UDC 338.2

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The economics of the energy transition in the EU aviation industry

The report analyzes the economic aspects of the energy transition in the EU aviation sector. It also analyzes the challenges associated with the introduction of environmental technologies, CO_2 emission reductions, financial instruments and investments in green aviation fuel solutions, and the impact of these changes on the competitiveness of the aviation sector.

Energy transition

The energy transition in the EU aviation sector is a key element in the fight against climate change and in achieving the goals of the Paris Agreement to reduce greenhouse gas emissions. The aviation sector is one of the most intensive sources of CO_2 emissions and an important target for the introduction of new energy technologies. The main goal of this transition is to reduce the aviation industry's dependence on fossil fuels and switch to more environmentally friendly and sustainable energy sources such as biofuels, hydrogen, and electricity.

The EU aviation sector plays an important role in ensuring the economic mobility of citizens and businesses, but its growth has also led to an increase in greenhouse gas emissions: aviation accounts for about 3% of total EU CO_2 emissions, but its importance as an environmental issue is growing due to the rapid growth in traffic. The importance of aviation as an environmental issue is growing due to the rapid growth of transportation. The main motivation for the energy transition in aviation is the EU's international commitment to reduce greenhouse gas emissions by 2030 and achieve climate neutrality by 2050. Economic factors, such as rising fossil fuel costs and new environmental taxes, are also pushing companies to look for alternative energy solutions. In addition, public demand for environmentally friendly modes of transportation, such as aviation, is also supporting the development of the sector.

The new global reality of economic development has significantly changed the rules of the game in the aviation market. The opening of borders and minimization of barriers between economies have paved the way for access to new markets, resources and opportunities in general, encouraging companies to increase the speed and efficiency of decision-making in an increasingly competitive environment. Ensuring stability and sustainable development is of utmost importance for the aviation sector, which is seen as the backbone of the air transport system and thus a vital link in the global economy. Although the European aviation sector has a very dynamic and competitive structure, the last decade has seen significant changes in the structure and management of the sector [1, p. 360].

There are several promising areas of modern technological development in aviation. One of them is the use of biofuels, which can significantly reduce CO_2 emissions compared to conventional aviation fuel. Second-generation biofuels derived from agricultural and forestry waste have the potential to reduce emissions by 50-80%.

However, they are expensive to produce and require significant investment in infrastructure. Hydrogen is another promising energy source that can significantly reduce emissions in the long term. Its use is still limited due to underdeveloped infrastructure for production and storage, but the EU is actively developing this technology. In addition, the electrification of air transport is becoming increasingly feasible on short-haul routes, which could reduce dependence on fossil fuels in the future.

One of the new ways of using business initiatives in the field of energy efficiency is through voluntary agreements. They are voluntary, without government intervention to monitor their implementation. There is a wide range of voluntary actions in the industry, including unilateral commitments, agreements, codes of conduct, and environmental conventions. In addition, the institutional mechanisms for regulating energy saving at the national level are closely linked to the regulatory mechanisms in the energy sector and transport, which are the largest consumers of energy and energy resources [2, p. 9].

In other words, the EU is moving towards an integrated approach through the development of institutional mechanisms for regulating energy saving to achieve the goals of reducing the consumption of imported energy resources, efficient use of energy and the start of energy production from alternative sources. Energy and transportation policies should take into account energy saving aspects.

Energy conservation policies aimed at saving energy resources by improving the efficiency of energy use at individual enterprises and in the economy as a whole are a complex combination of internally and externally oriented measures. The choice of these measures depends on the specifics of the country at this stage of its socio-economic and political development.

Studying the experience of the EU countries in the field of energy saving can help to improve the energy efficiency of national economies and the efficient use of energy resources in the regional and national economy as a whole [3].

Since the beginning of the industrial era, the availability of various forms of energy has transformed the lives of billions of people, allowing them to enjoy unprecedented levels of comfort and mobility. Amid growing concerns about global climate change, the need for a major transformation of the world's energy production and use infrastructure is widely recognized. This report examines the main trends in the global energy market in late 2021 and early 2022. It identifies the countries with the most favorable energy balances and characterizes progress in the transition to low-carbon energy systems [4, p. 187].

The transition of the economy to new types of energy is fraught with significant challenges. One of the main obstacles is the high cost of new technologies, which requires significant investments from airlines and governments. The European Commission estimates that more than 50 billion euros are needed in the aviation sector to meet the 2030 targets. A lack of financial instruments and opportunities to attract private investment is also a serious obstacle. Infrastructure issues, such as modernizing airports to use hydrogen and other alternative fuels, require significant resources and time. However, the EU is developing financial instruments to support innovation in the aviation sector. The Horizon Europe program, which funds research and development, provides grants for environmental projects. In addition, tax incentives encourage

investment in green technologies, and the EU Emissions Trading Scheme puts economic pressure on companies to reduce emissions and implement new solutions.

Green energy is an electricity generation technology that minimizes environmental pollution, including greenhouse gas emissions. Green energy utilizes inexhaustible and renewable resources such as wind, solar and hydropower.

The war between Ukraine and Russia has made its own adjustments to green energy and Ukraine's transition to green energy. The value of renewable energy has shifted from ecology to security, and from there to the economy. Six months ago, renewable energy sources were seen by the international community primarily as a means of combating inevitable climate change and reducing carbon emissions [5, p. 171].

Today, wind, solar, bio-, small hydro, and hydrogen energy are key to the country's energy security and independence and are significantly cheaper than fossil fuels. As of 2021, Ukraine's renewable energy sector is fighting for the right to operate under fair conditions guaranteed by the state, will become one of the pillars of Ukraine's post-war reconstruction by 2023, and will further increase the country's energy independence.

In most developed countries, the use of renewable energy sources is currently one of the main priorities for energy development. This is due to the need to address the energy instability caused by the energy crisis in countries and to reduce harmful emissions from the use of traditional energy sources. An important aspect is the possibility of creating a stock of organic raw materials for non-energy demand and preserving energy resources for future generations [6, p. 13].

The competitiveness of the EU aviation sector is also affected by the energy transition. The transition to cleaner technologies will temporarily increase the costs of European companies compared to competitors in other regions, but could be beneficial in the long run as international requirements for cleaner transportation become more stringent. As a leader in innovation, the EU could benefit from the introduction of new technologies in the aviation sector as global demand for cleaner transportation grows.

Conclusions.

The energy transition in the EU aviation sector is a key element in the fight against climate change and the achievement of the Sustainable Development Goals. While this process will require significant investment and face many challenges, it will also bring new opportunities for economic growth and innovation. The continued success of this transformation will depend on the ability of governments, the private sector and international organizations to work together and provide the necessary financial and technical resources.

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