

Challenges and solutions towards environmentally sustainable EU air transport sector

Air transport in the European Union is a key contributor to the European economy, with more than 100 scheduled airlines and a network of more than 400 airports, playing a vital role in Europe's integration and competitiveness. Therefore, any prospects for the sustainable development of air transport in the EU, both positive and negative, are important for consideration.

Air services for the market of European internal transportation are very significant, and to prove this fact, it is possible to take the key figures of the sector performance, provided by the European Commission [1]:

- Number of scheduled airlines: 100+;
- Airports: more than 400;
- Air navigation service providers: over 60;
- Amount of passengers handled by European airports: approximately 1.94 billion passengers (2022) showing recovery and noticeable improvement compared to previous years;
- Level of employment and support: employs 1.4-2 million people and supports 4.7-5.5 million jobs;
- Contributions to the GDP: more than €110 billion;
- Role, defined by the European Commission Directorate-General for Mobility and Transport: “vital role in the integration and the competitiveness of Europe, as well as its interaction with the world”.

The abovementioned characteristics clearly prove the strong need for strategic positioning of aviation for the economy of the united Europe. As it is not only the booster of the processes and the amounts of money of the EU economy key players, there are perspectives of better connectedness of the continent population from the internal perspective and with other parts of the world, which are also preferable options to be realized.

During the pre-pandemic period of 2020 [2], main challenges for the business aviation industry in Europe were environmental factors and pressures (Fig. 1). Although the basic information about the sample (at least the number of respondents) was not provided, this bar chart may be an interesting source of all challenges possible to emerge for air transport sector.

European Aviation Environmental Report identifies that aircrafts pollute the atmosphere due to the emission of harmful substances from the exhaust gases of aircraft engines. Significant pollution occurs both in the areas of airports and on the routes of flight. Gases generated by the operation of aircraft engines account for 87% of all civil aviation emissions, which also include emissions from special vehicles and stationary sources. The global impact is the formation of the greenhouse effect and

ozone depletion. Since 2014, overall environmental impacts from aviation have increased for CO₂ by 10%, for NO – by 12% and for noise pollution – by 14% [3-4].

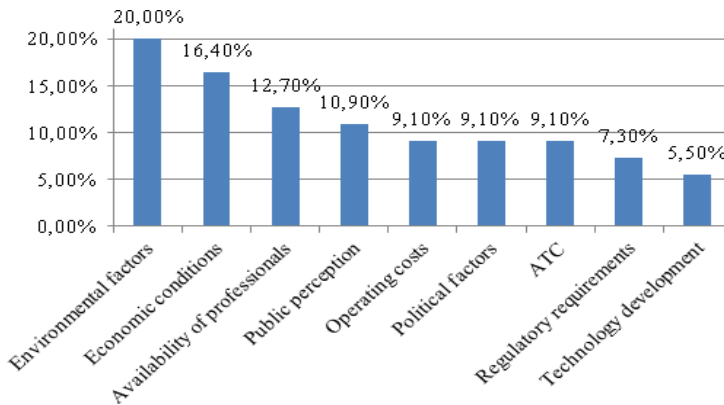


Fig. 1. Challenges of the European business aviation industry [2]

In addition to air pollution by aircraft, the air from industrial premises and individual airport facilities receives vapours of petroleum products, solvents, paints, alkalis, acids, aerosols of aqueous solutions of sodium hydroxide, carbon dioxide and phosphoric acid, sulphur dioxide, nitrogen oxides, carbon monoxide, dust, etc. Therefore, aviation, compared to other modes of transport, is a specific pollutant that has a fairly wide range of impacts on the quality of the environment. And there is no technical solution with a possibility to reduce negative impact.

Reduction of CO₂ emissions is regarded as the easiest method to implement in terms of reducing the influence of anthropogenic action on increasing the concentration of gases that negatively affect the temperature regime. There are several propositions how to achieve the emissions general reduction [3-4] (Fig. 2).

In order to reduce congestion in European airspace and cutting emissions from aircraft, the Shift2Rail, European rail initiative, is proposed to accelerate the integration of new and advanced technologies into innovative rail product solutions [5]. This sustainable development programme may result in reduction of inter-EU flights due to their inefficiency and political actions, under the auspices of caring for the reduction of harmful emissions into the atmosphere.

One of the key actions to reduce the environmental impact of transport is a reduction of fossil fuels use. However, this idea creates a completely new challenge for aviation, as the jet fuel is a specially prepared mixture of a variety of hydrocarbons. New types of fuel will require huge expenditures on their development, promotion, replacement, and new aircrafts and facilities that will be able to use this kind of energy source. It is known that fuel price increase tickets price and decrease margins, so the introduction of new fuel may require from carriers firstly increasing prices for passengers and clients even higher than now, with the aim of reduction in future.

Furthermore, there will be a need in high amount of costs from all EU-Member states to achieve compliance with new technologies, like SESAR.

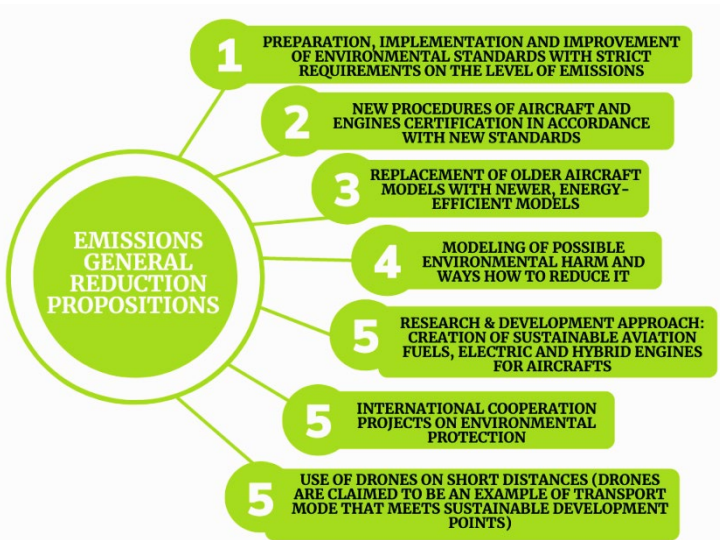


Fig. 2. Proposals on emissions general reduction achievement
*Compiled by authors

The European Commission states that improvement of air traffic management holds great potential for modernization and sustainability, helping to cut excess fuel burn and CO₂ emissions caused by flight inefficiencies and airspace fragmentation [1]. However, this kind of statement may have a political background with the aim of the SES and SESAR spread in order to unite the control under the European sky. Therefore, this measure can also be added to the list of possible solutions to reduce the impact on the environment, but taking into account the other possible entailed concerns and consequences.

It can be concluded that the atmosphere pollution caused by aircrafts and ground equipment makes a fairly significant contribution to the processes of changing the climatic regime on Earth. But at the same time, actions to reduce the negative environmental impact also create various obstacles for proper evolution of aviation. It is better to ensure the implementation of CO₂ emissions reduction policies, as those actions are considered as only possible to reduce the level of climate change and the appearance of irreversible outcomes of human activity. That includes standards creation and revision, exploitation of zero-waste fleet and equipment, use of alternative fuels and various scientific and technological suggestions. A strong need in solving the problem of significant diversity in documented procedures is still important for the European aviation in order to ensure positive changes towards sustainable aviation transport.

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