

# Greening Infrastructures: Airports' Role and Responsibility

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*This paper demonstrates the importance of infrastructures, and more specifically, airports, in the fight against climate change. The impact of infrastructures does not limit itself to their own operations, but also to their capacity to influence and shape the behaviours of their users.*

## Introduction and context

**I**n Achieving our goals in the fight against climate change is important and the need for action becomes more and more pressing, especially when we see how difficult it is to keep up with our commitments made under the Paris Agreement. Infrastructures play a crucial role in this challenge, as they often influence and shape our behaviours and hence can have an important impact on the reduction of greenhouse gas emissions. Examples of infrastructures that will shape our future behaviours and which are capable of reducing greenhouse gas emissions are infrastructures for mobility, energy-producing infrastructures, but also buildings, among many others. However, we should not forget in our fight against climate change that also other environmental impacts have to be looked at like noise and biodiversity. Furthermore, we should keep in mind the social impact of such measures and, notably, how we can avoid increasing social imbalance through our changes to make our society less impactful on the climate. In conclusion, it will be very important that, through our actions, we secure a good balance between all aspects of sustainable development, namely between the social, environmental and economic impacts.

Nevertheless, infrastructures and their operators can and must play a major role in reducing greenhouse gas and other emissions. Infrastructures can play a role in three dimensions:

1. By reducing greenhouse gas emissions related to the infrastructures and their operations;
2. By inciting and assisting greenhouse gas reduction in the use of the infrastructure;
3. Finally, by reducing greenhouse gas emissions by influencing the behaviours of their users by inducing a greenhouse gas reducing use of the infrastructure.

Before further laying out how airports can play a crucial role that can be played by infrastructures, let me give

another example, energy production infrastructures. In this specific case, the first dimension would be to ensure already in the building process a reduction of greenhouse gas emissions and also to use energy production methods that reduce as much as possible the emission of greenhouse gases (for example by producing energy either using solar or wind energy sources instead of fossil energy sources). For the second dimension, this will be achieved by assuring a competitive offering of lower greenhouse gas emission energy and by assuring and supporting the societal understanding of the importance to prioritise this energy over fossil energy. Finally, the third dimension could be achieved by launching an energy efficiency programme that supports and assists the consumers of the energy provided by this infrastructure to use it more efficiently and hence reduce its impact on the environment by using less energy. As demonstrated through this simple example, this is nothing new nor untested, but we need to replicate these three dimensions with all infrastructures and their operators.

Hence, it is important to understand and recognise that infrastructures and their operators must and will play a major role in our endeavour to reduce greenhouse gas emissions and that we need to plan, develop and operate all these infrastructures in this spirit. This simply implies that infrastructures are not only here to offer their service, but they need to take a role of leadership to not only reduce greenhouse gas emissions in their own operations but also shape how they get used and the behaviour of their users. Otherwise, it will become extremely difficult to meet our binding goals in reducing greenhouse gas emissions to mitigate the impact of climate change and subsequently, safeguard the possibility to live in a sustainable way on our earth for the generations to come.

## Greening infrastructures – airports' role and responsibility

Now let us apply these principles to an airport and illustrate with the example of Geneva Airport how this could be implemented and what results can be achieved. In a

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first part, we will describe the actions Geneva Airport has taken to reduce its greenhouse gas emissions in its direct operations, whereas in the second part we will look at how Geneva Airport incentivises airlines to contribute to the reduction of greenhouse gas emissions.

#### *Reducing greenhouse gas emissions in the airports' operations*

Geneva Airport has started over the past decades a global programme to reduce its environmental impact, which includes noise as well as CO<sub>2</sub> emissions. This programme will culminate in a CO<sub>2</sub> net-zero objective before 2050 and return to the noise impact levels of 2000 by 2030 at the latest. The programme is composed of the following elements:

1. **Buildings' energy efficiency:** Since 2016, Geneva Airport is only constructing new buildings that generate more energy than they consume; examples are our noise absorber and our new east wing for intercontinental flights.
2. **Energy consumption:** We will prioritise the energy use for essential needs; we will continuously increase our energy efficiency; and we will move towards the use of renewable energy. These efforts have enabled us to reduce our energy consumption by 26.4% compared to 2006. We will achieve 100% renewable energy consumption for our infrastructures by 2026 by using geothermal energy, by replacing all our heating and cooling by heat pumps using water from the lake located nearby, and by buying 5GWh per year of solar energy. Furthermore, we will be generating solar energy at the airport covering an overall surface of 55'000 square meters.
3. **Mobility airside:** We are upgrading our fossil energy-based buses for passengers by equipping them with electric motorisation (10 buses today with an addition of two more electrified buses per year). We are also targeting to replace the airside vehicles with electrically motorised ones (currently 29% of them are either electric or hybrid). We are also participating in the investments of our partners to support them in doing the same. As an illustration, today one of our ground handlers has electrified 50% of their vehicles.
4. **Mobility:** We are also promoting the use of sustainable mobility to reach the airport, and current-

ly over 50% of our passengers come by sustainable mobility, whereas we target 45% of our employees to do so. In order to achieve these targets we are offering buses for passengers and employees for late night and early morning hours, where there is no public transport. Furthermore, we are offering each arriving passenger a free ticket for a journey with the public transport system of Geneva.

5. **Energy support for airplanes:** We have introduced direct availability of electricity on an important number of parking positions to avoid the use of the planes' engines to generate electricity. We are also rolling out heat pumps directly at the parking positions to provide cold and heat to the planes during their turnaround time, again to avoid using the planes' engines to do so.

Furthermore, in preparation of our net-zero emission objective, Geneva Airport is offsetting since 2017 its CO<sub>2</sub> emissions and has this certified by the Airport Carbon Accreditation 3+ certification issued by the Airports Council International (ACI).

#### *Incentivising greenhouse gas emission reductions by the airlines*

Currently, there are only four options available to advance the reduction of greenhouse gas emissions by airlines that can be measured and incentivised by airports. These are:

1. Increasing the load factor (% of seats occupied in the plane) of the flights;
2. Using the last generation of planes with CO<sub>2</sub> emission reductions of up to 20%;
3. CO<sub>2</sub> compensation of the airline of their operations; and finally
4. Using Sustainable Aviation Fuel (SAF).

However, we need also to keep in mind that CO<sub>2</sub> emissions are not the only concern for which airports wish to incentivise improved operations by the airlines; we do also have a concern about noise emissions of the planes. Fortunately, the last generation of planes, examples are the Airbus 220 (former Bombardier C series and the Airbus 319, 320 and 321 NEOs for short to medium-haul flights and Boeing 787 and Airbus 350 for long-haul

flights), are not only offering a substantial reduction in noise (up to 40%) but also in fuel consumption and hence also in CO<sub>2</sub> emissions (up to 20%). This fact allows airports to develop incentivising policies that simultaneously address noise and greenhouse gas emissions.

The next question is what are the means an airport has to incentivise any of the above four options? To answer this question we need to better understand the nature and the contractual basis of the relationship between airlines and airports. First, in order to start flying into an airport an airline has to obtain a slot for landing and take-off. The airline will obtain these for level 3 congestion airports, from an independent coordinator. These slots can specify conditions for their availability like type of airplane or passenger capacity available at a certain moment. Then, the airport will define airport charges for the use of the airport infrastructure. These charges have to be negotiated and agreed with the airlines, whereby a direct relationship by costs generated by the use or by the providing of infrastructure will be necessary for the use. These two mechanisms are highly regulated to avoid any undue influencing of the market by airports and hence offer in the current context of regulations only limited opportunities to incentivise the reduction of noise or greenhouse gas emissions. Nevertheless, there are still some opportunities in this framework like in the context of noise taxes, where our system, which is in place since the beginning of 2018, has taxes adapted to the noise level and is hence favouring last generation planes. This has already facilitated the change of noisier and higher emission planes with last generation planes (one example was the replacement of an Airbus 330 by a Boeing 787).

Nevertheless, this situation can be addressed by combining the tax system with its limitations stemming from the regulatory framework, by incentive schemes. At Geneva Airport, we have implemented such schemes to generate incentives with financial returns on the airport taxes based on aspects like use of new airport types or load factors. These incentive schemes have been added to the airport tax proposal at the beginning of our last negotiations. These schemes have been part of the airport tax agreement negotiated with the airlines and the regulator, and have been accepted during the last quarter of 2020. To illustrate this, here is an example of the impact of such an incentive scheme: if an airline increases its movements of last generation aircrafts from 10% to 30%, they can obtain a return of their landing fees as paid according to the tax regulations of 30%. This incentive plan has already generated interest to increase the presence of last

generation airplanes in the locally present fleet of one of the airlines operating at the Geneva Airport.

We are also prospectively in discussion to add to these incentive schemes a recognition of airlines offsetting their CO<sub>2</sub> emissions and in the long run the use of SAF.

Finally, airports can also introduce actions to reduce greenhouse gas emissions or noise impact in their operating rules. Geneva Airport did not provide slots for take-offs after 10pm. This is also because 95% of the passengers fly to European destinations, which do not require take-offs after 10pm. But in the context of Geneva Airport's strategy to develop its intercontinental connectivity, we have introduced an allowance for last generation wide-body planes (currently represented by the Airbus 350 and the Boeing 787) for take-off after 10pm. Currently we have already one airline, Ethiopian Airlines, that uses this possibility with its B787 Dreamliner and a departure at 10h45pm.

Finally, we believe that the current slot system should be extended to allow the further limitation of the use of slots to emission-related criteria, like limitations to certain types of planes or permitted emission levels for certain slots, and also to the need to develop more qualitatively the connectivity of an airport. This last point seeks to avoid excessive competition on certain destinations, creating too many movements for one destination with lower load factors and hence increasing again the emissions per passenger.

In conclusion, this paper should have demonstrated how infrastructures, in our case airports, can actually reduce the emissions of their own operations but also facilitate the reduction of emissions by their users and operators. This should further exemplify the importance of the role of infrastructures to contribute in the fight against climate change.