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Efficiency of introduction of "green technologies" on aviation transport

The article analyzes the key tools of the introduction of green technologies in aviation transport, analyzes global experience of using green solutions in the production of air companies, and develops directions for the formation of the "green" aviation sector in Ukraine.

In the process of analyzing the current trends in green development in the aviation industry globally,it can be confidently state that trends have significant potential for increasing the productivity and efficiency of the aviation industry.

"Green" technologies, combining in time with fundamentally different approaches, serve as a way to a clean trajectory characterized by higher resource efficiency and "resilience" to the growth of adverse external influences [1-4]. This means that "green" technologies not only relate to the achievement of environmental friendliness, environmentalization of technology and activities, but are powerful catalysts for the transition to a new "green" technological structure, transformation of technological spheres of activity, economy and society.

In addition, the integration of the principles of "green growth" into the long-term strategy and priorities of technical and technological development, as well as the large-scale and coordinated support at the state level, leading airlines are actively developing and implementing scientific and technological developments to radically improve various aspects of their activities. According to world experience, the implementation of this concept requires significant investments and necessary state support at all stages of implementation.

In order to implement "green technologies" in aviation transport, it is necessary to take into account the key concepts of "ecological" development, the main of which are:

- creation of an effective system of ecological management;
- the formation of a flexible "environmental" pricing policy;
- creation of an effective public procurement policy;
- reforming the systems of "ecological" taxation;
- development and use of effective mechanisms of state investment in accordance with the principles of sustainable development of infrastructure;
- introduction of mechanisms of state support for research and development related to the creation of "green" technologies;
- development and implementation of strategies for the development of "green" aviation transport as part of the strategy for the formation of a sustainable "green" society.

Consequently, an important stage in the implementation of "green technologies" at aviation enterprises is the formation of an efficient system of environmental management, which is part of the integrated airspace management system used to implement environmental policy and controlling of environmental

aspects. The functioning of the environmental management system is aimed at improving environmental performance within the airline through their periodic analysis and evaluation. The ecological management system is a prerequisite for the controlling of the sustainable development of the airline, which encompasses a complex of processes and methods that enable the company to reduce its impact on the natural environment.

Based on foreign experience, it has been established that airlines can obtain potential benefits from the introduction of an effective environmental management system, as shown in Fig. 1

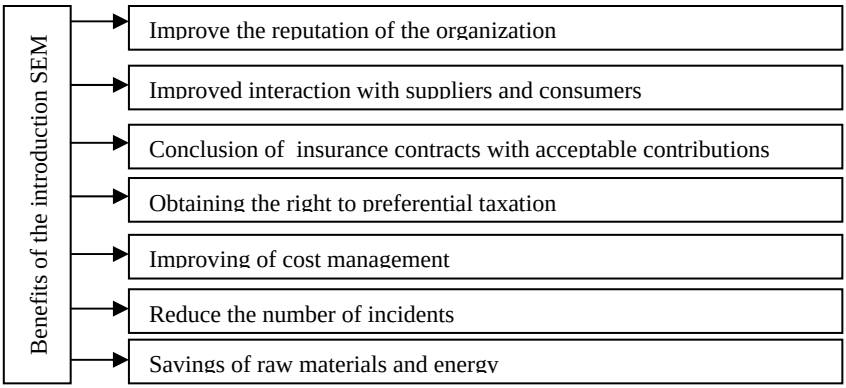

Fig. 1. The benefits of the airline from the introduction of an effective system of environmental management

The application of a systematic approach in the process of implementing a set of environmental management methods will enable airline management to obtain optimal results for all stakeholders. However, if acceptable and economically feasible, the environmental management system for the purpose of environmental goals can motivate the organization to use the best methods for achieving them (taking into account economic efficiency). Therefore, in order to achieve the effectiveness of the environmental management system, the components of the State Standard ISO 14001: 2016 must be integrated and harmoniously combined with elements of other functional subsystems of the airline (quality, occupational safety and aviation safety).

The leading position in the field of the use of green technologies in aviation transport is taken by the USA and Europe, which has developed a number of long-term programs and initiatives, according to which by 2025 it is planned to develop new-generation planes with radically new technical and operational characteristics. All this will enable the fuel economy (by 20% for EU plans), noise and emissions of greenhouse gases to be significantly reduced by 2025 (50% CO2 in the EU, 40% in the US).

According to NASA, US airlines can save up to $ 250 billion. between 2025 and 2050, thanks to green technologies developed by the agency and industry

partners, as part of the NASA Environmentally Responsible Aviation (ERA) program (aviation responsible for the environment). The technologies developed within the ERA program will strive to drastically reduce fuel consumption, aviation noise and pollution, that is, to deal with a variety of by-products of the flight. Such results will be achieved by increasing the engine efficiency and the more ergonomic structure of the aircraft [5].

It should be noted that the practice of using "green" technologies on aviation transport in Ukraine is at an initial stage. Within the framework of the implementation of ICAO policy in this direction, in January 2017, the State Aviation Service of Ukraine together with the Ministry of Infrastructure signed a memorandum of understanding with the Federal Aviation Administration (FAA) on reducing the impact of aviation on the environment [6]. The document provides conditions for cooperation in the field of aviation transport, in particular, research, promotion, development and use of ecologically balanced alternative types of aviation fuel.

There are no airports in Ukraine that could be considered "green", and some attempts to switch to natural resource conservation and a gradual transition to "ecological" development were made at Boryspil International Airport. Thus, within the framework of realization of the plan of energy independence from gas consumption, the airline introduced innovative technologies of heating on alternative fuels. In particular, the first "economizer" in Ukraine was installed at the airport, which allows receiving up to 20% of the thermal energy from the waste of the boiler - smoke. [7]. However, technological solutions in other areas of reducing the negative impact on the environment remain unresolved. As for other Ukrainian airports, there is almost no practical application of "green" solutions in their activities, and the environmental management system is not adequately adapted to the external and internal conditions of their functioning. The main reason for this situation is the lack of financial resources and the passivity of the state to such projects. It should be noted that only on condition of state support, the reform of the system of "environmental" taxation, the formation of "environmental" pricing policy of airlines, the availability of sources of investment "green" solutions in the aviation sector, etc. it is possible to implement innovative projects for the conservation of natural resources and reduce the negative impact of aviation transport on the environment.

It should be added that according to the experience of the leading "green" airports in the world at the level of domestic airports for effective environmental management, it is necessary to do the following: 1) to form an effective system of environmental management of the airport, taking into account its external and internal conditions of operation; 2) to analyze all sources of emissions at the airport and identify all possible ways to reduce greenhouse gas emissions; 3) to develop an effective system of control and monitoring of all processes at the airport that have a negative impact on the environment and climate; 4) to install modern energy-saving systems; 5) to install photoelectric systems (autonomous solar installation with batteries); 6) to implement measures to equip production capacities with energy-saving lighting; 7) to locate electric charging stations (on the territory of the airport), etc.

Conclusions

On the basis of the research, it was established that the use of "green" technologies in the aviation transport of Ukraine is an indispensable innovative solution for preserving natural resources and reducing its negative impact on ecosystems. An important tool for ensuring "green" growth is the formation of an effective system of environmental management of airlines and the introduction of a flexible environmental policy, taking into account the specific conditions of operation. It should be noted that due to state support in this direction it is possible to create a "clean" highly productive sector and obtain financial and economic benefits from its functioning.

References

1. Green agenda (ICAO) [Electronic resource]. - Access mode: http://www.icao.int/publications/journalsreports/2010/6503_en.pdf.
2. Committee on Environmental Protection from Aviation Report (Doc 10069) [Electronic resource]. - Mode of access: CAEP / 10http: //dspk.cs.gkord.ru/library/data/Doc_10069_komitet_po_ohrane_okr.pdf Montreal, February 1-12, 2016
3. Green Technologies in the Aerospace Sector - Global Trends and Development Prospects in Russia. [Electronic resource]. - Access mode: https://riss.ru/wp-content/uploads/2016/02/Prokopenkova_Doklad_18_02_ Aerokosmicheskijsektor_crop.pdf.
4. Pakhomova NV, Richter K.K., Malyshkov G. B. Structural Transformations in the Conditions of the Formation of the "Green" Economy: Challenges for the Russian State and Business // N.V. Pakhomova, KK Richter G. B. Malyshkov / Problems of Modern Economics. - 2012. - No. 3 (43) [Electronic resource]. - Access mode: http://www.meconomy.ru/art.php?nArtId=4155.
5. NASA plans to use green technologies on planes. - [Electronic resource]. - Access mode: http://cikavosti.com/nasa-planuye-vikoristovuvati-zeleni-tehnologiyi-v-litakah.
6. Ukraine will work with the United States to reduce the impact of aviation on the environment. - [Electronic resource]. - Access mode: http://www.kmu.gov.ua/control/uk/publish/article?art_id=249687746&cat_id=244277212.
7. "The official portal of the airport" Borispol ". - [Electronic resource]. - Access mode: http://kbp.aero/en/about/press-center/news/2016/1461/.