

Forum: Environment Commission

Issue: The question of sustainable air travel

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Introduction

Nowadays, we live in a globalized world where communication is fundamental. Through technological development, nations around the globe have been able to interact, relate and learn from each other. The transportation industry, especially the air travel market, has been a factor of great importance on the growth of humanity given that it has allowed a physical connection between countries. It has developed economical, political and social power.

The opportunity of traveling has become more available throughout time due to lower prices and more financial help for individuals. This has had a positive impact on the wealth of countries given the increase in the levels of employment and the growing tourism industry. In addition to this, air travel has enabled the advance to stronger relationships between countries as a consequence of the fusion between people with different backgrounds. Socially, the increased levels of diversity have had a great impact on cultures throughout the world, it has been an educational opportunity.

Nevertheless, resulting from the way the transport industry works, the environmental costs are very high. Aircraft use energy which is created through the burning of petroleum. This process releases a high level of toxic gases to the atmosphere causing air pollution. As the levels of production of pollutants are larger than what the environment can tolerate, our surrounding is being harmed. Due to the high dependency of transportation, it is important to find alternative solutions in order to balance human demands and what the environment is able to supply (Marchant, C., 2015).

Definition of Key Terms

Sustainability

Sustainability is the use of natural resources without causing degradation or reduction of these. This means that the damage to the environment should be the minimum

possible and the availability for future generations to use these resources should not be affected.

Air travel

Within the transportation industry, air travel is the way of taking people and goods from one place to another through the air. There are various vehicles which are able to fly, common examples are airplanes and helicopters.

Global warming

Global warming is the increase in the Earth's temperature due to the release of greenhouse gases. These gases absorb and re-radiate the energy from the Sun which reaches the planet's atmosphere. Although it is a natural process which is essential for Earth to function, as a result of human activity the rate of global warming is increasing.

A strong producer of global warming is the air travel industry due to the way its machines work. Given the possible consequences on nature, humans, and animals health caused by the change in temperature, it is very important to find possible solutions. In the case of the industry studied, countries and organizations have been questioning the ways of making the market more sustainable by releasing less greenhouse gases.

Contrails

A contrail is a white trail which can sometimes be seen in the sky after a plane has gone through. It is produced when the gas and the solid particles of the airplane, also known as the exhaust of the aircraft, mix with the water vapour of the sky creating ice particles. These are a type of cloud caused by human activity which depend on the amount of water vapour available to determine the time they last. Moreover, due to the fact that contrails particles are large, these interact with radiation causing the Earth's temperature to slowly increase. Therefore, the larger the amount of exhaust of aircrafts in the atmosphere, the bigger the quantity of contrails causing an increase on global warming (FAA, 2014; NASA, n.d.).

Fuel

A fuel is a material which releases heat that can then be transformed into energy. In our case, humans receive energy through the fuel which we call food. In the case of the aviation industry, the power is acquired through several types of liquid fuels. An example is jet fuel.

Many types of fuels are the result of a chemical reaction of fossil fuels. Through this process, toxic gases are released. As fossil fuels take a lot of time to be produced, these are nominated as non-renewable. Therefore, the production of fuel is very expensive. However, this has had a positive effect on the environment given that it has encouraged the transportation industry to find more efficient fuel vehicles causing a decrease on the release of toxic gases (J.M.K.C. Donev et al., 2018).

Biofuels

Biofuels are a type of fuel which are produced from plants and animals. Common examples are biodiesel and ethanol. As these are non-fossil fuels, the levels of greenhouse gases emissions decrease. However, the process of producing biofuels is still not more efficient than the use of fossil fuels. Therefore, these type of fuels are not used as regularly as other fuels yet. Moreover, due to the characteristics of the process of production, the dependency, and pressure on fertile lands increases causing a change on biodiversity. Nevertheless, it can become a new sector on the energy industry generating more employment (Green Facts, 2009).

Background Information

Finding a possible way to achieve sustainable air travel is vital as we are now facing a complex situation where supply is deteriorating and demand is rising quickly. However, in order to stop harming the environment, it is essential to understand the industry which is being analysed.

The beginning of air travel

Through history, there have been many attempts to fly. Therefore, it is hard to state the precise date in which air travel actually began. Many believe that in the 5th century, China was able to create the first flying object able to transport humans, the man-lifting kites. However, the date most accepted worldwide as the beginning of air travel is December 17, 1903. The Wright brothers were two American engineers who were fascinated by the idea of inventing. While investigating the creation of a flying object, the inventors decided to base their study on how birds are able to fly and the research of German engineer, Otto Lilienthal. The first flight was of 59 seconds covering 260 meters. Although it was a concise trip, people established it as the first successful flight. In the following decades, the invention held various changes in order to make flying trips more efficient. Civic aviation grew substantially and rapidly. Simultaneously, in response to the first and second World Wars, the military

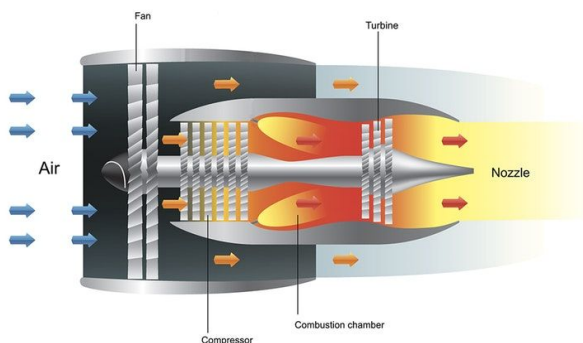
aviation community expanded as well. For the aviation industry, these events had a positive effect given that it encouraged the development of airplanes (History, 2018).



The first flight on December 17, 1903

How an airplane engine operates

Since its creation during the 1930s and 1940s, the civil aviation community mainly uses jet fuel. Today, air travel is possible through the use of a simple fan. By means of this component, airplane engines are able to absorb the air and push it out the other side in order to gain speed. A percentage of the collected air is then forced into the engine. This process compresses the air making it more explosive when mixed with the fuel. Subsequently, the fusion between the compressed air and the fuel causes an increase in pressure which leaves through the turbine as gases. Through this procedure, airplanes are capable of moving at a high speed carrying a considerable amount of weight (Port, J., 2017).



A visual description of how a jet fuel engine works

Its contribution to the environment

The way in which airplane engines operate is very efficient and successful. Nevertheless, it has a negative impact on the environment. The gases which are released to the atmosphere after the merging of compressed air and the fuel

contribute to climate change. Some of these gases are carbon dioxide, water vapor, and carbon monoxide. Based on the investigation of ATAG (Air Transport Action Group), the source of 2% of the carbon emissions caused by human activity is the aviation industry (Group, A. T., 2018). Besides causing a change in the temperature of Earth, air travel also has a negative effect on the quality of air. Due to air pollution, health problems can emerge for animals, plants, and humans as well. Therefore, the aviation industry can influence globally but at the same time, the local environment too.

Furthermore, resulting from the way airplane engines work, the aviation industry also causes noise pollution. Although noise standards have been established, technological development has not been able to solve this issue yet. In addition to this, the industry studied is also the source of water pollution. In consequence of the regular controls of chemical spills and the attempts to decrease the impact of the spills which do occur, a large amount of water is used. The polluted liquid later remains on the ground and is carried to nearby stores of water by runoffs. This affects negatively on the aquatic life causing an increase in the death rates and the spread of diseases (UN Environment, n.d.).

Major Countries and Organizations Involved

UNEP (United Nations Environment Programme)

UNEP is a programme within the United Nations system which is engaged in issues regarding the wellbeing of the environment since 1972. Its objective is to act as a role model in order to encourage other parties to get involved. Through an influential role and a sustainable attitude, the organization sets the global environmental agenda and establishes agreements between countries. In addition to this, the programme also works in specific themes as climate change, resource efficiency and environmental rights and governance.

Furthermore, the United Nations Environment Programme works with various parties in order to reach a common objective on how to tackle unsustainability and its effects on the environment. Some of the partners are: GRID (Global Resource Information Database), Environmental Management Group and Frankfurt School of Finance and Management (About UN Environment, n.d.).

KLM

KLM is a Dutch airline which was founded in 1919. Nowadays, in the transportation industry, it is a shining example given its ranking as the most sustainable airline since 2006. Through the KLM's Climate Action plan, the company has been able to succeed economically while minimizing the effect on the environment. Some of the processes that they follow are: recycling any object used within the airplane, compose any remaining food and cooling down the engines of the airplanes by washing them with water in order to burn less fuel. As well, through a holistic approach, the airline believes that passengers and KLM employees can help the industry to become more sustainable. This can be achieved by encouraging the involvement of these on reaching new green ideas and spreading awareness of the environmental costs (Harrison, K. T., 2018).

ICAO (International Civil Aviation Organization)

ICAO is an agency of the United Nations connected to ECOSOC (Economic and Social Council). Since its creation in 1944, its task is to establish policies accepted by the Member States with the objective of creating a global standard of how the industry should work. Therefore, the Standards and Recommended Practices (SaRPs) established by ICAO are frequently used by each nation on their local regulations. Moreover, this organization is of great importance given that its priority is to support aviation development in order to become a more efficient and safe industry. In addition to this, ICAO has strongly stated that within their global priorities, protecting the environment is one. Some of the organizations that participate on the work of the ICAO are: WHO (World Health Organization), IATA (International Air Transport Association) and CANSO (Civil Air Navigation Services Organization) (ICAO, n.d.).

Air Transport Action Group

ATAG is a non-profit organization which contributes to the development of the air travel industry. It is mainly focused on the negative effects caused by the industry to the environment and tackling the situation through a transparent debate. With the funding of the different parties within the market, the Air Transport Action Group is able to investigate and provide information about sustainable growth. Moreover, it organizes global events in order to achieve a worldwide objective to find possible solutions to the climate change situation. Due to the diversity of the 50 members of the organization, ATAG influences highly the industry. Some of these members are: CANSO (Civil Air Navigation Services Organization),

IATA (International Air Transport Association) and WTTC (World Travel and Tourism Council).

In addition to this, ATAG has established a website called Aviation Benefits Beyond Borders. The objective of the website is to present useful information in a simple but detailed way on how the aviation industry affects the economy, society and the environment (ATAG, n.d.).

United States

Nowadays, United States is known as the country with the most air flights per year given that the nation's airlines are listed as one of the most profitable airlines. Consequently, the economic growth of the country is highly dependent on the success of the aviation industry. Furthermore, United States government is an important party on the development of the aviation industry. This is because it has contributed with large amounts of money in order to reach new safety standards and air traffic control operations after the devastating terrorist attack on September 2001 (Markovich, S. J., 2015).

Regarding its relationship with the environmental situation caused by the aviation industry, within the Federal Aviation Administration there is an office of Policy, International Affairs and Environment. This section of the FAA is responsible of analysing the consequences on the our surroundings and finding ways in which the aviation system is able to develop without harming the environment. This is achieved by establishing policies, regulations and national objectives (FAA, 2014).

Timeline of Events

Date	Description of event
1945	IATA (International Air transport Association) was founded with the objective of developing the air transport industry in a profitable and sustainable way. Throughout history, it has helped to form many industry policies (IATA, 2019).
2002	World Summit Sustainable Development adopted the JPOI document (Johannesburg Plan of Implementation). The Johannesburg Declaration is a political commitment of parties to prioritize the

development of humanity in a sustainable way (Goals, S. D., n.d.).

November 26 & 27, 2016

Global Sustainable Transport Conference in Ashgabat, Turkmenistan. The aim of the of the convention was to discuss possible solutions and partnerships in order to create a more sustainable transport system (Conference, G. S., 2016).

January 11, 2018

Transforming Transportation event by the World Bank took place in the United States. The conference was centered on the importance of technology in order to sustainably develop the industry (Transportation, T, n.d.).

Relevant UN Treaties and Events

- United Nation's Earth Summit included in the Agenda 21 document the importance of Transport in sustainable development, 1992 (General Assembly, 2014).
- UN General Assembly noted that in the following twenty years, the transportation industry would be the cause of the growing worldwide demand for energy, 1997 (General Assembly, 2014).
- The Secretary General established a High Level Advisory Group on Sustainable transport (HLAG-ST), August 2014 (General Assembly, 2014).
- Role of transport and transit corridors in ensuring international cooperation for sustainable development, December 19 2014. **(A/RES/69/213)** (General Assembly, 2014).

Previous Attempts to solve the Issue

The aviation industry is a distinctive case given that it has not experienced big changes in the way it works. Since flying objects have been created, these have undergone constant changes with the objective of becoming a more efficient and profitable industry. In many cases, this has had a positive effect on the environment. Due to a higher level of

effectiveness of air travel, a reduced amount of toxic gases are released. Therefore, the environmental costs decrease.

The adoption of winglets

In 1976 the American aeronautic engineer called Richard Whitcomb announced his discoveries about the winglet design. The invention consists of a modern and more efficient type of wings for airplanes. Given that winglets are able to reduce the induced drag, airplanes are now able to fly at a higher speed and at the same time, burn less fuel. Therefore, the reduced amount of toxic gases cause a smaller cost on the environment. After Whitcomb published his findings, military and public aviation communities became very interested. Through numerous flight tests, the industry reacted positively. Nowadays, the use of winglets can be found on airplanes from around all the world (NASA, n.d.). Based on the investigation of ATAG (Air Transport Action Group), the use of winglets since 2000 has successfully eluded 80 million tonnes of carbon emissions (Group, A. T., 2018).

The implementation of budget airlines

As a consequence of the increasing demand for air travel, budget airlines began to function during the 1970s. These consist of low-priced tickets in order to increase the number of consumers able and willing to purchase the service. Low-cost airlines are able to function by cutting the traditional services provided in-flight as food, seat allocation and priority boarding. A clear successful example is Southwest Airlines. The American company is known as the world's largest low-cost airline (Marchant, C., 2015).

The concept of budget airlines economically has a favourable outcome for the owners of the company and for financially unstable consumers. Although initially, their priority wasn't to measure the impact on the environment, it has had an effect on our surroundings. Due to the fact that the company's priority is to gain a profit, everything in the airplane will have a use. Therefore, the levels of waste will reduce and the unnecessary carbon emissions will decrease. However, low cost airlines have increased accessibility, causing an increase on demand for air travel. Consequently, budget airlines have made the transportation industry more unsustainable.

Possible Solutions

Throughout time humanity has been able to develop significantly. However, the consequences of our past and present actions are being displayed. The harm on the

environment has been so massive that the world we know today can change completely. Nevertheless, air travel is a discovery on which we depend highly. For this reason, it is very important to find possible solutions in order to solve the issue at hand without losing a relevant industry.

The intervention of governments on the air travel industry

From an anthropocentric point of view, the most reliable and efficient solution is through legislation. Given that the government is responsible for lawmaking, its intervention on the air travel industry can have a successful impact on the environment.

The implementation of indirect taxes on specific products

A possible solution to unsustainable air travel is by introducing an indirect tax on products and services which have a negative effect on the environment. For example, if governments decided to tax petroleum, fueling airplanes would be more expensive. As approximately 33% of the operating costs of airlines is spent on fuel, this government intervention would have a huge impact (Group, A. T., 2018). Consequently, ticket prices would increase in order for transportation to be profitable for the airline. This would cause a decrease in the demand given that a lower number of people would be willing and able to pay for the new fare. As a result, decreased air travel would cause a positive effect on the environment as the carbon emission would have reduced (Rodrigue, J.-P., n.d.).

The urging to fly in economy class

Generally, airplanes are divided into three sections: first class, business class, and economy class. These vary on the level of service and fare, the economy class being the most accessible for consumers. A possible way of making air travel more sustainable is by encouraging society to use economy class and airlines to remove first and business class. This is because given that the more exclusive sections of the airplane take more space, if these were replaced for economy seats, more people would be able to fly in one airplane. Therefore, the total carbon emissions would reduce due to the increase on efficiency. This would have a positive effect on the environment (Marchant, C., 2015).

Innovative technology

From a technocentric point of view, encouraging the development of technology is the most unfailing solution to make air travel more sustainable. Given that the transportation industry is based on technological discoveries, many believe that the possible resolution is of the same origin.

Climate-optimized flight routes

In Germany, various organizations and scientists have been analysing the possibility of designing flight routes in order to reduce the negative impact on the environment. If pilots were able to use the weather forecast information in order to decide which routes would require less burning of fossil fuels, the unnecessary carbon emission would be reduced. Besides having a positive effect on the environment, it would also increase the profit of the airlines (King, J., 2018).

The use of blended wings

The American company called Boeing along with the scientific help of NASA, have been investigating the possibility of using blended wings instead of the original ones. This design is very different visually to the current airplanes. Its physical characteristics are able to reduce the noise pollution, the carbon emissions and at the same time, reduce the amount of fuel consumed. Due to its efficiency and reduced impact on the environment, many specialists believe that the military aviation community will be shortly using this design (Beall, A., 2016).

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