

# AIR TRANSPORT: PERCEPTIONS AND REALITIES

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## Collective reflection

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# **AIR TRANSPORT: PERCEPTIONS AND REALITIES**

**MARCH 2023**

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## Summary

As a result, despite it does not commit the Academy as a whole, it could be a priori perceived as a pro domo plea. To overcome this, it is as factual as possible, with three analytical appendices.

The first describes the way in which air transport is included in international climate agreements, the second the coordinating bodies for the decarbonization of air transport, and the third deconstructs the expression, which has become viral, "Only 1% of people are source of 50% of global aviation emissions".

With the Covid effect, the suggestive vision of air transport temporarily stopped, the observation of the possibility of continuing certain activities remotely without necessarily having to take the plane, has had an impact on ways of thinking, raised questions, acted as a catalyst, creating a very favourable context for a strong increase in the targeting of aviation in recent years, with strong disparities between regions and countries, depending on the interests and aspirations at stake.

These "too visible" planes are also accused of "carrying the rich". Admittedly, the very communication of air transport has too often emphasized dream destinations and first-class images for us to now be surprised by this criticism, which the democratization of air transport is not yet enough to thwart .

The dissemination of real decarbonization solutions, in facts and in communication, accompanied by greater societal awareness, is the best response to this media "targeting" of aviation

Media pressure can be beneficial by encouraging air transport to be an actor in the fight against climate change, commensurate with what traveling by plane means from a technical, sociological, and economic point of view.

# 1. Aviation, COP and international treaties

We can often read or hear that air transport enjoys a privileged status, not being included in international climate agreements such as the Paris Agreement and that its CO<sub>2</sub> emissions thus escape the various national and international inventories. But what is it in reality?

Aviation is in essence a means of connecting people and goods, both nationally and internationally.

The CO<sub>2</sub> emissions generated during national (domestic) flights are fully included in the "carbon" accounts of the States in which they are operated, through the national emissions managed by the United Nations Framework Convention on Climate Change (UNFCCC) and of its associated treaties (Kyoto Protocol of 1997 and Paris Agreement of 2015).

The situation is much more complex for international flights. Indeed, it is technically very complicated to allocate the emissions of an international flight to such and such a country. What would then be the terms and conditions for allocating these emissions? Would they depend on the nationality of the aircraft (airline or base of the said aircraft), that of the passengers, the geographical location, the airport of departure, the airport of arrival? To whom would the additional emissions due to adverse weather conditions or traffic control and regulation constraints be allocated?

Thus, for practical reasons and convenience, the management of CO<sub>2</sub> emissions generated by international aviation is dealt with globally, by the International Civil Aviation Organization (ICAO), the United Nations agency specialized in air subjects. This is also the reason why a system like CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) only applies to CO<sub>2</sub> emissions from international traffic, those from national traffic being managed by each of the Member States of the UNFCCC, moreover the same as the member states of the ICAO. The aviation sector is also the only economic sector capped in terms of emissions at the global level, through CORSIA.

Since the states undertake to put in place measures to achieve the objectives defined by the United Nations bodies to which they belong (both at the level of the UNFCCC and the ICAO), all these processes are clearly defined in a legal point of view and therefore there is no exclusion, privileged status, or possibility of escaping it for air transport.

A detailed and technical explanation of the operation of these bodies as well as an indication of the reference documents is given in Annex 1.

## 2. A recent mediatisation ... on both sides

Air transport obviously contributes to the greenhouse effect, through its CO<sub>2</sub> emissions, which today constitute around 2.5% of anthropogenic emissions. In international, European and national bodies, the climate issue has been taken into consideration for a long time, from the ICAO to European R&T programs and professional associations in the sector. These organizations and the agreements entered into are detailed in Annex 2.

Yet industry communication on this topic has long been superficial. It has only been a few years since the airline sector clearly displayed this issue as its priority. Previously, there were often ambitious research programs devoted to improving performance, but despite the discourse of the players in the sector which was in line with the political concerns of decarbonization, these improvements were sought above all for an economic reason – a permanent concern. Naturally, we should welcome this convergence between economic concern and ecological concern (what better guarantee for the latter?), but the result has been a communication on decarbonisation that appears superficial and defensive, even, in the eyes of some, offhand. The quest for alternative fuels, for its part, owed above all to the price of oil, and followed the vagaries of it in the short term.

The "targeting" of aviation in the climate field is also recent and has greatly increased in recent years. It is likely that this followed the awakening and crystallization of public opinion, questioning the sector on its desire to reduce and the credibility of its promises even though the latter's posture presented the limits that we have just mentioned.

Admittedly, it could have been tempting to close the file on the reassuring observation (from an economic point of view) of the return of passengers to planes in 2022, after the parenthesis of the health crisis.

But that would be excessively narrowing the field of vision, limiting itself to the short term.

Today, air transport feels blamed to a much greater degree for its contribution to climate change. If there is media or even "sociological" exaggeration, where does it come from?

To claim that aviation is the main or even the only scapegoat for the current climate controversy would be an exaggeration. Other activities, such as the use of the Internet and, in particular, streaming, 5G, SUVs, breeding, etc., are regularly questioned. Air transport players must therefore put this feeling into perspective.

Nevertheless, if we managed to count the media articles and "posts" on social networks, relating to the different sectors of activity, it is very likely that aviation would have a score well above 2.5 % cited above, and even to the share that can be attributed to aviation by integrating the most pessimistic analyses relating to "non-CO<sub>2</sub> effects".

This can be partly explained, on the part of the uninformed public, by a very strong overestimation of this weight. Surveys (for example that carried out by the Pégase Chair of the University of Montpellier (<https://www.montpellier-bs.com/international/news/the-pegase-chair-publishes-its-new-report-air-transport-the-impact-of-covid-19-on-the-behaviour-of-the-french/>, corroborated by others) give on average a spontaneous

estimate of around 10%. This overestimation is certainly a cause of the negative perception of air transport (when it exists), but it is also a consequence.

It may be tempting to cry political manipulation by activists driven by some hidden political agenda. But these ulterior motives would remain without effect if there was not a favourable ground among the "general public". Admittedly, this is very little affected by "flight shaming" (which remains very minor, although noisy); however, he shows a certain attentiveness to the questioning of aviation.

This is why it is necessary to go beyond this observation, which reflects a state of mind.

### 3. Sociological characteristics: an ambivalent perception

We must bear in mind the many contradictions that cross society on the environmental issue. In the same social group, and in the same individual, contradictory perceptions and even more, acts in contradiction with acquired ideas, coexist. The attempts at a subjective explanation that follow do not therefore apply uniformly to all citizens/passengers.

First, the sometimes aggressive questioning of aviation was already occurring, before the arrival of the climate issue. Very early on, noise for people living near airports was the subject of complaints, followed by very significant actions to reduce its effects; we can note the particular visibility of aviation for the public, due to the concentration of aircraft and their activities at the points of departure and arrival (airports), the density of certain air routes, the traffic peaks typically observed at certain hours, the visibility of the aircraft and their perceptible noise at low altitude, the multiple contrails in the sky.

Flying is, for an average citizen, a relatively rare act (compared to driving, eating meat, heating a home, etc.) whose climatic effect is concentrated over time. In a single distant air journey (a single decision, a single act, accomplished in a few hours), a person emits a considerable amount of CO<sub>2</sub> compared to his "carbon budget", while most other emission sources accumulate their effects slowly, through a series of "small acts" each of which seems more harmless. The fact that by making a round trip from Paris to New York, a traveller emits the same order of magnitude of CO<sub>2</sub> as their individual "target" in 2050 (2 tonnes, a figure often put forward, overestimated but whose order of magnitude is not false), strikes the spirits. At a certain standard of living, everyone can judge that it is easier to deprive yourself "just once" of a distant trip than to deprive yourself of streaming "every day". Which is not obvious if we reflect on the relative usefulness of each of the actions, daily or rare, of a citizen (a reflection that will have to be carried out one day...), but it is not a question there of a rational attitude, it is a question of a perception, and still, relatively implicit.

We can also note the psychological effects due to the planetary image of aviation, linked to its "global" range of action, producing a natural magnifying effect of its impact, on the scale of the terrestrial globe. The cartography of flights at instant "t" accessible on Internet sites, etc., are much more visible than the intercontinental journey of VOD electrons and their mass production!

## 4. Isn't air transport a transport for the rich?

Asked in the mid-twentieth century, at the beginning of commercial aviation, the answer would have been unmistakably yes, just like owning a car in the 1920s, a colour TV in 1960 or a refrigerator just after WWII. The world is becoming more democratic, the standard of living is rising, aviation is becoming more and more affordable, imposing new market rules on air transport, but the meaning of words is also changing, the meaning of the word "rich" is no longer the same.

### *a. The world is becoming more democratic, air transport is being reorganized.*

In 1944, 54 countries drafted the Chicago Convention leading to the creation of the ICAO and defining the basic principles of global air transport. The democratization of air transport in the world is initiated, it continues during the following decades, the rise in the standard of living resulting in a growing demand for travel needs. From 1970, air transport evolved towards a liberalization of the market, first in the United States with the Airline Deregulation Act in 1978, then in Europe with the Single European Act 1987/92, new rules which continue to be supplemented permanently.

### *b. Low cost, for whom?*

Low-cost airlines developed around the world from the 1990s, offering unbeatable travel prices. They are now benefiting from the post-covid recovery of air transport, by rising to the level of results of traditional companies, posting, like Air Asia, Ryanair or Wizz Air, exceptional results despite derisory ticket prices, for example a Paris Barcelona barely more than 30€, even if Michael O'Leary, the boss of Ryanair, explains that ticket prices will increase with an average price that would go from 40 to 50 euros! The merits of these "cut prices" can be discussed elsewhere, particularly from an environmental point of view, but it cannot be denied that they have contributed to expanding the customer base of the aircraft. We cannot both claim that people fly too much and that it is reserved for an elite!

Has air transport been democratized and opened to the working classes? The growth of inequalities in society, with strong ruptures in social functioning (pre-existing inequalities, not specific to air transport, but which contribute to giving it an image of an elitist means of transport), does not help to maintain an objective approach.

Some claim, with supporting figures, that social disparities in the use of air transport persist, and that the proportion of workers among passengers, relative to their weight in the general population, is still much lower than that of executives. It is indisputable. But others will answer that the rise of the middle classes is contributing to the growth of air transport, that billions of people, who have never flown, dream of it and will soon achieve the realization of this dream.

Obviously, the income threshold necessary to travel by plane is lower and lower, given the surprisingly advantageous prices of the air transport. The price of consumer goods, be it a car, a television set or any other good, has never stopped falling, making them accessible to the less well-off social classes, the same for a plane ticket, despite (or in

fact, thanks to) constantly developing aeronautical technology and increasingly sophisticated devices.

**c. Aircraft is no more elitist than the train (at least in France).**

For the time being, this analysis is limited to France. Such comparisons will be tried out for other countries, according to the availability of relevant data.

Surveys available on the Internet<sup>1</sup> make it possible to compare the respective users of the plane and the long-distance train in France in terms of socio-professional categories. It emerges that approximately 50% of both concern the upper categories (executives, business leaders, liberal professions, craftsmen) - which represent 20% of the total population: that the "richest" travel more than the "less rich" is obvious, but this is not the prerogative of the plane. All in all, it is wrong to claim that air travel is more elitist than the train. Moreover, the comparison of ticket prices is enough to notice it.

Categories	Long distance train	Air transport
executives, business leaders, liberal professions	51%	50%
Blue and white collars	10%	24%
Students	19%	12%
Retired	13%	10%
Others	7%	4%

**d. Obvious disparities at the global level**

On the other hand, looking at the global level, it is certain that air transport is not, or not yet, a means "accessible to all", and that moreover, the difference is immense between frequent users (and therefore the most CO2 emitters) and the mass of the others. A widespread statistic, repeated from media to media, states that 1% of the world's population (obviously, the richest fraction) is responsible for 50% of air emissions. Checks made<sup>2</sup>, this 1% seems clearly underestimated, which means that the distortion is less than announced. However, it remains large, of course, and it goes without saying that CO2 emissions are not evenly distributed according to social category. But so are many human activities. What is in question is not air transport itself, but the extent of the

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<sup>1</sup> Sources : DGAC, Enquête nationale auprès des passagers du transport aérien 2015-2016 ([https://www.ecologie.gouv.fr/sites/default/files/ENPA\\_2015\\_2016.pdf](https://www.ecologie.gouv.fr/sites/default/files/ENPA_2015_2016.pdf)) ; Th. Le Gouezigou, responsable Pôle Data et Performances TGV chez SNCF ([https://fr.linkedin.com/pulse/le-tgv-est-il-train-des-riches-thomas-le-gouezigou?trk=articles\\_directory](https://fr.linkedin.com/pulse/le-tgv-est-il-train-des-riches-thomas-le-gouezigou?trk=articles_directory))

<sup>2</sup> TMB Aéro, Octobre 2022, cf Annex 3

inequalities, either within a given country, or even more so at the global level, given the differences between nationals of the countries more developed and poorer countries.

Gradually, the respective growth rates show, the growth of air transport accompanies national and regional development. It is both cause and consequence. Logically, its democratization at the global level should follow in turn, following the precedent of the developed countries. But the continuation of this growth at the forecast rates depends, among other things, on the ability of air transport to decarbonise in due time, and in acceptable proportions.

## **5. Favourable prospects but a decarbonization that will take time to fully materialize.**

L'aviation est, en Europe, l'apanage d'acteurs économiques de premier plan aisément identifiables et, comme on l'a vu lors de la crise COVID, soutenus par les Etats. Cela fait de ces acteurs des cibles plus faciles que des activités diffuses, lointaines ou résultant d'importations. On retrouve ce schéma dans le nucléaire et l'énergie, par exemple. En outre, la construction aéronautique et le transport aérien ne sont pas un domaine économique comme les autres, revêtus qu'ils sont, en France et dans d'autres pays d'Europe, du manteau de la fierté nationale (le « pavillon français », etc). Non exempts d'arrogance du fait de leur histoire, ils suscitent en retour des réactions d'envie et d'hostilité.

A l'inverse de nombreuses autres activités, il y a des perspectives de croissance du trafic et donc d'une augmentation de ces fameux 2,5%. Avec volontarisme ses propres acteurs annoncent un triplement du trafic d'ici 2050, qui ne peut laisser indifférent. Or, compte tenu de toutes les incertitudes géopolitiques, énergétiques, sociétales et bien sûr climatiques qui pèsent sur les décennies à venir, dans un contexte où interagissent de multiples facteurs de manière complexe, il serait très présomptueux de s'en tenir à ces hypothèses sans les assortir d'une très grande marge d'erreur. L'optimisme commercial forcé inébranlable des acteurs du transport aérien est peut-être indispensable et réconfortant pour leurs actionnaires mais contribue immanquablement à ce « ciblage ».

En outre, les difficultés très concrètes de l'aviation à se décarboner, puisque l'électrification promise aux transports de surface (et qui les dédouane... un peu vite) lui est interdite à horizon prévisible (sauf niches insignifiantes), et que les autres solutions ne viendront qu'assez lentement, créent un certain scepticisme du public vis-à-vis des promesses qui lui sont faites.

## **6. A runaway... reversible if communication in the sector matures.**

Finally, there is in all this an effect of runaway opinion (of a part of it, rather), which is not irreversible. It is not impossible that in some time, the "climatic" acrimony towards air transport will decline spontaneously, and that the latter, without falling back on vigilance towards it (which it does not ask for!) will be restored in its proper place, no more, no less. And that then, we can work more serenely and more correctly, without show politics, on real solutions.

The dissemination of these, in facts and in communication, can contribute to responding to this media "targeting" of aviation. However, it is important that the objectives (in terms of level and time) of the solutions presented are certainly ambitious but remain within realistic limits. This condition is crucial to avoid another form of racing towards untenable, unkept promises, and a growing loss of credibility of the word of the sector, with a resurgence of the excitement of public opinion. Given the foreseeable real difficulty of the sector in achieving objectives corresponding to the necessarily very high expectations linked to the difficult fight against global warming, it will be all the more important that the response of the aviation sector is accompanied by a value of its major societal contributions. Air transport should not be considered "above ground" (contrary to what one might believe for such an activity!), it is intimately linked to society, responds to its needs and aspirations: it gives it an extended mobility, it irrigates the economy. However, it must also be ready to share as equitably and efficiently as possible the constraints implied by the general decarbonization requirement, such as the requirement for appropriate "sobriety". This holistic approach is and will be essential to achieve optimal global solutions.

# Annex 1: Air transport is included in international climate agreements.

## *a. International institutions and climate change*

Two main organizations are at the heart of the management of climate change and its consequences, at the global level: firstly, the United Nations Framework Convention on Climate Change (UNFCCC), and on the other hand the Intergovernmental Panel on Climate Change (IPCC).

### **United Nations Framework Convention on Climate Change (UNFCCC):**

- The UNFCCC is one of the 3 conventions adopted at the Rio Earth Summit in 1992, along with the Convention on Biological Diversity (CBD) and the Convention to Combat Desertification (CCD). Today its adoption is almost universal with 198 countries called "Parties", which meet annually during the Conference Of the Parties (COP). CNUCC entered into force on March 21, 1994, and is headquartered in Bonn, Germany. It is the first major international cooperation structure, operating within the framework of the UN, to recognize the existence and impacts of climate change. Its goal is "to stabilize greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with the climate system". The UNFCCC and is the parent treaty of the Paris Agreement of 2015 and the Kyoto Protocol of 1997 (ratified in 2005).

- The convention is based on the principles of international law but is not legally binding. However, to strengthen the international response to climate change, the Parties therefore indicate in subsequent agreements (such as the Kyoto Protocol or the Paris Agreement) the common approaches to be developed to achieve the objectives of the UNFCCC. Within these frameworks, Parties are legally bound to emission reduction targets.

### **Intergovernmental Panel on Climate Change (IPCC)**

-The IPCC is an intergovernmental body created in 1988 under the auspices of the World Meteorological Organization (WMO) and the United Nations Environment Programme. Open to all member countries of the United Nations, it now includes 195 States.

-The IPCC's mission is to assess the reality, causes and consequences of ongoing climate change and to synthesize the state of scientific, technical, and socio-economic knowledge available, in a neutral and objective way, to transmit it to decision-makers policies (including the UNFCCC and its members) who use them as information tools.

- Through its assessments, the IPCC determines the state of knowledge on climate change: it identifies where there is agreement within the scientific community on topics related to climate change and where further research is needed, due to existing uncertainties. Reports are written and reviewed in several stages, thus guaranteeing objectivity and transparency. For the Assessment Reports, experts volunteer their time as IPCC authors to assess the thousands of scientific papers published each year to provide a comprehensive summary of what is known about the drivers of climate change, its

impacts and future risks, and how adaptation and mitigation can reduce these risks. Open and transparent review by experts and governments around the world is an essential part of the IPCC process, to ensure an objective and comprehensive assessment and to reflect a wide range of views and expertise. The IPCC does not carry out its own research but is a place of expertise aimed at synthesizing work carried out in laboratories around the world, depending on a specific problem, for which the States, members of the UN, have mandated.

### **Close, exemplary cooperation between the IPCC and the UNFCCC**

-The UNFCCC, based on scientific information, sets targets to stabilize greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with the climate system. These objectives, when they are introduced by a protocol (Kyoto) or an Agreement (Paris) become legally normative. Thus, the Paris agreement clearly indicates the objective of keeping the increase in global temperature "well below" 2°C by 2100 compared to pre-industrial levels and continuing efforts to limit this increase to 1.5°C, recognizing that this would significantly reduce the impacts of climate change. Emissions should be reduced as soon as possible and reach net zero in the second half of the 21st century.

-Based on these objectives and current scientific knowledge, the IPCC has established a global carbon budget that it remains possible to emit to humanity as a whole to remain within the framework of the Paris Agreement objectives. This overall budget depends on the objective to be achieved (1.5°C or 2°C for example), the probability of achieving it (50% or 67% for example) as well as the refined level of estimates. To limit warming to 1.5°C (with a probability of 50%), in view of the CO<sub>2</sub> emissions made since the IPCC's 5th assessment report (AR5) and the special 1.5°C report of 2018 (SR15), the remaining carbon budget is about 300 GtCO<sub>2</sub> higher than the AR5 report, but almost the same as the SR15 report.

-Depending on this global budget, the UNFCCC and its members can decide (or not) to define a specific budget by State or by industrial sector. Unlike the Kyoto Protocol, the Paris Agreement is based on a bottom-up approach which is mainly based on cooperation to encourage all types of actors, public and private, to commit and act in favour of climate. The foundation of this dynamic is based on the search for benefits and co-benefits linked to climate action rather than on sharing the effort to reduce greenhouse gas emissions (specific budget). The agreement sets an overall trajectory, but grants flexibility to the parties to determine their own climate commitments, in the form of Nationally Determined Contributions (NDCs). NDCs describe the national efforts envisaged in terms of mitigation and possibly adaptation, based on their national circumstances.

### ***b. Aviation and international treaties***

Emissions from fuel used for international aviation, commonly referred to as international bunker fuels, have been addressed under the UNFCCC since the first meeting of the COP in 1995. They are therefore not exempted or excluded from the process. COP1 then invited the International Civil Aviation Organization (ICAO) to contribute to the work of the Subsidiary Body for Scientific and Technological Advice (SBSTA), on the allocation and control of emissions from international bunker fuels (Decision 4/CP.1). The Subsidiary

Body for Scientific and Technological Advice, known as SBSTA for its acronym derived from the English name, is one of the two permanent subsidiary bodies of the Convention created by the COP. It supports the work of the COP, the CMP (Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol) and the AMC (Conference of the Parties serving as the meeting of the Parties to the Paris Agreement) providing timely information and advice on scientific and technological matters related to the Convention, its Kyoto Protocol, and the Paris Agreement.

In response to this request, emissions from fuel used for international aviation have been addressed on an ongoing basis under the SBSTA.

In addition, the Kyoto Protocol also called for limiting and reducing greenhouse gas emissions not controlled by the Montreal Protocol from aviation bunker fuels, working through the Organization of International Civil Aviation (ICAO) (Article 2, paragraph 2).

The IPCC Guidelines for the preparation of greenhouse gas (GHG) inventories, the UNFCCC guidelines for the preparation of annual inventory reports for Parties included in Annex I to the Convention (decision 24/CP.19) and the Modalities, Procedures and Guidelines for the Transparency Framework for Action and Support referred to in Article 13 of the Paris Agreement (Decision 18/CMA.1) specify that emissions from the international air transport (also referred to as international bunker fuel emissions) should be calculated as part of Parties' national GHG inventories, but should be excluded from national totals and reported separately.

These emissions are not subject to the limitation and reduction commitments of Annex I Parties under the Convention and the Kyoto Protocol because they are not counted in the national totals. They are, on the other hand, managed by ICAO and are taken into consideration in the specific objectives defined by ICAO, namely an improvement in energy efficiency of 2% per year, carbon neutral growth from 2020 and a Net Zero target in 2050 defined by ICAO Assembly Resolution A41 (October 2022). Thus, ICAO has established a basket of measures aimed at reducing emissions from international aviation. The Carbon Off setting and Reduction Scheme for International Aviation (CORSIA), one of the pillars of this basket of measures, therefore, applies exclusively to emissions from international aviation, those from domestic aviation being dealt with by national accounts and nationally determined contributions, state by state

Relations between the UNFCCC and ICAO are close, particularly between the respective secretariats, and through the ICAO Committee on Aviation Environmental Protection (CAEP), where the UNFCCC sits. like "Observe". The UNFCCC secretariat maintains close relations with the ICAO secretariats. Cooperation between the two organizations is based on an effective and reciprocal exchange of information. Through the SBSTA, the ICAO and IMO secretariats continuously provide reports and information on work relevant to the SBSTA. Special expert meetings are organized to address methodological issues related to the estimation, compilation and reporting of data on GHG emissions from international air transport.

### ***c. Conclusion***

CO<sub>2</sub> emissions from aviation are therefore measured by each member state (party) of the UNFCCC. Emissions relating to domestic flights (including flights between mainland

France and overseas territories and departments) are included and considered in the national accounts and the contributions determined at the national level, submitted by each party to the UNFCCC during the COPs. Emissions related to international flights are accounted for differently, and managed by ICAO for international aviation, which provides this information to the UNFCCC through exchanges between ICAO and the SBSTA, in the framework of cooperation close between ICAO and UNFCCC.

There is therefore no exclusion from these issues but a differentiated management, far from a specific sectoral privilege.

It should be noted that an identical management system exists for international maritime emissions, for which the International Maritime Organization (IMO) plays a role like that of the ICAO for international aviation.

## **Annex 2: Air transport decarbonization coordination bodies**

If we give a brief historical reminder of the gradual taking into account of decarbonization issues by air transport, we can recall a succession of events concerning the taking into account of the general problem of global warming since the UN conference in Stockholm (first "Earth Summit") in 1972, followed by the Rio Earth Summit in 1992, COP1 in Berlin in 1995, the signing of the Kyoto Protocol in 1997 (implemented in 2005), the "Paris Agreement" (COP21) in 2015, to name just a few milestones.

At the same time, the many reference scientific studies carried out at the global level were the subject of very comprehensive reports published periodically by the Intergovernmental Panel on Climate Change (IPCC) (created under the aegis of United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO), in 1988), and its specialized working groups. Between the first report of 1990 and the 6th report of 2022, within the interval several "special reports" devoted to particular subjects. IPCC reports are generally recognized as the most credible sources of information on climate change.

Aviation, although not specifically targeted by the IPCC, was not forgotten by him, who in 1999 published a specific report "Aviation and the global atmosphere", to which many experts in the aviation sector, in particular ICAO, industry, and research. We will recall the close links between the IPCC and the United Nations Framework Convention on Climate Change (UNFCCC), of which it is the main source of scientific information, via the subsidiary body for scientific and technological advice, a permanent body of the UNFCCC known as the Subsidiary Body for Scientific and Technological Advice (SBSTA). At the international level, the links between the aviation sector represented by the ICAO are naturally close with the UNFCCC, the two organizations both depend on the UN, and statutorily, their tasks are well listed and complementary. At the level of the States, or Europe, the links between the aviation sector and global governance also exist, through ministries, various official bodies (including the European Commission, European Union Aviation Safety Agency (EASA), Eurocontrol) and environmental agencies.

This awareness of the climate phenomenon and the associated concerns have thus gradually increased (and non-linearly, with some inevitable clashes and debates) with projects and actions launched at all levels and in all sectors to fight against climate change. global warming.

This rise in environmental and climatic concerns has been reflected in research activities in Europe since Framework Program No. 2 (1987-1991, dealing with earth and environmental sciences, up to the HORIZON 2020 program (2014-2020), with dedicated activities, passing through the framework program n°5 (1998-2002), with activities on energy, the environment and sustainable development. towards these issues, in application of major European action plans: Green Pact ("Green Deal"), "FIT for 55 package" (European law targeting a 55% reduction in greenhouse gases by 2030, "Single Basic Act" (to ensure the consistency of the "Joint Undertakings"), "Clean Hydrogen Partnership". Aviation is not to be outdone, with the "Strategic Research and Innovation Agenda", Advisory Council on Aeronautics Research in Europe (ACARE) and

the 2020 vision (in 2000/ 2001), Flightpath 2050 (2012), the successive SESAR programs (which have aims in part i.e. environmental, through operations), Clean Sky 1 (2008-2014), Clean Sky 2 (2014-2023), then Clean Aviation (2022-2030), with budgets increasing sharply from one program to the next, as both for global research on climate change and for research dedicated to the aviation sector.

In Europe again, we can recall the common vision and the long-term roadmap ("Destination 2050") adopted by the industry in February 2021, supplemented by the creation of the "Aviation Climate Taskforce" (ACT) coalition, aiming the short and medium term (including sustainable fuels and hydrogen). Finally, during the Aviation Summit, in February 2022, the Toulouse Declaration for the carbon neutrality of air transport by 2050 was adopted by the 27 members of the European Union, 10 ECAC states and many stakeholders of the civil aviation industry. This was a step towards the adoption of the ICAO LTAG objectives (see below). In June 2022, the European Alliance for Zero-Emission Aviation, or AZEA, a voluntary initiative of public and private partners, was created.

The partners, which include many players from industry and research, the European Commission, EASA, Clean Aviation, SESAR, etc., share the objective of preparing the future commercialization of "zero emissions" hydrogen or electrical. The Alliance aims to identify and prioritize the difficulties inherent to the adaptation of infrastructures and economic actors. It is open to all players in the sector. The objective of the alliance is consistent with the ambition of the Toulouse Declaration.

At the French level, concerning the environment and sustainable development, in a scope not limited to research, we can cite the role of the DGAC, GIFAS, 3AF and the actions of the Council for Civil Aeronautical Research (CORAC) in France, the creation of the Sustainable Aviation Observatory (OAD), in 2021, and for the global question, the creation of the High Council for Climate (HCC) in 2018.

At the level of research and in the aeronautical sector, we observe in the USA similar trends to those existing in Europe, with a strong involvement of FAA (PARTNER Center of Excellence on the environment launched in the early 2000s, today now replaced by others, including one on sustainable fuels), NASA and several universities and specialized laboratories. In any case, the USA strongly supporting the ICAO, which has a role of regulation/strategic standardization, the FAA is, in fact, engaged in actions aimed at reducing the contribution of the sector to global warming, in particular concerning fuels durable for aviation.

For the aviation sector, we can also cite the work based on the principle of carbon offsetting, inspired by the mechanisms of the Tokyo Protocol, work that took many years between the successive phases of design, development, negotiation, and implementation. work, often laborious, and always subject to reluctance on the part of certain actors and countries:

- Integration of aviation into the European carbon dioxide Emission Trading (ETS).
- Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) emission compensation system instituted by the ICAO at the international level.

- At the European level, the ECAC, which is very closely linked to the ICAO, counts the environment among its main missions.

The evolution of ICAO's own activities, in relation to the UNFCCC, as mentioned above - gives a good overview of the continuous progression of the importance taken by (given to) the reduction of impact of aviation on global warming: the activities of the CAEP environment committee were originally focused on noise, the major environmental problem from the very beginning of aviation (nuisance for people living near airports), but from the CAEP/6 cycle (2001-2004), activities intensified on gaseous emissions (mainly at low altitude, in connection with air quality problems), and from the CAEP/8 cycle (2007-2010), we are specifically interested in CO<sub>2</sub> emissions, with a view to a standard, as well as trade-offs between noise, NO<sub>x</sub> and CO<sub>2</sub>.

A CO<sub>2</sub> standard for aircraft will be introduced by the ICAO in 2016 (CAEP/10), after a long period of in-depth studies and negotiations.

Integrated environmental technological objectives (noise, CO<sub>2</sub>, and NO<sub>x</sub>) in the medium and long term, taking into account environmental trade-offs, are the subject of a report (Independent Expert Integrated Technology Goals Assessment and Review for Engines and Aircraft (OACI – Doc 10127 – 2019) resulting from a study carried out mainly in 2017 and 2018,) drawn up at the request of CAEP (report presented and approved at the CAEP/11 meeting in 2019, then endorsed at the 40th session of the ICAO Assembly).

In conjunction with the CAEP activities and the ICAO Assemblies, environmental subjects have taken on specific importance in the first decade of the 21st century, at the level of IATA, which has created a dedicated site [www.enviro.aero](http://www.enviro.aero) and institutes periodic world summits held in Geneva. In 2008, at the instigation of IATA, ATAG (Air transport Action Group) was created, bringing together all the players in the civil aeronautics industry. ATAG takes over from periodic global summits and, in 2021, publishes a benchmark report setting out ambitious commitments for 2050 (see "Waypoint 2050" report).

Note the continuity that exists between the first objectives for the aviation sector announced by IATA, the industry at European or international level (via ATAG) and ICAO, and the current objectives, each time requesting the same four levers of action priorities: 1) aviation technologies (aircraft and engines), 2) optimized operations (ground and flight), 3) sustainable fuels for aviation and 4) economic measures (CO<sub>2</sub> offsetting). The ICAO Long Term Aspirational Goals (LTAG) consider the same instruments in 2022 (CAEP/12 and Assembly Session 41), as do most of the roadmaps produced by various organizations in Europe and internationally over the past two decades, right up to the present day. However, the level of ambition has increased significantly over time, in response to general concerns related to climate change, and obviously, the perspectives and issues have continued to evolve.

In general, most of the activities on subjects concerning aviation and its environmental impacts involve, at European or international level, the same actors, often represented, in part, by the same people, with multiple interactions, substantial technical work and negotiations spread out over time, which accentuates the character of overall continuity, regardless of the fact that the subject is gaining momentum and that the studies and roadmaps emanating from various organizations are proliferating, with variations in analysis and figures.

In all these activities, some of the member countries, as well as NGOs, officially represented via members or observers, take part in the debates, in the context of CAEP working groups or within ICAO (Council and Assembly) and in other instances, where they display positions implying a significantly higher level of requirement compared to the other actors, towards aviation.

## **Annex 3 “Only 1% of people are responsible for 50% of global aviation emissions”.**

*Perception biases depending on the way of presenting statistical information:*

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<http://id-aero.com/page-accueil.php>

### **With the authorization of its Director Jacques Delys**

*For some time now, we have seen the expression “Only 1% of people are responsible for 50% of global aviation emissions” flourish. This expression has been taken up, without any nuance, by almost all the media. For example, the daily French 20 Minutes asks the right questions: “But where does this data come from and is it reliable?” 20 Minutes answers the first question: “This data was indeed revealed (Editor’s note: it would be a secret) in a report published in May 2021 by the European NGO Transport and environment. (...) the statistic is taken from an earlier study, published in November 2020 in an issue of Global Environmental Change”. But the daily does not answer the second question. The fact that this statistic is disseminated by the NGO Transport and Environment is clearly enough to ensure the credibility of the statement. Even the French Agence de l’environnement et de la maîtrise de l’énergie (ADEME) takes up the information in its recent computer graphics as a truth, a nice slogan, but simplistic and misleading: “Besides, the increase in the use of aircraft in France is not necessarily linked to a phenomenon of democratization, but rather to the intensification of the use of this mode of transport by the wealthiest classes.*

*According to the data from the study below, from which the formula is derived:*

- aviation activities accounted for 2.4% of total global anthropogenic CO<sub>2</sub>,*
- commercial (passenger) and private (general aviation including business aviation, helicopters) flights account for 71% +4% = 75% of aviation emissions.*
- 50% x 2.4% x 75% = 0.9% of total global anthropogenic CO<sub>2</sub>.*

### *Origin of expression 1% to 50%*

*The statistic comes from an academic study: “The global scale, distribution and growth of aviation: Implications for climate change” by Stefan Gossling and Andreas Humpe) published in November 2020.*

<https://www.sciencedirect.com/science/article/pii/S0959378020307779>

*In the abstract, the authors of the study highlight the following result: “The percentile of the most frequent travellers - at most 1% of the world’s population - probably accounts for more than half of the total emissions of passenger air transport. “Some countries and individuals contribute disproportionately to climate change from air travel.”*

*The authors consider that the average emissions per capita of a country do not consider the differences in emissions per capita within each country. According to them, the*

principles of distribution of responsibilities should be based on individuals ("the big emitters") rather than nations.

Some statistical results of the study. In 2018 (Editor's note: latest statistics available in 2020), aviation activities accounted for 2.4% of global CO<sub>2</sub> emissions, broken down as follows: commercial aviation (passengers) 71%; commercial aviation (freight) 17%; military aviation 8%, private aviation (general aviation including business aviation, helicopters) 4%. 11.1% of the world's population took the plane in 2018. The authors highlight different types of travellers, including frequent travellers (6 return flights and more during the year).

The art of presenting statistical information... depending on what you want to demonstrate.

By way of demonstration, we take the statement as it is. Next, we will examine the reliability of the statistic. The authors arrive after many calculations at the result:

*10% of travellers to 50% of global air transport CO<sub>2</sub> emissions*

But as the expression is not punchy enough, does not sufficiently demonstrate the unequal aspect of air transport, they introduce the world population. This reduces the first term from 10% to 1%. Obviously, the goal is to get the smallest possible number to the left of the arrow and the largest possible number to the right.

*1% world population to 50% of global CO<sub>2</sub> emissions from air transport*

According to the study, 100% travellers = 11.1% of the world population = approximately 845 million inhabitants

Here are 4 ways to present this same information.

- *10% of travellers to 50% of global air transport CO<sub>2</sub> emissions*
- *1% of the world's population to 50% of the world's CO<sub>2</sub> emissions from air transport*
- *85 million people at 50% of global CO<sub>2</sub> emissions from air transport*
- *1% world population to less than 1% of global and total CO<sub>2</sub> emissions*

Which one to choose?

- ☒ *For a "scientific" university study, it would have been desirable to present all the information under the 4 facets.*
- ☒ *For the well-established Transport and Environment NGO, the militant objective takes precedence over a complete presentation of information.*
- ☒ *And for the media, it would have been useful to push the investigations further instead of disseminating and repeating the information as it is, without critical thinking.*

The reliability of the expression 1% to 50%

We will examine the 4 main assumptions of the demonstration of the study.

- 10% of travellers (the most frequent) carry out 40% of flights.
- Premium seats represent 15% of seats.
- Premium class passengers require on average 5 times more energy than an economy class passenger.
- The 15% of premium seats are occupied by the 10% of the most frequent travellers.

1. 10% of travellers (the most frequent) carry out 40% of flights.

Travelers can be segmented into 3 groups: occasional, regular, and frequent. The study refers to 5 surveys in different countries (UK, USA, and Germany) and two airports (Gothenburg and San Francisco). "Surveys suggest that among commercial air travellers, the top 10% of travellers may account for 30-50% of all flights flown. Graph 7 of the study which represents the distribution % travellers/% flights indicates that the amplitude for the 10% most frequent travellers is from 28% to 45%, retaining 40% is not a conservative estimate, **but the high end of the range, the average of the 5 references is 33% and not 40%**

Based on the elements provided by the study, we can conclude that 10% of the most frequent travellers make 1/3 of the flights. Therefore, hypothesis 1 is overstated and erroneous in view of the data presented.

2. Premium seats (First + Business) represent 15% of seats.

The authors of the study use the Singapore Airlines A380 cabin configuration to estimate the global share of premium class seats at 15%.

This estimate calls for two reservations: it does not correspond to the estimates of the profession, it mixes up and confuses premium share on the international market and premium share on the domestic market. IATA indicates that internationally, the premium class (First + Business) represents 8% of RPKs in 2019, 2021 and 2022. For its part, Air France assesses the share of its high contribution customers (First + Business + Economy premium) to 10% of its traffic, knowing that the scope also includes Economy premium. On the domestic market, the share of premium is much lower, because on many domestic flights, there is no First or Business class. **If we distinguish between international traffic and domestic traffic, by applying different coefficients (8% on international and 5% on domestic) we end up with a share of premium traffic between 6% and 7%.**

Hypothesis 2 of taking 15% as a share of premium class on all seats offered or occupied (domestic and international traffic) is clearly overestimated.

3. Premium class passengers require on average 5 times more energy than an economy class passenger.

The study takes the area as a comparison element between the energy expended to transport a premium class seat compared to the energy expended to transport an economy class seat. According to this approach, the business and first classes emit more than the economy classes, which is indisputable. But the consumption is related to the

mass and not to the surface of the floor; the element of comparison between premium seat vs economy seat must be the mass. We carried out a comparison on the A380, the program chosen by the study to calculate the coefficient 5. Comparison which shows that the coefficient calculated by the mass is lower by about 25% than the estimate by the surface.

- Surface area: 2.3 m<sup>2</sup> in business class with insulated chair-bed versus 0.8\*0.45 or 0.36 m<sup>2</sup> in economy class. Let a coefficient of  $2.3/0.36=6.4$
- Mass: 2,170 kg in business or first vs 440 kg in economy class. That is a coefficient of 4.9.

Proof by absurd: If in a plane, we remove 5 economy seats and replace them with a premium seat, what is the result: less CO<sub>2</sub> in total (the mass of 4 passengers less), and more revenue for the airline.

**Corrected for this bias, the coefficient of 5 chosen by the study drops to 3.75. But it is necessary to make a second correction: on the domestic market, the surface area difference multiple between a premium seat and an economy seat is very far from 5 and is closer to 2.**

In the end, the coefficient is closer to 3 than to 5, therefore false or overvalued.

4. The 15% of premium seats are occupied by the 10% of the most frequent travellers.

“Assuming (Editor’s note: underlined by ID AERO) in addition, in a conservative way, that the 10% of the most frequent travellers take 40% of all flights, including all those available in premium classes. (Study excerpt) This hypothesis is therefore an assumption that is not based on any data. There is no indication that the premium classes (First + Business) are 100% occupied by the most frequent travellers and not by occasional or regular travellers. The only explanation lies in the desire to load the boat.

#### Conclusion on the main hypotheses of the demonstration

We have demonstrated that the main hypotheses that aim to demonstrate that 1% population ---> 50% of CO<sub>2</sub> emissions from air transport are erroneous, fragile, overestimated, or false.

**The expression 1% world population ---> 50% of CO<sub>2</sub> emissions from air transport is therefore false.**

**In conclusion, the only rigorous formula that can be deduced from this avalanche of figures is: 7% of seats (First+Business) ---> 18.5% of global CO<sub>2</sub> emissions from air transport**

$$18.5\% = 21/114 \quad 21 = 3 \times 7 \quad 93 = 1 \times 93 \quad 114 = 21 + 93$$

#### A constant of all these studies: denying the dynamics of democratization of global air transport

As the objective of the study is to highlight inequalities, all aspects of air transport are only treated from this angle. In their desire to demonstrate that the distribution of air

*transport is skewed in favour of a limited number of travellers, the authors manage to deny the dynamics of democratization of air transport.*

*Thus, on the current situation, the authors mainly retain the inequalities between regions, between countries (according to income), between categories of individuals ("the large proportion of the population in all countries who do not take the plane", the significant share of the most frequent travellers.)*

*When they analyse future forecasts, they believe that "differences in individual air travel needs will become even more pronounced in the future. "*

*They find that the share of Asia/Pacific will increase, but this is only to better highlight that Africa "which represents 25% of the world's population, will only represent 2.4% of the world's transport demand. air. »*

*They do not in any way analyse the economic and social utility of air transport, the nature of the need for language distance transport.*



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