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Prospects for the use of Natural Gas as an Alternative to Traditional Aviation Fuel

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Abstract: *In this article, the problem of aviation fuel is widely covered, the constantly increasing cost of fuel and environmental pollution, changes in the structure of the global energy balance, the comparative content of harmful emissions during combustion of gasoline and natural gas in engines. Potential resources of natural gas are many times greater than oil resources. Modern technologies for dehydrating natural gas require improvement, since at the moment they are quite expensive and hot always effective. Therefore, the creation of highly efficient and energy-saving technologies for drying natural gas is an urgent task.*

Keywords: *navigator, competent, strategy, simulator, transport, activities, professional, pilot.*

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The trends of the possible transition from traditional aviation fuel to alternative gas fuel are considered. The arguments of the feasibility of using natural gas for aviation equipment are given. For the efficient use of natural gas, complex energy-intensive processes are required to ensure the specified physicochemical properties of aviation fuel. The most important technological step of creating highly efficient fuel is its drying, the technological scheme of which requires innovative approaches.

Each year, the aviation industry is experiencing a wave of criticism from the public and ecologists who note that the increase in traffic makes serious damage to the environment with a constant increase in air fuel value [1].

Along with the development of economies of countries and the growth of the quality of the population, the demand for energy resources is growing. Currently, fossil sources of energy - oil, coal and gas account for more than 85% of world energy consumption. But global energy develops uneven due to the rapidly growing economies of China, India and some other countries. The main centers of energy consumption are moving. The structure of the Global Energy Balance also changes. Traditional energy sources - coal, oil and atomic energy are gradually displaced by natural gas and renewable energy sources, such as solar and wind energy.

The change in the structure of the global energy balance is caused by two main reasons.

The first reason is technical progress that helps to increase energy efficiency use of energy sources and, therefore, their availability.

The second reason is the desire to reduce the negative impact on the environmental emissions from burning fossil fuels, especially carbon monoxide emissions (CO) and carbon dioxide (CO2).

In this case, according to most of the forecasts, it is expected that the consumption of natural gas will be exceeded compared to other energy resources. In particular, according to the forecast, the International Energy Agency, the consumption of natural gas in the world can grow to 4 trillion cubic meters by 2022. Energy Minister A. Novak At one of the meetings of the Russian government, expressed the opinion of most experts who agree that at present the demand for natural gas will steadily grow from today's 3.7 trillion. M3 Gas to more than 5 trillion. M3 Gas in 2035, which will be more than 40% [2].

These predictions are confirmed by the implementation by the Government of the Russian Federation of numerous programs for the development of gas engine fuel market and the translation of various categories of transport to work from gas fuel, n in the use of natural gas.

Natural gas is one of the most common and popular primary energy carriers on the planet Earth. This is a unique energy in its environmental and economic properties effectively used to produce heat and electricity, cooking, lighting, as fuel for vehicles and stationary engines. The basis of natural gas is methane. It does not have color and smell, lighter than air is chemically inactive, easily soluble in gas and liquid media, such as air, water or oil. Natural gas has mainly organic origin.

The low cost of applying water internal combustion engines is defined as follows:

Significantly lower price compared to traditional liquid fuel.

A smaller specific fuel consumption is 10-15% less than liquid fuel consumption.

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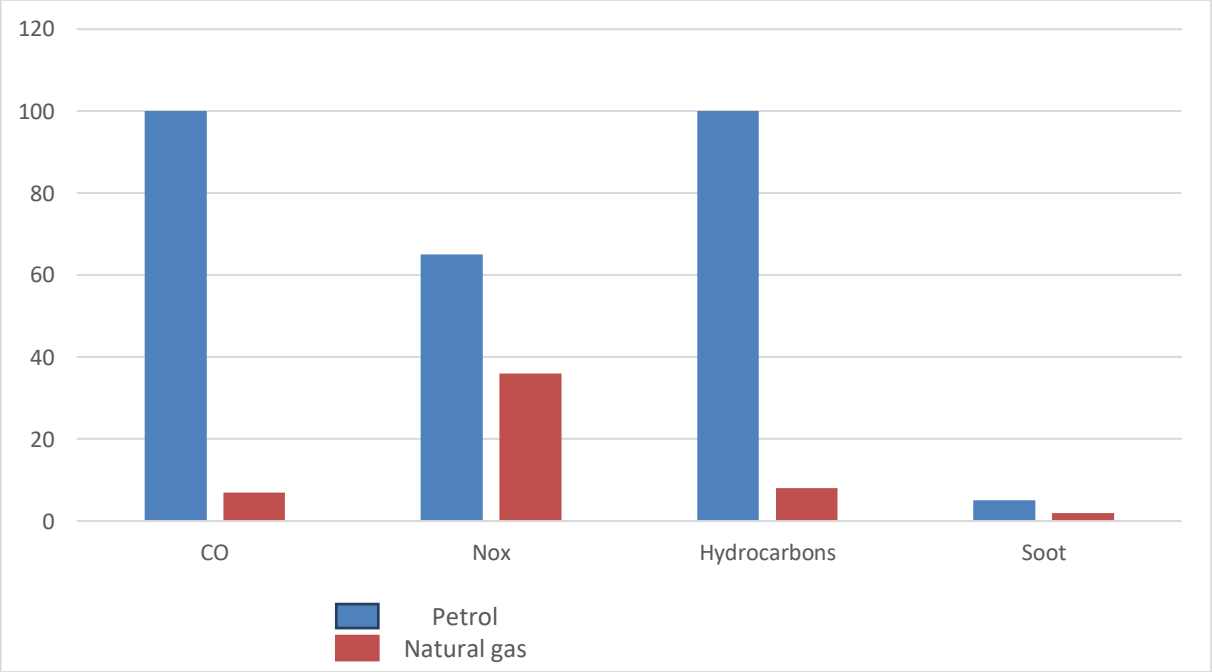
The ecology of natural gas in a compressed and liquefied state is explained by a number of properties:

1. Fullness of burning natural gas: reduction of carbon oxide emissions, soot, hydrocarbons, including polyaromatic;

2. Uniform fuel distribution in the cylinder and, therefore, no overheating zones, reduction of nitrogen oxide emissions;

3. The relatively low relative carbon content in methane, which helps to reduce carbon dioxide emissions.

The comparative content of harmful emissions during combustion in gasoline and natural gas engines is represented in the diagram (Fig.).



Drawing. Comparative analysis of emissions in combustion of fuel in internal combustion engines

Potential resources for the use of natural gas are many times more than oil resources. Fuel from light hydrocarbon gases is currently being used everywhere in road traffic. Intensive work is underway to translate parts of railway and air parks on gas fuel.

Studies have already been conducted to verify the possibility of using gas fuel in aviation.

On September 7, 1987, the Mi-8TG helicopter with a power plant worked on gas fuel was rising into the sky.

Mi-8 TG flight tests were carried out throughout the operational range of heights and flight rates characteristic of the Mi-8T transport helicopter. Flight and technical characteristics remained unchanged, and some even improved. So gas fuel is better suitable for working in low temperatures. No differences in the piloting of the helicopter on gas fuel and on the aircraft carrier were not marked. Ground service also differed little. The transition to gas fuel increases the operational fireproof of the helicopter, because in emergency situations it evaporates and

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carries the wind, and does not differ and burns like kerosene. Capacities of vapors of fuel compartments of the helicopter and the environment are ten times lower than sanitary standards.

On April 15, 1988, for the first time he climbed into the sky Tu-155 with the experimental NK-88 engine on gas fuel, which was performed on a liquefied natural gas for almost 100 flights. In October 1989, this plane made an indicative flight on the route Moscow-Bratislava-Nice (France) to the 9th International Congress on Natural Gas. In July 1991, the plane was flying along the route Moscow-Berlin to participate in the International Congress in Natural Gas [3].

Tests for the transfer of aircraft engines to work from natural gas have shown that to ensure safety of flights to gas fuel, a number of requirements for physico-chemical composition must be applied.

In particular, the exploitation of vital systems of aviation equipment can be provided by the use of gas fuels that do not contain mechanical impurities and water. The presence of free moisture in a compressed gas is more than 0.5 g / m3 in the winter period will be limited to its use as fuel. Under conditions of low temperatures, water crystals can be formed, which quickly clog the filtering materials of fuel systems. Dissolved water when interacting with a cold surface, flashes the mesh filters, the parts of the pumps, etc. The corrosion aggressiveness of fuel in the presence of water increases several times [4].

In order for natural gas to become a high-quality aircraft fuel, it needs to go through a long technological path in accordance with the specified physicochemical composition.

Natural gas in the reservoir is always saturated with water vapors, therefore, in gaseous rocks, there is always a knitted, sole or edge water. Dehydration of gas requires high energy costs, which, with an increase in the growth of the need for essential economic indicators.

Modern technologies of disintegration of natural gas require refinement, since at the moment they are quite expensive and not always effective. Therefore, the creation of highly efficient and energy-saving technologies for the drainage of natural gas is an urgent task.

References:

1. Report on Human Development in the Russian Federation for 2017 / Ed. S. N. Bobyleva and L.M. Grigoriev. M.: Analytical Center under the Government of the Russian Federation, 2017-292 p.
2. Ryazanov M.O. Economic aspects of energy security of BRICS countries / disc on the science of scientific degree of candidate of technical sciences. - M.: Moscow State Institute of International Relations (University) of the Ministry of Foreign Affairs of the Russian Federation. 2017.-228 p.
3. Sargsyan D.R. Analysis of the experience of applying alternative fuels on aircraft / Scientific Journal of the Moscow State Technical University of Civil Aviation. 2011.-s. 23-28.
4. Aviation Himmotheology: Fuel for aircraft engines. A 202 Theoretical and engineering basics of application: Tutorial / N. S. Kulik, A. F. Aksenov, Ya. S. Yanovsky [and others]. - K.: NAU, 2015. -560 p.
5. Ochilov, A. (2012). Education and economic growth in Uzbekistan. *Perspectives of Innovations, Economics and Business, PIEB*, *12*(3), 21-33.

ISSN 2697-2212 (online), Published under Volume 11 in November-2021

ISSN 2697-2212 Online: https://academicjournal.io

6. Ochilov, A. (2014). Is higher education a driving force of economic growth in Uzbekistan?. *Perspectives of Innovations, Economics and Business, PIEB*, *14*(4), 160-174.
7. Jurakulovna J. G. The Necessity and Theoretical Basis of Financial Statement Analysis in Modern Management //Academic Journal of Digital Economics and Stability. – 2021. – T. 7. – C. 89-95.
8. Ochilov, A. O. (2017). The Higher Education Dynamics and Economic Growth: The Case of Uzbekistan. *Journal of Management Value & Ethics*, *7*(2), 46-53.
9. Ochilov, A. O. HIGHER EDUCATION IS AN IMPORTANT FACTOR IN STIMULATING ECONOMIC GROWTH. *GWALIOR MANAGEMENT ACADEMY*, *23*, 133.
10. Abitovna, K. N. (2020). Economic Mechanisms Of Formation And Use Of Intellectual Capital In The System Of Innovative Cooperation Of Education, Science And Production. *European Journal of Molecular & Clinical Medicine*, *7*(7), 929-937.

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