

## ЛОГІСТИЧНІ АСПЕКТИ ТА ПЕРСПЕКТИВИ РОЗВИТКУ НАФТОГАЗОВОГО КОМПЛЕКСУ УКРАЇНИ

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**Розглянуто перспективи вирішення проблем нафтогазового комплексу в умовах ринкової економіки та логістичний підхід до створення стратегічного резерву нафти і нафтопродуктів. Сформульовано пропозиції щодо розроблення стратегії поведінки підприємств нафтогазового комплексу, прискорення їх розвитку, передусім за рахунок логістичного підходу до організації роботи підприємств нафтогазового комплексу з метою запобігання виникненню кризових ситуацій на ринку нафтопродуктів.**

**Ключові слова:** нафтогазовий комплекс, ресурсний фактор, енергетична безпека, нафтопродукти, глибина переробки нафти.

## LOGISTICAL ASPECTS AND PROSPECTS OF OIL AND GAS COMPLEX OF UKRAINE

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**The prospects of solving the problems of oil and gas sector under the conditions of market economy as well as the logistic approach to creating strategic reserves of petroleum and petroleum products have been examined. Suggestions for developing behavioral strategies of oil and gas companies, accelerating their development mainly due to logistic approach to the organization of oil and gas companies have been developed to prevent crises in the oil market.**

**Key words:** oil and gas sector, resource factor, energy security, petrochemicals, oil refining.

**Statement of the problem.** With the need for economic reform and active integration of Ukraine into the world economy, oil and gas companies constantly improve technologies and production processes. The optimization of scientific and technical reform strategy is possible under the minimum cost for its development, manufacture of petroleum products, their transportation and storage.

The effectiveness of the field directly affects the state's economy, the pace and direction of development in almost all areas of material production. The range of oil and gas products is extremely wide. Among them fuels (liquid and gaseous), oils, lubricants, additives, catalysts, and corrosion inhibitors rank the first positions. The growing demands of consumers for the produced products are the driving force of the global oil and gas processing industries.

The valid document "Energy Strategy of Ukraine till 2030" [1] for oil and gas industry needs clarification on specific strategic directions and mechanisms for their implementation. It is necessary to analyze specific issues and development challenges in reforming the economic environment sector as well as activity of oil and gas industry agents. The energy strategy of Ukraine is the dominant issue.

The purpose of this article is to ground the necessity of the enterprises activity and coverage of modern logistics aspects of the oil and gas complex of Ukraine.

**Analysis of recent research and publications.** According to the latest research and numerous publications on the transition of the Ukrainian economy to a market economy the modernization of refining and petrochemical industry is possible only while creating a favorable climate for the introduction of new technologies and logistic approach to the creation of stocks of oil and petroleum products.

Among the factors affecting the reliability of the economic development of Ukraine the problem of ensuring the production and social spheres by fuel and energy resources plays the leading role. Fuels based on petroleum will play a leading role in the satisfaction of energy needs for a long time. The increased demands for qualitative properties of automotive fuels require the introduction of new high technological processes in oil and gas processing industry.

The investigation of oil and gas industry problems and the effectiveness of market reforms in this field are extremely important, therefore some authors considered these issues [2]. However, despite the large number of publications the organizational-economic mechanism effectiveness was not ensured. In most published forecasts focused on energy development it is indicated that oil and hydrocarbon gas will remain the most important raw materials for a long time [3]. Therefore today oil and gas companies are important objects of the world economy, which are closely related to international integration processes.

**The formulation of article goals.** This article is based on the analysis of specific topics and developments concerning the industry reform. Its goal is to develop a strategy of enterprises behavior, to accelerate their development mainly due to the logistic approach to the organization of work.

In order to give the possible recommendations concerning transformation of oil and gas enterprises into the modern and prospective ones and optimization of logistics system it is necessary to analyze the existing problems. It is necessary to develop an intelligent product to identify weaknesses in the activities of industrial, administrative and service structures of oil and gas industry.

**The main material.** Energy is the key point of the overall strategy of economic development of our country and the resource factor has the determinant value. Some natural resource characteristics of the energy sector, including oil and hydrocarbon gas are the basic elements in the energy development strategy and define the conditions of energy security of Ukraine.

In order to enhance energy security, to provide the economy with energy resources and to prevent crises in the oil market it is necessary to create a strategic reserve of oil and petroleum products. Taking into account the perspective of Ukraine entry into the European Union the creation of oil and petroleum products resources will be carried out in accordance with EU requirements – the equivalent of 90 days of consumption. While analyzing the structure and efficiency of the existing system it is necessary to develop a program of the strategic oil reserves and petroleum products based on the specific needs of Ukraine, to ensure the state's economy by petroleum products under extreme circumstances.

Ukraine is among the countries in the world that have stocks of all types of energy resources (oil, hydrocarbon gas, coal, peat, etc.) but the degree of coverage, their production and use do not provide the required level of energy security. Ukraine provides itself by own energy sources in amount of approximately 47 %.

Oil transportation system of Ukraine, operated by JSC “UkrTransNafta”, consists of 19 oil pipelines of 4766.1 km total length. The annual capacity of oil transit from Russia is: at the input 114 million tons, at the output – 56.3 million tons. If necessary, the pipeline system is able to fully meet the needs of refineries, based on their maximum design capacity of over 50 million tons per year. The pipeline operation is provided by 51 oil pumping station having 176 pumps with a total capacity of 356.5 MW. The total capacity of the tank farm is 1085 000 m<sup>3</sup>.

Oil pumping stations and international oil terminal “Pivdennyi” have 11 tank farms for commercial oil. Total number of tanks is 81, their nominal capacity is 1085·10<sup>3</sup> m<sup>3</sup>, commodity capacity – 745·10<sup>3</sup> m<sup>3</sup>. The lifetime of the pipeline varies from 20 to 44 years and 90 % of them exceeded their depreciation period. Equipment of oil transportation system is kept under safe condition, although it is outdated, needed to be replaced or modernized and demands additional operating costs. Ensuring the reliability of the oil

transportation system in the nearest future will require financial expenses amounting to about 4 billion UAH, including 2.3 billion UAH – for the implementation of priority measures.

It is necessary to bring the existing pipeline system to the international standards, involving the introduction of new technologies and equipment: energy efficient motors and variable frequency drives, pumps with high efficiency, modern equipment of tank farm, modern automation systems and telecontrol, anti-turbulent additives, effective anti-corrosion coatings and electrochemical protection of pipelines, effective technologies for pipelines and reservoirs cleaning from residual water and paraffinic deposits, record system of oil quantity and quality, new technologies for diagnosis and repair of pipelines, information- analytical systems for optimization of oil transportation system.

A significant shortcoming in the oil supply in Ukraine is that Ukrainian oil pipeline system is connected only with Russian pipeline system, leading to a monopoly position of Russia in this sphere relative to Ukraine. Under such conditions the measures of oil sources diversity are the key element of national security and creation of conditions for stable operation and development of the economy.

Ukraine's geographic position allows to use a variety of independent sources of oil supply from Azerbaijan, Kazakhstan, Turkmenistan, Middle East countries and so on Fig. 1. Thus the role of state-transit between the oil producing Caspian region and the important markets in Europe increases significantly [4].



Fig. 1. Scheme of the oil transportation system in Ukraine

Source: [4]

Today the oil supply through the oil transportation system of Ukraine is diversified very actively. The capacity of the "Odessa-Brody" pipeline is 40 million tons. To ensure the country by energy carriers and to prevent crises in the oil market it is necessary to create a strategic reserve of oil and oil products. Taking into account the prospect of Ukraine joining the European Union the reserve of oil and petroleum products will be carried out in accordance with EU demands – by the equivalent of 90 days of consumption.

While analyzing the structure and efficiency of the existing oil reserve it is necessary to develop a program of forming oil and petroleum products strategic reserves, which are based on the specific needs of Ukraine and will be enough under extreme circumstances.

Therefore, in order to strengthen the energy security of Ukraine it is necessary to implement measures for infrastructure, legal and financial support, maintenance and replenishment of such reserve. On the basis of the European Union experience the reserve forming will last 8–10 years. The total length of the “Odessa-Brody” pipeline is 4600 km. The input power is 110 million tons of oil, output – 56 million tons of oil. Today Ukrainian oil pipeline system is loaded by only 30%.

Since 2009, the “Odessa-Brody” pipeline began to carry out its purpose, i.e. started to transport oil from Kazakhstan and Azerbaijan to JSC “Ukratnafta” (Kremenchuk) through the “Southern” port. Since 2010 “UkrTransNafta” supplies Azerbaijani oil to Ukrainian refineries, such as Drogobytsky and Nadvornyansky refineries. Since 2011 more than one million tons of oil is supplied by the route Odessa-Mozyr (Belarus).

The important factor of the oil transportation system efficiency is the ability to diversify oil supplies, including the ability to replace the main oil supplier (Russia) for other suppliers (Kazakhstan and Azerbaijan). The processes of different oils mixing and preparing oil of “Brody brand” were planned. The capacity of vessels for above-mentioned purpose is 250 thousand tons.

Till 2015 it is expected to increase the workload of oil to 70 million tons per year; during following years – to save or gradually decrease the oil transportation volumes. The increase in oil transportation is planned through gradual integration of the pipeline “Druzhba” and “Adria” (transportation by pipeline “Druzhba” – an additional 5–15 million tons ), the construction of pipeline Brody (Ukraine ) – Plock (Poland) and gradual implementation of EANTK project for transporting oil (20 million tons) from the Caspian region (Kazakhstan, Azerbaijan) and Gulf States (Iran, Iraq, etc.) till 2015.

Ukrainian refineries can produce more than 100 types of commercial products: motor gasolines of various brands; diesel, stove and fuel; petroleum bitumen; liquefied petroleum gas; oil and products such as benzene, toluene and paraffin used in the chemical and petrochemical industry. Only four of six refineries in Ukraine pertain to Ukraine:

- JSC “Ukratnafta” (Kremenchuk)
- “Khersonnaftopererobka” (Kherson)
- JSC “NPK Galychyna” (Drogobych)
- OJSC “Naftokhimik Prykarpattya” (Nadvirna);  
and two refineries are owned by Russian corporations:
- JSC “Lukoil – Odessa Refinery” (Odessa)
- “LNOS” (Lysychansk).

Today oil and gas companies are working with incomplete charging, and some of them even are idle. As a result the problems of building an integrated system for the development of oil and gas complex in Ukraine are very urgent. It is necessary to develop more effective organization-and-economic mechanism that would facilitate the introduction of innovative technologies, resulting in possible increase of oil refining depth. Moreover, the obtained products will be of higher quality and competitive at domestic and foreign markets.

The need to revalue the ways of business processes management encourages approaches that can fully realize the benefits of new technologies and human resources. First of all it concerns the ways of increasing oil and gas industry efficiency due to the domestic reserves. This is the lever by means of which the enterprises can affect the results of their own production activities under any conditions prevailing in the external environment, where internal and external conditions for the economic development of Ukraine are radically changed.

**Conclusions and recommendations for further research.** It is necessary to develop several National Programs relative to the realization of planned strategic directions on the basis of adjusted and extended Program of Energy Strategy of Ukraine. This will eliminate gaps in the main positions of the strategy and contribute to savings in logistical and financial resources.

Use of basic directions will allow to develop ways of increasing economic development of oil and gas complex of Ukraine.

It is necessary to improve the management structure in order to optimize costs and clearer allocate the responsibilities between relevant organizations and institutions, according to the adjusted strategic directions. The scientific developments based on the principles of optimization, compliance, integration, professionalism and maximum benefit should be widely introduced. The newest vision of purposeful effect on this process would have wide-ranging positive for the industry as a whole, and individual enterprises in particular.

It is necessary to implement deep oil refining processes such as catalytic cracking and hydrocracking in the Ukrainian refineries. This will reduce the production energy intensity, improve the efficiency of catalysts and increase the output of finished products with better quality.

Adaptation of Ukraine's energy legislation to that of EU consists in achieving the security of supply and ensuring the reliability of the power system by adopting legislation. They assume the following measures:

- Creation and maintenance of oil and petroleum products at the level sufficient to ensure domestic consumption for at least 90 days;
- Creation of uniform accounting procedure and the use of oil and petroleum products;
- Creation of oil deep refining complex;
- Development of an action plan to be applied if difficulties in the supply of crude oil and petroleum products will occur;
- Creation of conditions for the reliable operation of internal and interstate pipelines, transit of oil;
- Determination of the order of international consultation and ensuring coordination of the national response if crisis in the oil and petroleum products market will occur.

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