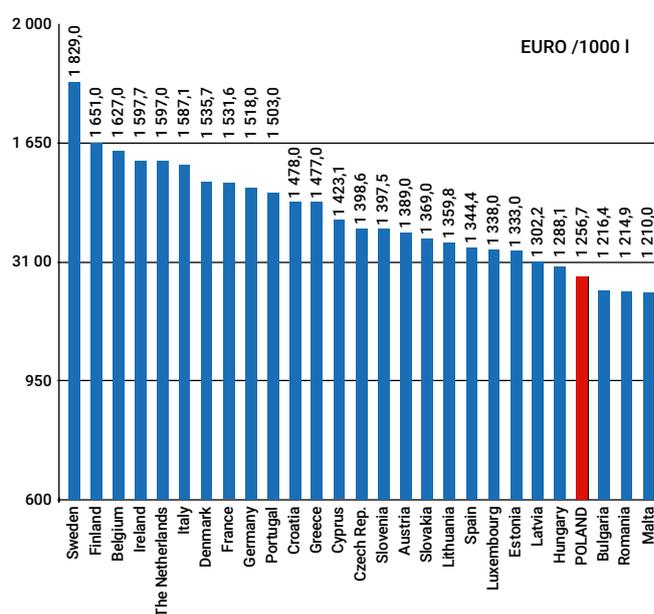


FIG. 44 SHARE OF TAXES IN RETAIL PRICE OF EU95 PETROL IN EUROPEAN COUNTRIES AT THE END OF DECEMBER 2021

Source: POPIHN's own data

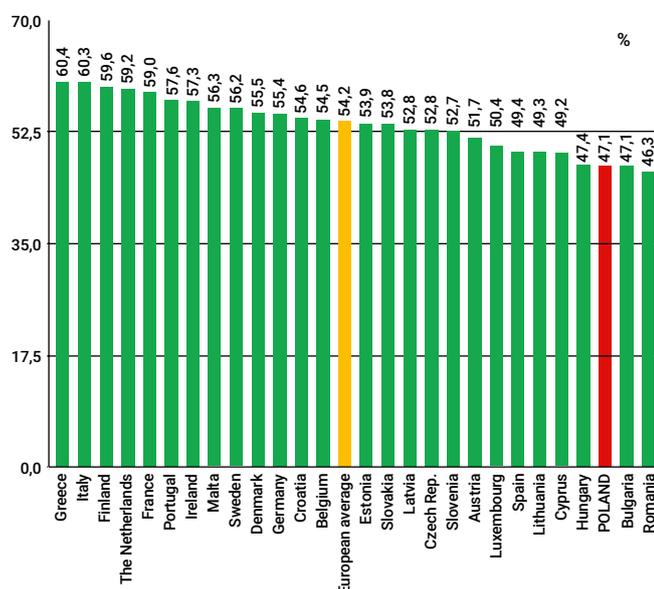
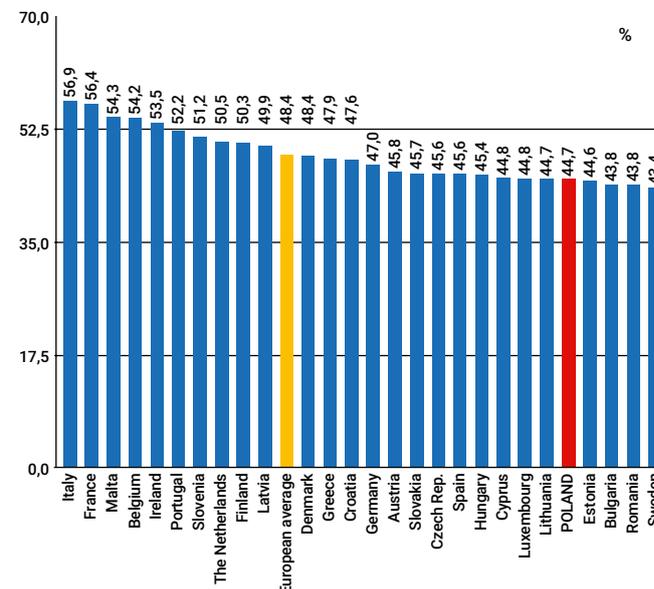


FIG. 45 SHARE OF TAXES IN RETAIL PRICE OF DIESEL IN EUROPEAN COUNTRIES AT THE END OF DECEMBER 2021

Source: POPIHN's own data



lowest retail price it was 770 EUR/1000 l (106 EUR more than a year before). This means that the net price spread has decreased, but the difference directly at the distributor has increased. For diesel the difference between net prices equalled 384 EUR per 1000 liters (135 EUR more than in the previous year), and the difference between retail prices was 615 EUR per 1000 liters (101 EUR more than in the previous year). Here the disparity increased in both cases. Retail price differences of both fuel types grew more than their net prices, which means that taxes achieved from their sales increased.

Poland is one of the European countries with the highest applicable rate of VAT for fuels, but due to

relatively low (after conversion into EUR) net prices the actually paid VAT continues to be more or less in the middle of the European rates. At the end of December 2021 the difference between the amount of VAT paid on EU95 petrol, compared to the EU average, was 12%, which was 1 percentage point less than in the previous year. For diesel the same difference decreased to 6%, i.e. 2 percentage points. The amounts of excise tax paid (after conversion into EUR, including fuel surcharge and emissions fee) respectively for EU95 petrol and diesel were 36% and 27% lower than the European averages. Compared to the previous year, this is 5 percentage points more for EU95 petrol and 2 percentage points more for diesel.



Fot.: UNIMOT S.A.

The analyses show that in all European countries the share of taxes in the price of EU95 petrol does not exceed the level of 50% of the retail price in only 7 countries, including Poland. In the case of diesel, there are 18 such countries. Poland is, of course, also among them. As we can see in the graphs, taxes that Poles are burdened with constitute a slightly smaller percentage of the fuel retail price than in the case of drivers in the majority of EU countries, but there are also countries where it is less than in Poland. In addition, in December 2021, the size of the tax share spread in the retail price between the most burdened Greece and the least burdened Romania for EU95 petrol decreased by 3 percentage points and reached the level of 14 percentage points. For diesel, between first-placed Italy and last-placed Sweden, this relationship was 13.5 percentage points, showing a decrease of 2 percentage points. A comparison of the total tax burdens on fuels in the EU countries at the end of 2021 is presented in Fig. 44 and 45.

In December 2021 in the European Union EU95 petrol was the cheapest at filling stations in Bulgaria,

Romania and Poland. These are the same countries as the year before. Drivers could buy diesel cheaper than in Poland only at filling stations in Romania, Bulgaria and Malta. Therefore it was profitable to come to Poland from any EU country directly neighbouring with us in order to fill up one's car completely. German drivers visited Polish stations in particularly large numbers. Traditionally, fuels across Poland's eastern border, in non-EU member states, were cheaper than in Poland, yet trips in order to buy them were heavily limited by pandemic restrictions. It's still a good idea to fill up your car before leaving our country, and return with an almost empty tank. The data analysed above show that Polish drivers pay slightly less for filling up their cars than the vast majority of the representatives of other EU member states. We should, however, bear in mind the correlations between fuel prices and average earnings in a given country. In such a comparison Poland does not do very well, despite the fact that in this category its position is constantly shifting upwards.

LUBRICATING OILS MARKET

2021 was a time to rebuild the economy after the shock brought by the COVID-19 pandemic. Many industries had to reinvent themselves in a post-Covid reality. Nonetheless, the pandemic did not alter the green direction taken by the European Union, announced on 11 December 2019 as the European Green Deal. Despite the recession, which has affected almost all European countries, the Green Deal has defended itself as an EU priority. The above was confirmed by the "Fit for 55" package, announced on 14 July 2021. Among the prepared regulatory proposals there was the issue of stringent emission standards, which in practice translate into a ban on the registration of combustion vehicles after 2035. For the lubricating oil industry, this means the slow materialisation of a bleak scenario, in which the gradual electrification of transport will consistently reduce demand for lubricating oils used in passenger cars. Nevertheless, before this happens, an increase in demand for advanced lubricants is forecast, which will make it possible to reduce pollutant emissions in transport, e.g. by minimising energy losses in the drive system and longer vehicle operation without the necessity to replace the lubricating oils used in it.

The Polish market for lubricating oils reached 241,973 tonnes in 2021, which, compared to 219,270 tonnes in 2020, means an increase in the overall level of sales by 10.35% y/y.

The main factor driving growth in the lubricating oil market in 2021 was the return of the public to increased use of passenger cars. Unlike in 2020, we were no longer faced with stringent movement restrictions and lockdowns of the economy, isolating people in their homes. Many people who had neglected the annual servicing of their cars during the pandemic decided to catch up and had their engine oil changed. The market for heavy-duty engine oils was also absorbent. The pandemic changed consumer behaviour and the e-commerce market developed rapidly. This directly translated into the freight industry, the demand for courier services increased, as well as for freight companies that are able to cooperate with e-commerce.

The increase in sales also applies to the industrial oils segment. Preliminary estimates by the Central Statistical Office indicate a real growth of 5.7% in Polish GDP in 2021. Business was recovering from a difficult

2020, when broken supply chains and economic lockdown caused emergencies such as production stoppages in some industries. Consumers were spending again, which had earlier been postponed due to the uncertain situation.

One of the hot economic topics in 2021 was rising inflation, which in the second half of the year reached values not recorded for years. This phenomenon also took place in the lubricating oil market: base oils recorded a significant price increase and there were also difficulties in obtaining raw materials for production of lubricants.

The price of lubricating oils was influenced by yet another factor, namely the costs of implementing the recovery obligation. The industry reported serious difficulties connected with problematic interpretation of provisions regulating this obligation, while recyclers informed about exhaustion of processing capacity in connection with the amount of demand for recovery.

Data for 2021 show a slight increase in the share of the automotive segment in relation to the industrial segment compared to the proportions recorded in 2020.

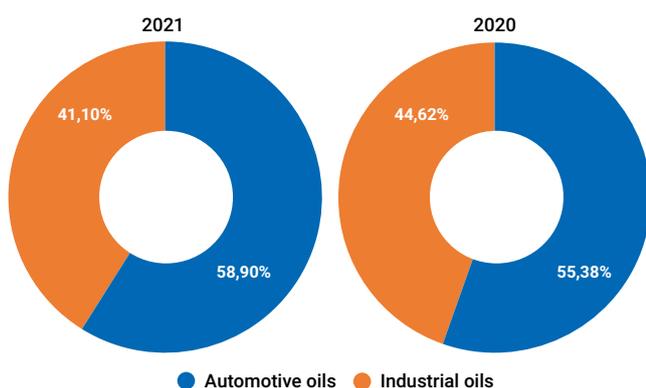
While analysing shifts in the market structure, what stands out is the increase in the share of oils designed for passenger cars. In 2021, this segment grew by 27.09%. It should be taken into account that such a large increase is partly justified by a low base effect – in 2020 it was sales of oils for passenger cars that recorded the largest decline due to pandemic movement restrictions.

The observed changes in share in the engine oils segment have continued the current trend. Among engine oils for passenger cars, synthetic oils have consistently increased their share in the segment and currently account for more than ¾ of the entire market of oils designed for passenger cars. The share of engine oils for passenger cars in the structure of the entire lubricant market increased by 3.79 p.p., while in the structure of the market for automotive oils the increase amounted to 3.74 p.p. A double-digit increase in sales was also recorded in the segment of heavy-duty engine oils, which in 2021 amounted to 10.97% y/y. In this group of oils the highest increase in sales was recorded in semi-synthetic oils, namely by 17.49%, which translated into an increase in their share in the structure of the entire lubricating oils market by 0.46 p.p.

Hydraulic oils remained the most important type of oil in the industrial segment. Their sales in 2021 increased by 7.58% y/y compared to sales in 2020. Their share in the industrial oils segment recorded an increase of 2.26 p.p. and equals to 41.04%. At the same time, due to a significant increase in sales of oils for passenger cars, the share of hydraulic oils in the structure of the entire market decreased by 0.43 p.p. In 2021 POPiHN modified the way the industrial oils market is monitored. From the category „other industrial”, two additional categories were separated: „chainsaw oils” and „heat transfer media”. For these two new categories it is not possible to present the change in sales y/y. The category „other industrial” recorded the largest drop in sales in 2021 among all specified categories of industrial oils, by as much as 17.56%¹.

FIG. 46 TOTAL MARKET FOR LUBRICATING OILS IN 2021

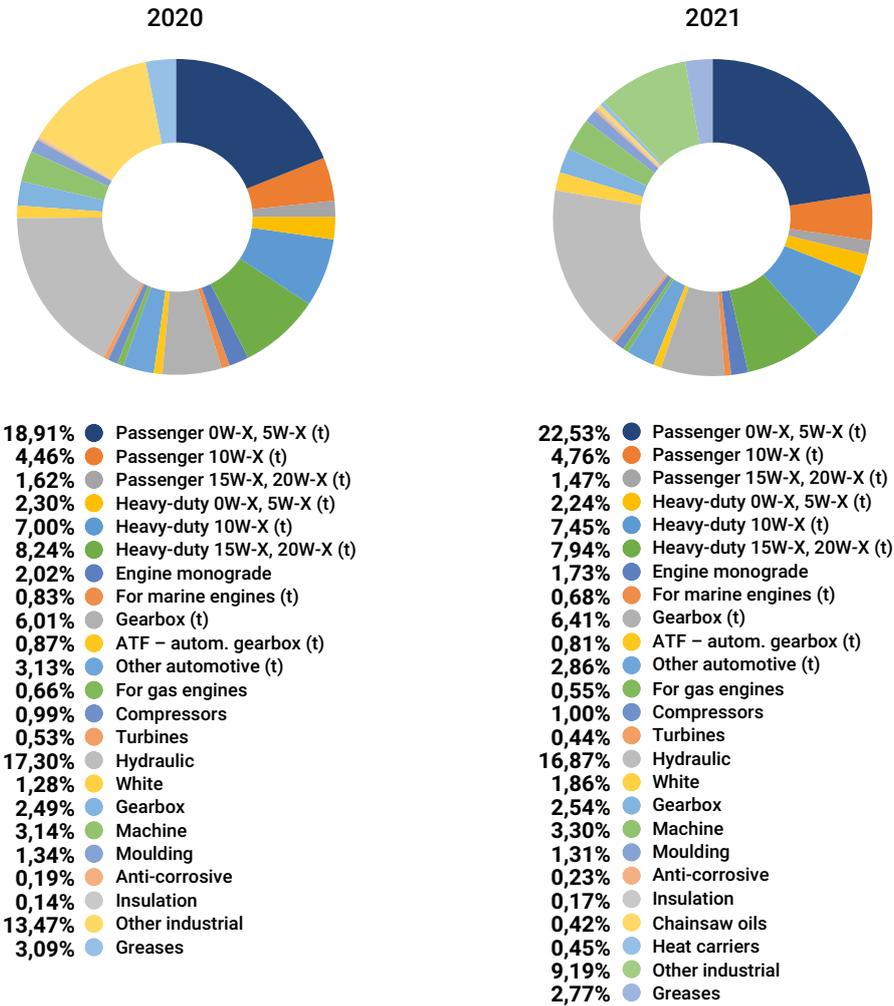
Source: POPiHN's own data



¹In order to correctly calculate the y/y sales change, sales of the „chainsaw oils” and „heat transfer media” categories separated in 2021 were added to the value of „other industrial”, bearing in mind that they were included in the sales value of the „other industrial” category in 2020. In the next report, each of these categories will be treated individually.

FIG. 47 COMPARISON OF THE STRUCTURE OF THE MARKET FOR LUBRICATING OILS IN 2020 AND 2021 [%]

Source: POPIHN's own data



THE MAIN FACTOR DRIVING GROWTH IN THE LUBRICATING OIL MARKET IN 2021 WAS THE RETURN OF THE PUBLIC TO INCREASED USE OF PASSENGER CARS.

FIG. 48 COMPARISON OF SALES OF CHOSEN LUBRICANT TYPES IN 2020 AND 2021

Source: POPIHN's own data

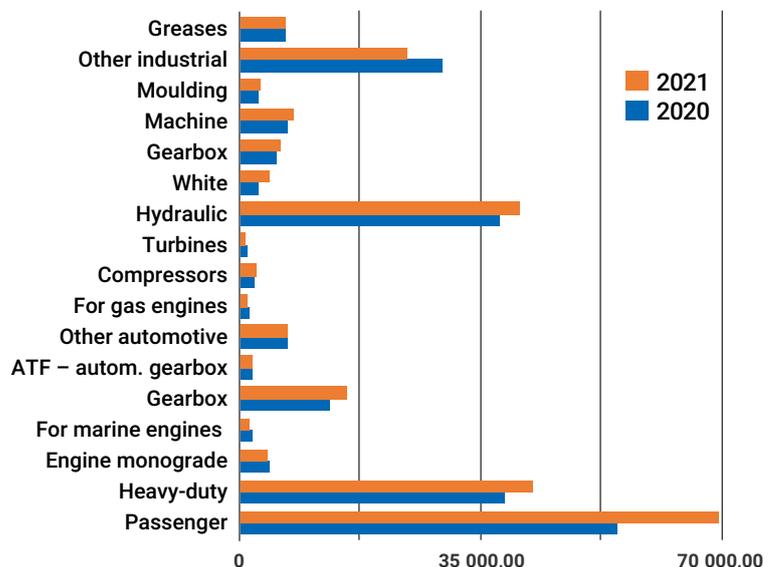
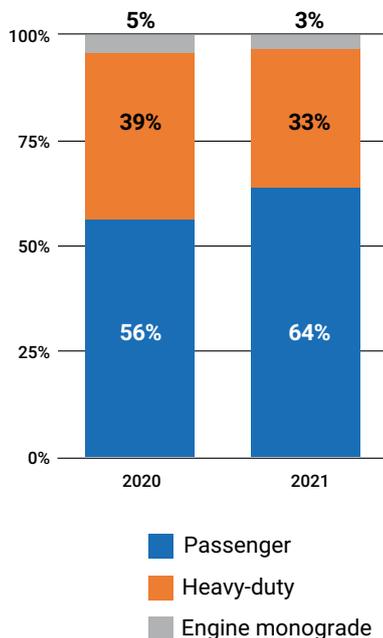


FIG. 49 AUTOMOTIVE ENGINE OILS

Source: POPIHN's own data



ENGINE OILS FOR THE AUTOMOTIVE INDUSTRY

Automotive engine oils account for 48.14% of all lubricating oils sold in Poland, representing 81.73% of sales within the automotive segment.

In Poland in 2021 sales volumes of engine oils designed for vehicles amounted to 116,482 tonnes. In the previous year the sales volumes amounted to approximately 97,675 tonnes, so the increase equalled 19.25% on a yearly basis.

The highest increase in sales in 2021 was recorded in engine oils for passenger cars, by as much as 27.09% y/y. At the same time an increase by 10.97% was recorded in sales of heavy-duty engine oils. The observed scale of growth is partially justified by a low base effect, as in 2020, due to pandemic movement restrictions, 10.65% less passenger car engine oils were placed on the market.

More broadly than just engine oils, sales of all automotive oils in 2021 totalled 142,517 tonnes. This represents an increase of 17.36% compared to sales in 2020. The subgroup outside of engine oils that witnessed the highest increase in sales was gearbox oils. They entered the market in the volume increased by 17.86% compared to the previous year. The biggest decline was recorded in marine engine oils as their sales were lower by 9.67% compared to the year before.

FIG. 50 AUTOMOTIVE ENGINE OILS AGAINST THE OVERALL LUBRICATING OILS MARKET IN POLAND [%]

Source: POPIHN's own data

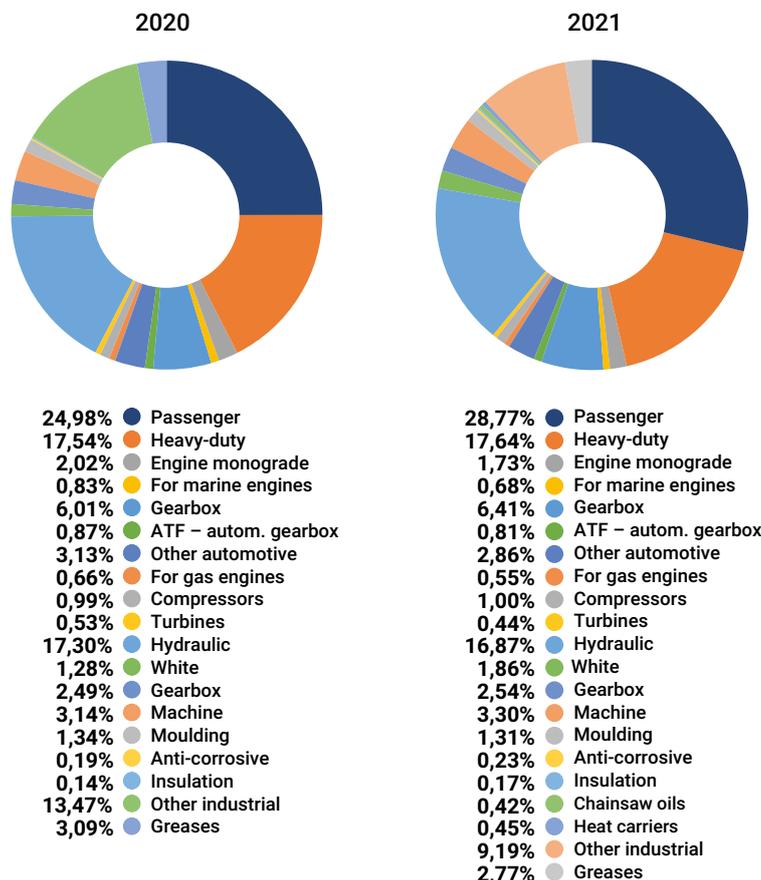
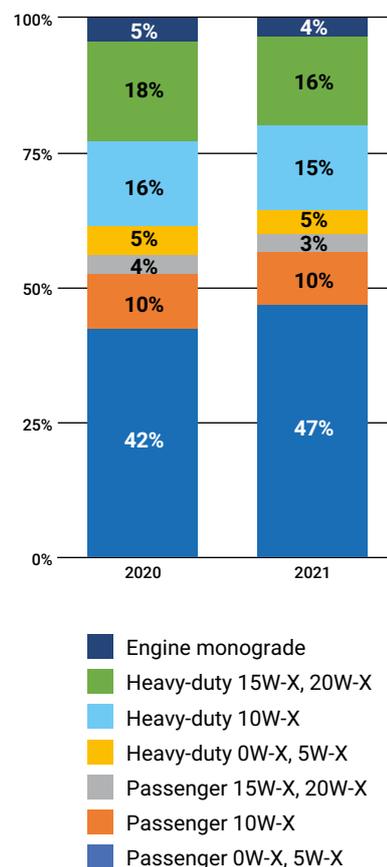


FIG. 51 STRUCTURE IN THE SEGMENT OF THE AUTOMOTIVE ENGINE OILS IN 2020 AND 2021

Source: POPIHN's own data





Fot.: FUCHS-OIL

PASSENGER CARS MOTOR OILS (PCMO)

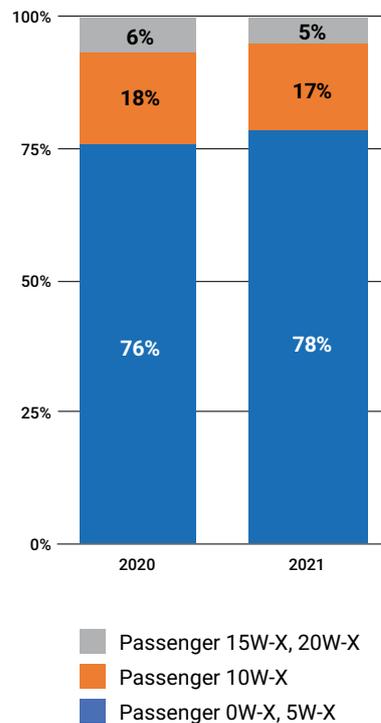
In 2021 the segment of engine oils for passenger cars recorded an increase of 27.09% and sales volumes amounted to 69,621 tonnes. Such significant growth is justified by, among other things, catching up with the service backlog of 2020, when travel restrictions and the sudden rise in popularity of remote work meant that a significant number of passenger cars were not in use. This is supported by quarterly data, according to which synthetic oils recorded as much as 50.76% higher sales in the second quarter of 2021 than in the same period of 2020. The 31.53% year-on-year increase in sales of synthetic oils is a confirmation of the progressive replacement of cars on Polish roads with more technologically advanced ones. This is also confirmed by data on sales of new passenger cars and vans up to 3.5t: a 6.5% increase in sales was recorded in 2021 compared to 2020, despite restrictions in the availability of components and delays in vehicle production.

Semi-synthetic oils also recorded a significant increase in sales: 18.00% more oils from this group entered the market than the year before. Sales of mineral oils in 2021 were at a level similar to the one from 2020, with a symbolic increase of 0.32% y/y.

Taking into account the proposals contained in the "Fit for 55" package, we are to expect a gradual decline in demand for lubricating oils for passenger cars. Consumers are changing their behaviour, more and more often choosing alternative forms of transport instead of deciding to buy their own car. In Western Europe, there is a continuous increase in sales of electric cars, and it is only a matter of time before these cars reach Poland as part of the aftermarket. Electrification of transport will also be motivated by high prices of fossil fuels.

FIG. 52 PASSENGER CARS ENGINE OILS WITH REFERENCE TO VISCOSITY CATEGORIES (EXCLUDING MONOGRADE OILS) – MARKET STRUCTURE IN 2020 AND 2021

Source: POPIHN's own data



HEAVY-DUTY ENGINE OILS (HDEO)

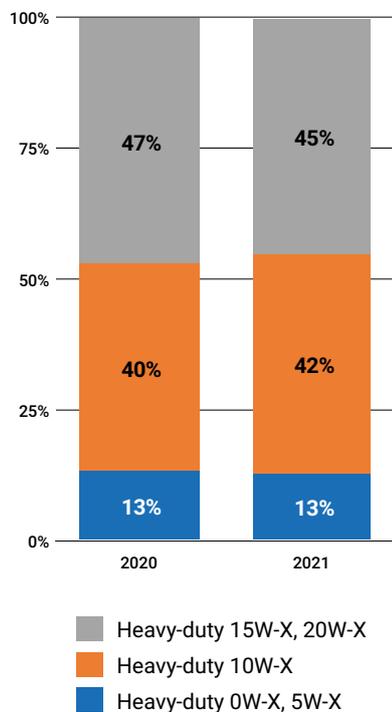
In Poland in 2021, 42,686 tonnes of heavy-duty engine oils were sold, which constitutes an increase by 10.97% compared to 2020.

The main factor responsible for this growth is the continued dynamic development of the TSL industry, which has recognised and managed the change in consumer behaviour since the beginning of the pandemic, in particular the increased interest in e-commerce services. The next year may be problematic, as regulations related to the mobility package are expected to come into force. These changes will have the potential to limit the competitiveness of transport companies from central and eastern part of the European Union. As a result of the above, demand for heavy-duty engine oils in the Polish market may decrease. The risk associated with regulations of an ecological nature is assessed as low, as energy alternatives for road freight transport are still not able to meet the requirements of this segment of transport.

Mineral oils with the highest viscosities (15W, 20W) recorded sales growth of 6.37% y/y, thus retaining the largest share in the segment. Nonetheless, the 17.49% y/y increase in sales of medium viscosity oils reduced the gap between them from 7.06 p.p. in 2020 to 2.77 p.p. in 2021. Synthetic oils achieved sales growth of 7.63% y/y in terms of tonnage, yet their share of the segment remains small, at the level of 12.72%.

FIG. 53 HEAVY-DUTY ENGINE OILS WITH REFERENCE TO VISCOSITY CATEGORIES (EXCLUDING MONOGRADE OILS) – MARKET STRUCTURE IN 2020 AND 2021

Source: POPiHN's own data



Fot.: TANQUID

LUBRICANTS FOR INDUSTRY

Last year, 99,455 tonnes of industrial lubricating oils were sold in Poland. The above means an increase by 1.66% compared to 97,835 tonnes sold in 2020.

The preliminary estimate of 5.7% GDP growth in 2021 was not directly reflected in the market for industrial oils. Indeed, gross value added in industry in 2021 increased by 14.1% compared to 2020, but sales of hydraulic oils, the most important oil group in this segment, grew by 7.58% y/y. The apparent difference can be attributed, among other things, to the base effect. In 2020, the industry's gross value added shrank by 5.3%, while in the same year hydraulic oils were one of the few in the segment to record sales growth by 2.19%.

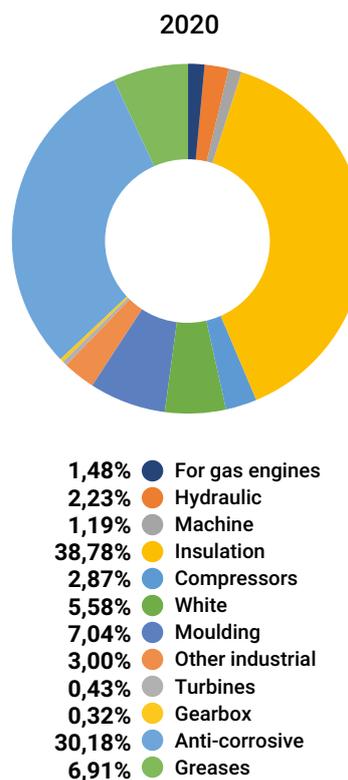
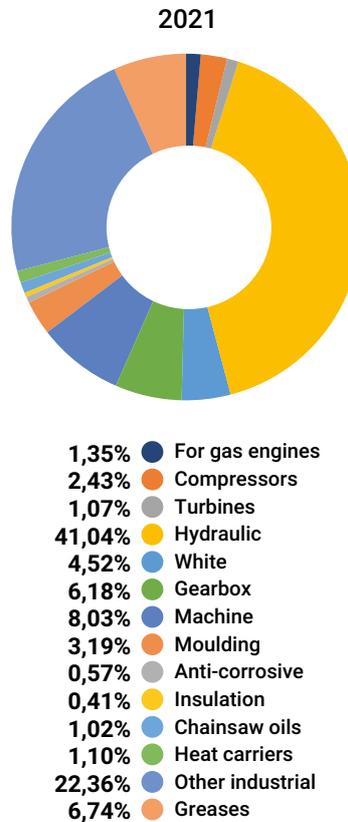
The second largest group in the segment, 'other industrial', in 2021 shrank by 17.56% y/y. A record increase in sales was recorded for white oils, by as much as 60.08% y/y, but their share in the segment is still insignificant, at the level of 4.52%. The influence of gearbox and machine oils on the segment's result is growing. With sales growing by 12.62% y/y and 15.95% y/y, they increased their share in the segment by 0.60 p.p. and 0.99 p.p. respectively.

When analysing the disproportion related to the growth of the industrial oils segment and GDP, one should take into account factors which had a significant impact on the lubricating oils market. One of them is the sudden increase in the price of base oils, which made domestic products lose their attractiveness in terms of price against foreign markets. This was the case, e.g. in the shipping industry, where an increased interest in cheaper oils from Eastern Europe was observed. This phenomenon was also observed in the subgroup of marine engine oils.

Disturbed supply chains were another factor of a global nature that hampered the development of the industrial oil market. The influence of this factor was clearly visible in the automotive industry, which in 2021, by recording a 6.5% year-on-year increase in sales of cars and vans up to 3.5t ATW (allowable total weight), was recovering from 2020, which had been disastrous for the industry. However, a manifested problem with semiconductor supplies has forced other suppliers to reduce production. Car manufacturers adjusted their orders of other components and subassemblies, in proportion to the bottleneck forced by low semiconductor availability, so as not to overstock. The industrial lubricants industry also experienced this impact, with lower order levels from, for example, the rubber industry: manufacturers of tyres, wipers or rubber floor mats.

FIG. 54 INDUSTRIAL OILS – MARKET STRUCTURE IN 2020 AND 2021

Source: POPIHN's own data



PERN

AN ECOLOGICAL PARTNER FOR TRANSFORMATION

New capacities for fuels and crude oil for PERN's clients, starting the construction of the Boronów – Trzebinia product pipeline, consistent expansion of the fuel hub in Dębogórze and record-breaking transshipments in Naftoport – this is what 2021 looked like in a nutshell for PERN. While developing its business, the company is putting more and more emphasis on reducing its carbon footprint, carrying out environmentally-friendly activities and investing in renewable energy sources.

2021 - AN EFFECTIVE RESPONSE TO CLIENT EXPECTATIONS

In 2021 PERN – despite having to operate under a stricter sanitary regime – completed a number of investments. The company put 180,000 m³ of new fuel capacity into service for its clients – 7 tanks at the depots in: Małaszewicze, Emilianów, Dębogórze and Rejowiec. PERN has also started the next stage of the fuel capacity expansion.

The construction of the Boronów – Trzebinia pipeline also started in 2021. In this PERN project work is well underway, reaching approximately the 50% completion mark.

PERN has also completed one of the key projects that radically strengthened Poland's energy security

in the area of crude oil. The company's clients can now take full advantage of the Oil Terminal in Gdańsk, as the last tank constructed as part of the second stage of its expansion has been commissioned. As a result, refineries are able to flexibly import crude oil to Poland from any part of the world. The storage capacity of PERN at the Polish seaside alone has thus increased to almost 2 million cubic metres.

In total, PERN has expanded the available capacity for fuel and oil by almost a fifth in five years, responding to market demand.

EFFECTIVE IMPLEMENTATION OF THE STRATEGY IN 2021.

-  **180,000 m³** of new fuel capacity
-  **7 tanks** in 4 depots
-  Starting the next stage of fuel depots expansion
-  Starting the construction of the Boronów–Trzebinia pipeline
-  Finishing the second stage of the expansion of the Oil Terminal in Gdańsk

Oil Terminal in Gdańsk



Fot.: PERN



DIGITISATION SPEEDS UP CONTACT WITH CLIENTS

PERN has implemented a number of solutions aimed at speeding up customer service. Nearly 1,000 users are already using the Carrier Portal, where online you can obtain information on the number of transports waiting or receiving fuel at a given facility, access your own database of drivers and vehicles, or obtain information on transports currently in progress.

Recently, it has been possible to make an appointment through this portal to collect fuel at a convenient time, which significantly shortens the processes for clients. Over 10,000 transports have already been carried out using this formula. This option is already available at our six largest depots: Koluszki, Nowa Wieś Wielka, Rejowiec, Emilianów, Kawice and Boronów.

PERN is also working to have as many multiproduct loading islands as possible at its facilities, which also has a significant impact on service time. Thanks to such a solution, drivers can load the required fuels at one loading island.

DIGITISATION AND FASTER CUSTOMER SERVICE



Almost **1000 users** are using **PERN Carrier Portal**



Over 10,000 transports at a chosen time – new notification system



Notification available in as many as 6 depots: Koluszki, Nowa Wieś Wielka, Rejowiec, Emilianów, Kawice and Boronów



Multiproducts at loading islands for road tankers

OIL AND FUELS FROM THE SEA

PERN's fuel depot in Dębogórze, which is a key link between the Polish fuel market and the world, witnessed record-breaking transshipments in 2021. It handled over 2.3 million tonnes of fuels delivered by sea transport. Such a result happened for the first time in its history. The development has resulted from the increase in demand for liquid fuels in the country and has been possible thanks to ambitious investments carried out by PERN.

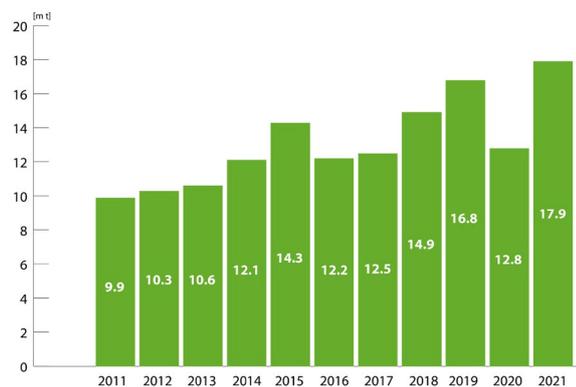
PERN's investments in the Dębogórze Fuel Depot by 2024 in railway infrastructure alone will exceed PLN 40 million. The depot has recently been expanded with two new tanks with a capacity of 32,000 m³ each. This expansion increased the storage capacity of the depot to almost 260,000 m³. At the moment, the construction of another tank is underway and it will be commissioned later this year. At the same time, the contractor for another two tanks is being selected.

PERN is also intensively developing and modernising the rail tanker transshipment front at the Dębogórze Depot and increasing the operational capacity of the front by extending the railway siding. As a result, the depot will gain the capacity to increase the number of rail tanker transshipments by almost half. This will strengthen the stability of the domestic and international petroleum products logistics market. The expansion of the infrastructure will also improve the quality of the currently provided services.

Thanks to the good cooperation between PERN and the Port of Gdynia Authority, the Liquid Fuels Transshipment Terminal located in the Port of Gdynia is being constantly modernised. The Dębogórze Depot will soon be able to make use of an elevated filling machine for unloading large tankers – over 30,000 tonnes. This is the second piece of equipment of this type at the terminal. What is more, this year will witness the deepening of the access to the terminal, which will enable the handling of tankers with a draught of up to 15 metres. Thanks to these investments, the security of continuity of the transshipment installation's operation will be increased and it will be possible to handle much larger vessels.

Very good transshipment results were also recorded in 2021 by Naftoport from the PERN Group - almost 18 million tonnes of crude oil and fuels. This is over 6% more than in the record year 2019. At that time, the unit was operating at maximum capacity due to the chloride crisis, which stopped pumping through the 'Przyjaźń' pipeline for 46 days. Today, almost two-thirds of crude supplies to Polish refineries are already delivered by sea, mainly from directions other than the east.

TOTAL TRANSSHIPMENTS IN NAFTOPORT TERMINAL IN 2011-2021



Today, Naftoport is a key company ensuring the diversification of crude oil supplies to Poland. It is the only maritime terminal in Poland for the transshipment of crude oil and one of the largest terminals for the transshipment of refined oil products. It is also one of the largest transshipment terminals on the Baltic Sea.

” *PERN attaches great importance to the development of infrastructure located on the Baltic Sea. It allows our clients to effectively diversify crude oil supplies so as to obtain the most efficient mixtures and produce the best quality fuels and petrochemicals. Over the last two years, we have significantly increased the storage potential dedicated to crude oil – right on the coast. We increased the capacity of the Gdańsk Depot and completed the second stage of expansion of the Oil Terminal in Gdańsk, which increased our potential by almost 600,000 m³.* ”

Igor Wasilewski, Chairman of PERN Management Board

In 2021 PERN handled nearly 270 tankers. Today, vessels with a length of more than 300 and a draught of 15 metres can call at Naftoport. As many as 5 transshipment terminals are available to clients.

Naftoport's potential enables transshipment of over 36 million tonnes of crude oil and 4 million tonnes of petroleum products per year, ensuring full coverage of the needs of refineries connected to the PERN pipeline system. The company's marine terminal handles crude oil and petrol, aviation fuel, diesel, heating oil, condensates and components.

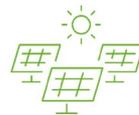
ECOLOGY AND RES IN THE FOCUS OF PERN

The use of renewable energy sources, lowering the carbon footprint and the implementation of key investments worth over PLN 1 billion – these, in turn, are the most important challenges for PERN in 2022.

As a company operating in the area of fossil fuels, PERN is paying more and more attention to the rational use of energy resources, but also of water and plastics. The company also wants to produce its own electricity on a larger scale to reduce electricity costs associated with pumping raw material and fuels through pipelines. That is why PERN will invest PLN 130 million in photovoltaic farms located at its depots until 2024.

Ultimately, PERN aims to produce 10% of the electricity it uses to pump raw material and fuel from photovoltaics, which should reduce the company's carbon footprint by 6%.

PHOTOVOLTAICS WILL REDUCE PUMPING COSTS



PLN **130** million for photovoltaics by 2024



10% of electrical energy needed for oil and fuel pumping from the company's own sources



6% lower carbon footprint

Fuel base Boronów



Fot.: PERN

In 2022 PERN will allocate almost PLN 40 million for investments improving ecological safety and for investments in environmental protection. The company will modernise petrol vapour recovery installations at four depots, thus significantly reducing hydrocarbon emissions into the atmosphere, and at another three it will modernise sewage treatment plants.

BUSINESS AND ECOLOGY



PLN 40 m in 2022
for protecting the environment



Modernising petrol vapour recovery installations



Modernising sewage treatment plants



Modernising lighting



We are focusing on making sure that our activities at PERN increasingly incorporate ecological aspects. Changing the company in this area starts with changing our habits - reducing water and paper consumption, limiting the use of plastic and electricity and greater use of digital tools. To meet the changes in the market, we are developing the competences of our employees.



Igor Wasilewski, Chairman of PERN Management Board

PERN is also systematically developing its infrastructure in the area of biofuels. The company is modernising its depots to enable its clients to meet the National Biofuels Target (NBT) – NBT is an obligation resulting from the act on biocomponents and liquid biofuels and is one of several instruments to achieve the goal of 14% share of renewable energy in transport by 2030.

These investments will increase PERN's bio-component capacity by 4,350 m³, i.e. by as much as two thirds.

The value of PERN's investments in 2022 is a record-breaking value. The largest part is attributable to Mega-investments, which account for two thirds of the total expenditure. These include the construction of another 7 fuel tanks and the construction of the product pipeline Boronów – Trzebinia, which will significantly improve the security of fuel supply to the south of Poland.

PERN INCREASES ITS BIOCOMPONENT CAPACITY



PERN's investments will increase the company's biocomponent capacity by 4,350 m³, i.e. by as much as **two thirds**.

Mega-investments are not the only development activities undertaken by PERN. The company will also upgrade its automation systems, rail infrastructure, petrol vapour recovery facilities and both rail and road tanker fronts.

Demand for crude oil will continue, considering its key role in the petrochemical industry. We encounter intermediate products from oil processing almost everywhere. They are all around us in cosmetics and medicines, dyes, fertilisers and plastics.

STRATEGIC INVESTMENTS AIMED AT CLIENTS AND THE COUNTRY'S SECURITY

2022

PLN 1 billion
for new investments

- 7 new fuel tanks – over 220,000 m³
- Boronów–Trzebinia fuel pipeline – 50% already completed
- Expansion of the fuel hub in Dębogórze



Fuel base Koluszki



Fot.: PERN

PERN: WATCHING OVER CLIENTS' SAFETY

When we fill up at a station, we do not usually think about the journey fuel has to make to get there – how many operations and people are involved, what the value chain behind it looks like. After all, everything begins with the extraction of raw material, which reaches Poland through various channels – recently more and more often by sea. It is then distributed by PERN to refineries, where it is processed into e.g. fuels. Along the way, it is constantly monitored and tested – first as crude oil and later as products of its refining. This is where the huge role of PERN's laboratories comes in, which ensure the safety of both the refinery and the clients at fuel stations every day.

PERN's laboratories are a key element of the company's infrastructure, which is responsible for the safety of the company and its clients. With this in mind, PERN has been investing in this area for years.

A total of 95 people work in the PERN laboratories. Each employee is a specialist in the field of fuel and oil quality testing. In order to ensure the highest possible quality safety of the products, the employees of the laboratories are constantly developing, improving their skills and introducing new testing methods in line with the emerging needs.

This is why the company continually invests in laboratories. It is enough to mention that over the last four years, investments in this area have averaged PLN 2.5 million year-on-year.

The PERN laboratory system consists of a total of 11 laboratories – 8 fuel and 3 oil laboratories.

We distinguish:

- Liquid Fuels Laboratory in Koluszki,

- Liquid Fuels and Environmental Protection Laboratory in Nowa Wieś Wielka,

- Liquid Fuels Laboratory in Boronów,

- Liquid Fuels Laboratory in Rejowiec,

- Liquid Fuels Laboratory in Emilianów,

- Liquid Fuels Laboratory in Wola Rzędzińska,

- Liquid Fuels Laboratory in Kawice,

- Liquid Fuels Laboratory in Małaszewicze,

- Oil Laboratory in Adamowo,

- Oil Laboratory in Miszewko Strzałkowskie,

- Oil Laboratory in Gdańsk.



Fot.: PERN

**THE THREE PILLARS:
OIL LABORATORIES AT PERN**

Oil laboratories are located on the premises of the Adamowo and Miszewko Strzałkowskie depots and at the Oil Terminal in Gdańsk. Their main activity is to conduct laboratory tests of crude oil, which is transported and stored in the PERN system, in order to determine its physical and chemical parameters, in particular pollution ballast indices used for quantity settlements with contractors. The quality of crude oil is not a legally regulated area according to national legislation, as is the case with fuels. Therefore, laboratory tests are carried out on the basis of testing methods specified in commercial contracts.

The largest of the oil laboratories is the one in Adamowo. It controls the quality of REBCO crude oil received into the PERN system by pipeline transport. The laboratory in Miszewko Strzałkowskie examines oil before it is dispatched westwards to clients in Germany and to the PKN Orlen facility.

Since 2020, the oil quality control system has been expanded to include a laboratory in Gdańsk, which examines oil supplied to the PERN system by sea transport and oil dispatched to the refinery in Gdańsk.

**THE INDISPENSABLE EIGHT:
LIQUID FUEL LABORATORIES**

The Liquid Fuels Laboratories carry out tests on fuels, biofuels and liquid biocomponents in accordance with the requirements of product standards. The largest centre of this type in PERN is the Liquid Fuels and Environmental Protection Laboratory in Nowa Wieś Wielka. It consists of two laboratories: the Liquid Fuels Laboratory and the Environmental Protection Laboratory, which conducts research in the field of the natural and occupational environment, providing its services throughout the country.

In order to guarantee the quality of fuels delivered by the main source, i.e. the long-distance pipeline, laboratories are located at its ends. They are located at fuel depots in Nowa Wieś Wielka, Boronów, Rejowiec and Emilianów. Product quality testing takes place during pumping from the refinery in Płock to fuel depots, and then after the product is loaded into the tank.

Products are also delivered to fuel depots by rail and road tankers. They are tested by laboratories located in Wola Rzędzińska, Kawice and Małaszewicze. The laboratories also carry out quality supervision over products in storage depots. Thanks to the distribution of such centres throughout the country, the quality supervision of products stored in all depots is uninterrupted and guarantees the quality of products to PERN clients.



Fot.: PERN

**PERN ON THE WAY
TO THE ENERGY
OF FUTURE**

PERN is preparing for challenges in the energy sector by fuelling the Polish economy, which needs evolutionary changes to remain competitive. However, the company is already placing increasing emphasis on environmental protection to reduce its carbon footprint.

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