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## **JUSTIFICATION OF THE NEED TO TRANSLATE ROAD TRANSPORT TO ALTERNATIVE FUELS**

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Currently, fuel and energy and environmental problems are gaining increasing relevance and scale. The depletion of oil fields, an annual increase in consumption of motor fuel lead to a deficit and, as a result, increase the cost of gasoline and diesel fuel. Periodically arising world fuel crises are forced to think about the need to use alternative types of energy resources. And road transport is one of the largest pollutants of the environment worldwide. Recently, in many countries of the world, including in Ukraine, requirements for fuel quality from the point of view of their environmental safety have tightened. What makes it look for alternative fuels, one of which can be natural gas. As the main advantages of its use, there is a reduction in emissions of harmful greenhouse gas vehicles by 25%; Reducing natural gas costs (compared to gasoline and diesel fuel The cost of natural gas is below 60-70%) and safety – natural gas is easier than air twice, in case of his leakage it immediately disappears, which significantly reduces the risk of fire [1,2].

Every year, only a domestic fleet (this is more than 34 million units of vehicles throughout the country) is discharged with exhaust gases of 14 million tons of harmful substances, which is 40% of total industrial emissions into the atmosphere. In large cities, they reach 90% and represent a serious ecological threat to the health of the population. The magnitude of environmental damage caused by industrial emissions is a sum of 2% of the gross national product, while 60% of damage is applied by road. In aggregate with annual increase in the cost of petroleum products, all of the above factors make more close attention to the question of translating transport to alternative fuels [3,4]. The most promising of them is natural gas (methane) and hydrocarbon gases (propane-butane mixtures), because on the territory of our country is concentrated without a small third of the global stocks of hydrocarbon raw materials. Currently, compressed natural gas and liquefied hydrocarbon gas are the most prepared types of fuel for use in internal combustion engines in domestic realities. Abroad actively applied liquefied natural gas. Using this type of fuel in the future will expand in Ukraine.

The current state of road transport for used types of fuel is as follows: diesel (23.6%), gas (~ 1%), hybrid (about 1%), alternative fuel and hydrogen less than 0.4%, gasoline engines (74%) [one]. Automobile transport occupies a leading place in the implementation of transportation of products and goods. The forecast of the development of the fleet of Ukraine testifies to the tendency to the sustainable increase in the number of cars and fuel consumption. In the near future, motor vehicles will mainly be provided by imported oil raw materials [5].

For Ukraine, which does not have sufficient oil and gas reserves, the search, expansion of the production and use of alternative energy and fuel sources is of

particular importance. Ukraine consumes about 200 million tons of fuel and energy resources every year and relates to energy corrective countries, since it covers its energy demand for about 53% and imports 75% of the necessary amount of natural gas and 85% of crude oil and petroleum products [6]. Such a structure is economically inexpedient, creates the dependence of Ukraine's economy from oil and gas exporters and is threatening for energy and national security.

In the field of production and consumption of mixed automotive fuel, the problem of resource saving and search for alternative sources of raw materials will be determined, of course, in parallel with the solution of environmental impact issues. At the same time, the needs of vehicles constitute a year to 12 million tons of gasoline and up to 15 million tons of diesel fuel. Therefore, identifying the possibilities of applying alternative fuels and determining technological directions to reduce the consumption of fuel in oil origin, a decrease in emissions of pollutants is relevant.

Along with the decrease in world oil reserves, there is a tendency to the ubiquitous increase in oil prices and oil fuels. All this creates prerequisites for wider use of other energy resources. The trend of the development of the world and domestic automobile park leads to the need to increase the production of motor fuels. Thus, the oil refining industry is developing in the direction of increasing the production of light petroleum products. Uninterrupted and mobile operation of the engines in a shortage of a deficit of a particular fuel makes it possible to ensure the development and implementation of "multi-fuel" engines, which operate on different oil fuels, as well as replacing oil fuels alternative.

Due to the above factors, the transition of part of the domestic automotive fleet on fuel obtained from alternative raw materials becomes inevitable.

The need to translate road transport to alternative fuels are increasingly determined by tightening environmental requirements for spent gases of vehicles, since the problems of environmental safety of road transport are part of the country's environmental safety. The significance and acuity of this problem are growing every year due to the annual increase in emissions by motor vehicles of pollutants into the atmosphere (on average by 3-5%). One of the radical ways to reduce the consumption of liquid fuel consists in expanding the use of non-traditional energy and fuel on their basis, creating and operating the powerful installations of vehicles designed to work on them, which largely solves the environmental problem of transport energy.

The fuel is determined alternative if it is:

- fully manufactured from non-traditional sources and types of energy raw materials or is a mixture of alternative and traditional fuels in proportions established in accordance with state standards;
- made from oil, gas, oil and gas condensate deposits, exhausted deposits, from heavy varieties of oil and in their signs differs from the requirements for the traditional type of fuel.

Increased interest in the problem of using alternative fuels in internal combustion engines is due to both the exhaustion of oil resources and an increase in oil and petroleum products and the urgent need to solve acute environmental problems caused by a rapid increase in the number of vehicles. Alternative fuels can be divided into three groups (Fig. 1).

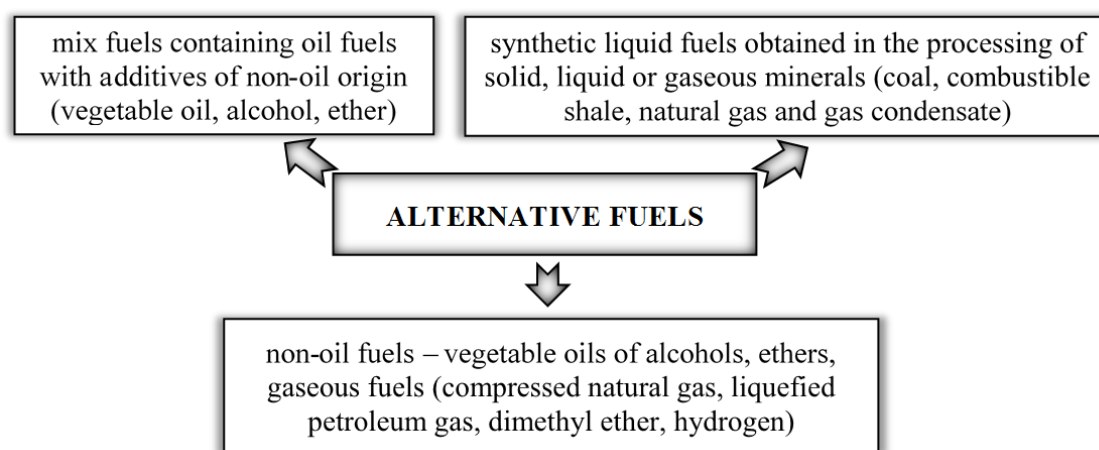


Figure 1 – Alternative fuel groups

Issues of using alternative fuels on transport are strategic and successfully solved by many countries in the world, since they allow us to expand the energy base, reduce dependence on the state of natural resources and price fluctuations on them, reduce environmental pollution. The main directions of development of modern energy of Ukraine are the development and implementation of highly efficient energy-saving technologies in traditional energy, widespread use of alternative, including non-traditional and renewable energy sources.

#### Reference:

1. Болтянська Н.І. Сфери інноваційного розвитку та агроекономічного зростання сільськогосподарських підприємств. Технічне забезпечення інноваційних технологій в агропромисловому комплексі: Мат. I Міжн. наук.-практ. конф. Мелітополь: ТДАТУ, 2020. С. 75-78. URL: <http://www.tsatu.edu.ua/tstt/wp-content/uploads/sites/6/boltjanska3.pdf>
2. Болтянський О.В., Болтянська Н.І. Дослідження техніко-економічних показників дизельного двигуна при роботі на суміші ріпаково-етиллових ефірів та газового конденсату. WayScience. Дніпро, 2020. Т.1. С. 116-118.
3. Болтянський О.В. Визначення напрямів енергозбереження в сільському господарстві. Науковий вісник ТДАТУ: Мелітополь: ТДАТУ, 2020. Вип. 10, Т. 1. URL: <http://www.tsatu.edu.ua/tstt/wp-content/uploads/sites/6/naukovyj-visnyk-tdatu-2020-vypusk-10-tom-1.pdf>
4. Болтянська Н.І. Визначення переваг та недоліків основних альтернативних біопалив. Технічне забезпечення інноваційних технологій в агропромисловому комплексі: Мат. I Міжн. наук.-практ. конф. Мелітополь: ТДАТУ, 2020. С. 265-269. URL: <http://www.tsatu.edu.ua/tstt/wp-content/uploads/sites/6/boltjanska5.pdf>
5. Boltyansky O. V. Analysis of the main areas of resource conservation in animal husbandry. Motrol: Motoryzacja i Energetyka Rolnictwa. 2016. Vol. 18, No 13. Pp. 49-54.5.
6. Sosnowski S. Analysis of major errors in the design of pumping stations and manure storage on pig farms. ТЕКА Commission of Motorization and Energetics in Agriculture. 2016. Vol. 16. No.2. 49-54.