

# WILL “SOBRIETY” PREVAIL IN AIR TRANSPORT – AND IN WHAT FORM?

March 2023



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**MARCH 2023**

This paper, written in the framework of the “energy and environment” committee of the Air and Space Academy, is not an official document of the Academy, but the result of a common writing coordinated by Eric Dautriat with the contribution and the agreement of the following members: Pierre Andribet, Philippe Forestier, Jean-Michel Fourtanier, Jean-Marc Garot, Alain Joselzon, Michel Wachenheim.

# Table of contents

Summary.....	4
1. Sobriety deals with uses and behaviours .....	6
2. A societal choice, or a consequence of the limits of technical responses to global warming.....	8
A choice of society .....	8
A consequence of technical limitations.....	9
3. Recent and short-term prescriptions, with an uncertain future.....	10
4. Voluntary sobriety, regulated, imposed by the offer .....	11
5. Mainly a European concern, diversely shared in the United States, absent in China 13	
6. A component of sustainable development .....	15
7. Despite the fuzzyness of the words, sobriety is not decrease .....	16
8. From business trips to tourism, different evolutions are plausible .....	18
9. A thirst for flying that counteracts the “shame of flying » .....	21
10. Flying is still a cultural marker .....	22
11. For the decarbonisation of air transport, a measure of sobriety may well be necessary.....	24
12. Carbon offsets are not in competition with sobriety .....	25
13. Differentiated energy efficiency in transitional phase? .....	27

## Summary

To talk about possible sobriety as far as air transport is concerned, it is essential to address it in a global context.

Sobriety is a fuzzy concept, which we must distinguish from energy efficiency, even if they are linked: the first deals with behaviour and uses, the second with technical and operational solutions (thus for aviation: performance improvement, alternative fuels, flight optimization).

The first is more complex and more controversial than the second; it can induce untimely collateral effects; it calls into question acquired lifestyles and the true definition of "real needs". It can result from two opposite but converging approaches: on one hand, a societal choice that would aim at slowing down the runaway consumption of recent decades; on the other, a complementary response to decarbonization, insofar as energy efficiency and carbon absorption solutions (notably in the form of offsets, for air transport) will not be sufficient within the target timeframe.

It can be voluntary, even spontaneous, very individual or, on the contrary, organized at society level; it may be constrained by a restricted supply or by rising prices; it may or may not be the subject of incentives from the public authorities, which are also responsible for putting in place the optimal conditions for it to occur. For air transport, all these modes can coexist; apart from a change in behaviour which is likely to be quite marginal, at least in the beginning. What seems most likely is "sobriety", if we can still call it that, induced quite simply by an increase in tickets prices resulting from the use of alternative fuels.

The debate on sobriety, strongly amplified in short term and, lately, by the geopolitical energy crisis, is essentially European. About air transport, which is essentially global, this is a very serious inconvenience. However, this situation, perhaps temporary, cannot be enough to prohibit reflection on a model of society and a model of transport that are truly European: air transport is not an activity "above soil" (if one dares to say). In particular, the development of virtual relationships has an impact on the frequency of professional flights, and tourism is experiencing the beginnings of challenges in its current form – although the return to normal post-pandemic life shows a thirst for travel to quench, and that long-distance travel, the prerogative of the aircraft, is in any event a civilizational fact that should be preserved and whose beneficial societal effects must be measured.

Sobriety is linked to two other concepts that fuel the ecological and social debate: sustainable development, of which it is, basically, a component; and "decrease", a notion variously used and therefore tending to lead to misunderstandings. It is important to clearly distinguish this notion from the first concept – even if partial, targeted, thematic "decreases" can accompany it.

One might be tempted to think that between energy efficiency, particularly in air transport, and sobriety, the second is by far the fastest to implement. In short, it would only have to be decided. This is surely simplistic and misleading. Voluntary changes will most likely be gradual. The introduction of constraints, undesirable, would require, as seen on several occasions, a minimum of social consensus. It is not acquired today, particularly for air transport, despite certain militant positions. Sobriety cannot replace

the “technical” search for efficiency, which is even the most urgent and ardent obligation. However, we can imagine a combination of the two, for example if the gradual arrival of increasingly carbon-free flights made it possible to satisfy, at a higher price, the desire for sobriety of some users.

It is of utmost importance to get rid of postures and preconceptions on both sides. Aviation bashing is unfair and ridiculous; conversely, the technician and conservative refusal to question the energy voracity of contemporary societies, including aviation (in its rightful place, no more, no less) is a dead end. Between drunkenness and sobriety, one must choose; conversely, sobriety and efficiency are not rivals but complementary, at dosages that no one can yet predict. It is a great and noble subject of public debate, a political subject if ever there was one

# 1. Sobriety deals with uses and behaviours

Talking about sobriety for air transport would make absolutely no sense without placing this notion in a general framework.

However, sobriety is an often fuzzy notion, the definition of which must be clarified.

Energy sobriety is the reduction of energy consumption through lifestyle changes and social transformations. This political concept is reflected by the limitation, to a sufficient level, of goods and services, produced and consumed. Focused on the behaviours, organization and structure of society, energy sobriety differs from other energy transition approaches by its non-technical approach. Its confusion with energy efficiency remains frequent

We immediately see the difficulty: what is the "sufficient level" of goods and services? And then another: this sobriety is only mentioned, for the moment, in Europe, with some exceptions (see 5).

Sobriety deals with the uses and behaviours, and what can affect them, while energy efficiency concerns mean. The two are associated and intertwined: thus, the replacement of a heating oil by a heat pump can modify the uses of peak hours / off-peak hours, even more with the intermittency of renewable energies. But this overlapping is not a reason to evacuate "basic" sobriety, which, in this same case, would consist in reducing the interior temperature.

Sobriety can take different forms (see 5), spontaneous or regulated. It can be above all a matter of state of mind, at the individual or collective level (including the organization that recommends or manages it) (see.13).

Its implementation is a priori more difficult and controversial than energy efficiency, on which it seems easier to agree. Sobriety, on the other hand, involves psychological and sociological factors where perception, the signifiers of the symbolic order take on a singular importance. It evokes for some the restrictions of wartime, for others it is an insult to the human creative genius which is said to be able to get us out of any situation, or to the all-powerful technology, or to the very essence of the liberal model of society based on economic growth. The caricatures are not far away. Between the mirage of abundance and the apprehension of scarcity, the concept of sobriety awakens the opposition between malthusian and expansionist points of view. In the field of air transport, reactions focus around "private jets" perceived as symbols of waste and the vision of air transport perceived as a mode of transport "monopolized by a class of rich people". We will return to some of these points elsewhere, as well as to the possible links and differences between sobriety and degrowth. But it will be necessary to consider, to go further, the existence of prejudices, which often manifest themselves by epidermal reactions, and to preserve ourselves from them.

The fact remains that within the framework of voluntary or imposed sobriety, limiting such and such an activity deemed to be "CO2 emitter" can indeed have collateral, "perverse" or at least unforeseen effects, which can lead to the growth of another substitute activity, which will be "worse". Giving up on proper heating would lead to an explosion in health care costs in winter... Admittedly, this example is caricatural and

simplistic, but other unexpected pitfalls exist in many seemingly clear decisions. We must also be wary of appearances; deciding to travel, alone, from Lyon to Milan by car, believing that it is doing the right thing by avoiding the plane, increases CO2 emissions. Etc... In particular, the emissions balances very often forget the upstream part of the value chain that led to the use of a particular product or service.

In addition, it is important not to limit the issue of sobriety to activities that directly emit CO2. It is energy sobriety in general that must be considered, insofar as the main obstacle to reducing the causes of the greenhouse effect will reside in the difficulty of producing carbon-free energy in the quantities required. There is therefore a communicating vessels effect between all "energy-intensive" human activities. It may be much more socially and economically relevant to reduce a "low-carbon" activity because it already uses relatively "green" electricity, but with low social utility, than to attack an activity that certainly emits CO2 today, but capable of being decarbonized later (and relatively quickly).

In the field of global warming, most subjects are complex. Again, this is not a reason to deduce that it is better not to touch anything. It follows that a global, "holistic" vision is essential, making this approach to sobriety an eminently political question, the most political of all, in the best sense of the term, that of the debate within the city.

It goes without saying that, if there is a need for energy sobriety, it concerns the whole world. But not necessarily simultaneously, and perhaps with differences in application, even more knowing the positions of certain emerging countries... or emerging ones.

Air travel can be affected by sobriety like any other activity. He is particularly questioned on this subject, for objective and subjective reasons that we will discuss elsewhere. We will address it in what follows "for itself", with its own internal objectives, while bearing in mind that another approach would have been possible: rather than decarbonization (integrating energy efficiency, sobriety and offsets) sectoral, in silo, a global vision that would have taken into account the respective socio-economic utility of each type of activity, the relative ease of decarbonizing, etc. in order to deduce differentiated objectives, in the name of optimal overall efficiency. But it seems to us that this approach is currently coming up against the commitments already made by all the players placed in a uniform sectoral logic.

Sobriety in the air sector will therefore, by definition, consist in reducing in certain cases, in certain circumstances, for certain purposes, the use of air transport. We can also, for a small part of air transport, speak of the substitution of other means of transport, typically the train rather than the plane (whatever the reservations that we may have on the often very incomplete respective balance sheets ). But this reduction, which should not necessarily be assimilated to an overall decrease, questions the purposes of the trip itself more than the use of the plane. This is most often, in the heart of its use, non-substitutable. We must keep this in mind: the meaning of sobriety in the airline sector lies in travel.

We will not go further here in this attempt at definition. At this stage everything remains to be clarified. What cases, what circumstances, what goals, what journeys?

## 2. A societal choice, or a consequence of the limits of technical responses to global warming

### *A choice of society*

There are two ways of looking at sobriety, not contradictory in their rationale but inverse in their logical progression.

On the one hand, sobriety can be seen as a philosophical choice, made a priori, considering that excessive consumption makes humanity lose its bearings and its common sense, that the degradation of the environment ends up causing an unsurprising alarm bell and that it is time to rethink the world we want to live in by trying to define "what we really need and what we will need in the future". This is the whole debate of sustainable development, a somewhat forgotten concept these days, and yet fruitful, to which we will return later (6). It is true that the word "development" is itself subject to questioning.

Still, the notion of "real needs", very natural and often raised, is difficult. This is an individual and subjective question. It can only remain so unless it enters an authoritarian world. A certain level of consensus can however emerge from the public debate, up to a certain point, or at least, an evolution of what are "reasonably" considered to be needs, and what are superficial desires maintained by the zeitgeist. Conversely, we must be careful not to retain as "justified uses" only those which would fall under "fundamental needs", our society having, fortunately no doubt, moved away from this strictly necessary.

An individual and moral, even moralistic approach, well in tune with the times, is developing, accompanied by a new "good environmental conscience". In each individual, to varying degrees, this background of good conscience clashes with daily needs and/or desires, which often have the last word... We can therefore anticipate that voluntary sobriety, which is based on sense of individual responsibility, will have limited effectiveness, and that it will be wiser to rely on public responsibility and collective action, whether at the political, technical or industrial level. In any case, "Doing one's part", the 2019 study by the French Consulting company Carbone <https://www.carbone4.com/f>, indicates that only 20% of "target" decarbonization (2 tonnes per person by 2050) is a matter of individual choice.

Beyond individual behavior, in fact, the responsibility of companies is particularly significant, given their weight in the economy. Here again, we should make a clear distinction between sobriety and energy efficiency (a favorite area of business action). In terms of sobriety stricto sensu (according to our definition), that is to say the use of "energy-intensive" means, companies also have a role to play. In the field of aviation, the eventual moderation of business travel is largely in their hands. But a thousand other examples can be cited, for example excessive night lighting, ubiquitous advertising, the organization of mass tourism, food waste, or planned obsolescence. Sobriety has this advantage over its "sister" efficiency, that it does not require long technical efforts to be implemented...



Aviation will not remain insensitive to this movement. If a practice of limiting heating is adopted, If the use of the individual vehicle is really called into question, it is difficult to consider that this will have no impact on "travel consumption". Of course, this will also depend on the incentives, a point discussed later.

### *A consequence of technical limitations*

On the other hand, a more factual, "bottom-up" approach consists first in identifying the plausible technical limits of decarbonization at a given time: in particular the future availability of green primary energy; reasonable investment capacity; the land area that can be dedicated to energy production; etc. We can then be led to deduce, if necessary, that these capacities will not meet the need within the necessary deadlines (because the question of the deadline is essential) and that, consequently, it is necessary to complete the technical solutions (in the broad sense: technological, organizational, operational, etc.) by "a dose of sobriety" of variable magnitude in amplitude and duration. It should be noted that this makes the question of the realism of uniform objectives by sector more critical to achieve global optimized solutions.

This approach applies to air transport if we consider that the technical means relating to energy efficiency, which will allow its decarbonization, are not available today, and will only be partially available in the short term (see 8).

Another parameter relates to compensations, of different natures. These are often disputed in their measurability and robustness; they are only considered, moreover, as complements to "clean" decarbonization efforts. It is unthinkable to leave too much of the way to compensations (cf. 9). Therefore, the question of air sobriety is likely to arise for the next two or three decades.

This approach obviously presupposes rejecting a sort of widespread magical thought, no doubt more among the "elites" than elsewhere: the idea that technology will always end up "saving us" knowing that each year, the God Helios dispenses to the planet about twenty times the energy consumed today by humanity. Certainly! Maybe someday. There is also fusion, etc. But this is to discount the climate emergency, which no one, on the other hand, rejects. The following maxim is attributed to Albert Einstein: "We cannot solve our problems with the same thought we had when we created them. »

This need for sobriety "deduced from forecasts" is seen by some as an action to reduce risks, so great are the uncertainties relating to technical and industrial decarbonization capacities. The priority to be given to the fight against climate change is not debatable. However, it does not mean "exclusive attention" and other risks exist, such as those induced by a strong loss of economic activity. In the case of aviation, these perhaps do not concern air transport itself so much as the activities for which it is the condition, in particular international tourism – itself subject to almost existential questioning (see 9).

### **3. Recent and short-term prescriptions, with an uncertain future**

The notion of sobriety has long been reserved for certain ecological circles synonymous with the rejection of the “consumer society”; it has entered the debate on climate change to the point of being one of the solutions recommended by the Intergovernmental Panel on Climate Change (IPCC).

But the energy crisis linked, among other things, to the war in Ukraine and the resulting geopolitical situation has caused its sudden emergence, in all directions. The media have all taken it up, governments and the European Commission are promising plans, certain quantified targets for reducing energy consumption are circulating. And of course, the more we talk about it, the less we know what it is.

However, it is difficult to predict the future of this “slogan”. The sobriety invoked may be only a posture. It can be limited to a second-generation “waste hunt”. It can be used to mask political impotence. It can target companies or individuals, or both (probably). It can also become a form of “green washing”. Or, on the contrary, it can initiate a real reflection on current lifestyles and initiate a cultural, even civilizational evolution, by transforming the current bout of fever into more thoughtful perennial attitudes. Both tendencies are possible and will undoubtedly coexist.

It also remains that this fever mainly concerns Europe, for the moment, for obvious geostrategic reasons.

It will be necessary to assess almost month by month how this “sobriety” develops, what criticism it arouses, and what consequences it can have on air transport, which is also facing its own decarbonization problem.

## 4. Voluntary sobriety, regulated, imposed by the offer

Sobriety can take very different forms:

- It can be spontaneous
- It can respond to information and persuasion campaigns
- It can be constrained by a kind of rationing
- It may come, not from demand (which is the case of the forms above) but from a restriction of supply, itself spontaneous or imposed by law or regulation
- It can result from a price increase or simply from economic difficulties of households.

Some of the promoters of sobriety are content to invite all-out moderation, emphasizing activities known to be high emitters: eating less meat, driving slower, not taking your car in town, buying less clothes, heat less... fly less. In this case, it is a progressive evolution, but which could be rapid, of mentalities, by a progressive change of culture. Thus, in the case of air transport, freely renouncing certain journeys by reflecting on their real usefulness, or even replacing two weekends in two different places with a week in one; etc. Opinions differ on the likelihood of seeing this spontaneous or encouraged sobriety reach a significant level; the effectiveness of voluntary sobriety alone is questionable, and the encouragement / incentive effect remains to be confirmed. In this case, the industrial sector (the aviation sector) is not the main player. It can participate in disseminating information, requesting the preferential implementation of certain incentive measures this is already a lot on a symbolic and political level. , it is a question of demonstrating that the leaders of the sector are not situated in an approach of "always more".

Still in this hypothesis, the expected role of the public authorities is then, at least, on the one hand to propose objectives (such as 19°C for apartments), to provide the means for these changes (the most obvious concerns the availability of efficient and pleasant public transport).

A sobriety constrained by rationing? The suggestion of individual CO<sub>2</sub> emission quotas exists here and there among NGOs, in a minority. We cannot agree with such an approach, of which we can imagine only too well into what excesses and what "world" it would lead our civilisation, each "gesture" having to be measured in terms of CO<sub>2</sub> emissions, listed, registered maybe on a "CO<sub>2</sub> pass"...

Sobriety can also be a matter of individual economic choicessome voluntarily drive more slowly because they save fuel. (Will they be followed or not, that is the question.)

Some organizations offer quantified scenarios. (Thus the French Agence de la transition écologique ADEME <https://www.ademe.fr/> (by taking only non-air examples): reduce the surface area of new housing by 30%, divide our meat consumption by 3, reduce the km traveled by 26%, etc.) But isn't it contradictory to rely on popular wisdom (to be built) to change behavior, and to set quantified objectives (generally not argued)?

To the trust placed in citizens, individually or collectively, to move in the direction of sobriety by changing their state of mind and practices, i.e. to a policy of "sober

demand" opposes another possibility, that of acting on the offer. It is an "authoritarian" action or one that can be "subjected to", as could be the case, in the field of energy supply (if a shortage leads to power cuts). Applied to aviation, a "sober supply" policy, if you can call it that, can be devised; it even already exists by refusing the construction of new airports by refusing the extension of the existing one (Terminal of Charles de Gaulle airport), by limiting, or reducing, the number of slots available (Schiphol from 2023). Admittedly, the fundamentally global nature of aviation makes such measures rather complicated. It is difficult to authoritatively reduce the traffic of European airports without worrying about the traffic of their "counterparts" in the United States or China. But this is already being done... on a moderate scale for the moment.

The restrictions already imposed stem from the real or supposed situation of public opinion, encouraged by very active activists. It is above all a matter of symbolism. Other infrastructures are victims of the same disavowal (even the fast train lines).

Raising prices is another way of supply-side restriction. The price elasticity of air transport is not very easy to determine; experience shows that it fluctuates according to the situation; anyway, the value taken into account by the FNAM (French Fédération nationale de l'Aviation et de ses Métiers) is 0.8: a 1% increase in the price of the ticket would cause a drop of 0.8% the number of passengers. Two main reasons can cause prices to increase significantly: carbon taxation and the massive, albeit gradual, switch to synthetic fuels (the two can be combined). This second source is the most interesting, because it is almost certain that it will happen. If the SAF are two to three times more expensive than fossil kerosene, on the end, this still represents an increase of around 30% of the price of the ticket (of which the fuel does not constitute obviously only a part). The resulting drop in traffic would then be of the order of what the most "firm" activists of air sobriety would like.

This is not a very satisfactory conclusion: sobriety in the air would thus be obtained by a lessening of the democratization which has been that of air transport (whatever one may say) in the past decades, and a reduction in access to distant travel, the importance of which for civilization cannot be overstated. But that is the most likely way...

## 5. **Mainly a European concern, diversely shared in the United States, absent in China**

France (well representative of the European Union average) consumed 37 MWh per person in 2021, the United States 73, China 28, Congo 5.

Clearly it would be indecent to preach sobriety to Africans (on average). But also, that the question is posed first and foremost to the Americans, and that China, on the rise, is not far from the level of Europe; it would therefore be just as logical for the Middle Kingdom to take an interest in it.

The United States offers an ambiguous image. On the one hand, it was in this country that the first ecological thinkers arose; climate research efforts are among the most important there. But the split on the ecological issue is very strong, as on other subjects, in an energy context with no particular supply problem to date. Thus, sobriety does not yet seem to be an explicit subject in the public debate, unlike energy efficiency, which is very much on the agenda in the country. It is likely that the multiplication of natural disasters affecting the country, such as recently in Florida or with the fires on the west coast, will induce additional developments. We are beginning to see this behavior emerging in California in particular, without official watchwords encouraging this sobriety. This form of sobriety, linked to eco-anxiety, will undoubtedly have the most impact in the United States to change behavior.

For its part, China has shown its desire for carbon neutrality by 2060, which is a very ambitious objective. The actions undertaken in particular since COP21 are significant. That said, the economic constraints due to the increase in the cost of energy with the war in Ukraine has pushed the government to resort to coal on a massive scale, there is an obvious step backwards. And in terms of sobriety, with the peaks of heat pushing the use of air conditioning in particular, nothing on the horizon. It must be said that the zero-Covid strategy imposed by the government takes precedence over any other possible sobriety action requested of the citizen: it is an extreme but temporary form of sobriety... The day China decides, it will be easier to implement a sobriety strategy if necessary in a country where the citizen is used to obeying; China is not, until further notice, a country where new uses come from the citizen.

Sobriety is therefore an exclusively European concern, or thereabouts; And for how long ? For ever ? A frustrating question because this subject is crucial for aviation. Is it because of this uncertainty that it is so little addressed by European NGOs pushing for "our" sobriety? This is a kind of unthought of European ecology, even the best intentioned.

But conversely, can we take advantage of the inertia of others to do nothing ourselves? It is clear that the reasoning consisting in saying "I will change my habits (of air transport) when the Chinese do it" is a dead end (if the Chinese did it, we would find another country which does not do it, and so on, it's an endless game). Moreover, it is entirely legitimate for a highly developed group like Europe to chart its own path towards a different model. If sobriety there must be, let Europe begin, therefore, but at the same time, taking the greatest account of the diversity of the world and the complexity of geopolitical situations, and above all without posing as a giver of lessons, she thinks

about ways to be followed, not in detail but in the direction she would show in this way.  
Steps towards sobriety cannot be synchronous.

## 6. A component of sustainable development

There is sometimes a tendency to oppose the concept of sobriety to that of sustainable development. Especially of course when sobriety is equated with degrowth and the latter takes on an absolute form.

Sustainable development is defined as

- *development that meets the needs of the present without compromising the ability of future generations to meet theirs. Two concepts are inherent in this notion:*
- *the concept of "needs", and more particularly the basic needs of the most deprived, to whom the highest priority should be given, and*
- *the idea of the limitations that the state of our techniques and our social organization imposes on the capacity of the environment to meet current and future needs. (UN Bruntland Commission, 1987).*

The word "development" made the idea of "sustainable development" relatively consensual (until the appearance of "decreasing" and collapsologists). However, it does not imply perpetual growth in the sense of GDP and even less the perpetual growth of all consumption and all uses.

Based on the UN principles of sustainable development there are three pillars: sobriety (in the sense that we understand it here: sobriety of uses), energy efficiency and renewable energies.

Understood in this way, sobriety can become a component of sustainable development.

This is obviously not enough to define either its scope, its objectives or the means of implementing it.

## 7. Despite the fuzzyness of the words, sobriety is not decrease

In other words, is sobriety a polite term for decrease? Or, what comes to the same thing, is it only the state to which decrease leads, which is a dynamic? This is certainly the case for a number of its thurifers. Sobriety is a "positive" word, opposed to excess, drunkenness, gluttony. Decrease is reminiscent of decadence. It is scary, especially since it is not assigned an "final" objective or limits. It is directly opposed to the very positive connotation given in economics to growth, that of GDP by definition, the latter being considered as the yardstick of a better life. Growth which, until further notice, is closely linked to energy consumption.

Generalized decline, the weakening of technology, the refusal of innovation, etc., would lead to a world that is difficult to imagine. It is easy to speak of degrowth as long as it is not characterized; but what about the decline in medicine, infrastructure, water supply, even "reasoned" agriculture, education, etc.? All these sectors are energy consumers, some only exist thanks to the sufficiently abundant energy and the availability margins that it allows to release.

But the words, in the political debate, are often trapped. We said it above: the more a theme acquires notoriety, the more it becomes excessively simplified. Thus degrowth has (recently) become a "marker" around which Manichaean scavenger battles can take place to the greatest satisfaction of both parties; without really knowing who means what by that.

Sobriety is often seen on the contrary as the only bulwark against (the risk of) a sudden, possibly brutal, unpredictable and dangerous decline; so perhaps decline, but organized. It remains to be seen by whom and how; we can assume that in a democratic society, it would be a collective elaboration, which only shifts the question (how?).

Is sobriety the enemy of improving living conditions? enemy of travel? enemy of progress? Could it be put in the same bag as technophobia? We guess not. At least within certain limits. It remains to demonstrate it. Existing discourses on sobriety often (not always) discount economic considerations.

We must try to go beyond simplistic visions. Some activities may be reduced, for example if they generate a lot of CO<sub>2</sub> emissions, directly or indirectly; it is not "degrowth". For others, sobriety will simply mean stagnation. For still others, less, "controlled" growth. In fact, sobriety cannot be defined by a single figure as is (unfortunately) growth: it can only be declined ad infinitum according to sectors and uses. Moreover, if sobriety is a state of mind, it is artificial to assign it quantified objectives other than "aspirational". This may be different if it is imposed by the offer.

A moderate decrease in air traffic would simply bring its level back a few years, a time quite difficult to compare to prehistory. However, this notion of moderation which can go as far as "a negative value" raises the crucial question of its global application. Indeed, it is obvious that for certain activities, moderating, capping, reducing in Europe if the rest of the world does not do so in a similar or similar way, would lead to a very



dangerous, even fatal loss of European competitiveness. This does not concern moderation in all sectors: that of individual or public lighting, or the heating of dwellings, or the use of public transport rather than the car; but such a unilateral limitation is more problematic for air transport for example, or agricultural production (even this could be protected by tax barriers, which is difficult to envisage for international air transport). In these cases there is, at the very least, material for further investigation.

There is another possible form of sobriety, so to speak, that we mention here in passing: that of demography. The planet is on track to reach 10 billion people by 2050, although in many countries the birth rate is down to around 2 children per woman or is in the process of doing so. There remain notable exceptions, notably in Africa. This population growth is not going in the right direction in terms of energy consumption, that goes without saying. The most resolute opponents of any decrease almost always make an exception for demography! But this one is not "controllable", except to take measures that only the China, for a time, had taken, and depends mainly on the advancement of the standard of living and education.

## 8. From business trips to tourism, different evolutions are plausible

Throughout the preceding paragraphs, a variation of sobriety in general in the case of aviation has been sketched. Let's try to say a little more here.

It goes without saying that the sobriety possibly applied to air transport (and whose nature remains to be defined) cannot be disconnected from the general movement of society. Aerial sobriety in a context of "debauchery of energy" would otherwise make absolutely no sense. It would be like cycling to Doha to watch the FIFA World Cup in air-conditioned stadiums.

It is not forbidden to imagine a world where the various individual and collective activities are weighed not only in terms of their financial report, their approval, their effects on health, their social impact, etc., but also their climate impact. This is the whole meaning of sustainable development.

As we have seen in the preceding paragraphs, the question of sobriety, posed to all energy-consuming activities, also arises in aviation, by definition... in proportion to at least three parameters: its contribution to global warming, its social usefulness, its ease in decarbonising.

It is essential, in order to reflect soundly on this question, to detach oneself from the context of aviation bashing and flight shaming, the aggressive, unjust and unqualified excess of which often creates a defensive reflex and an impossibility to debate. In what follows we will therefore make no reference to these "movements".

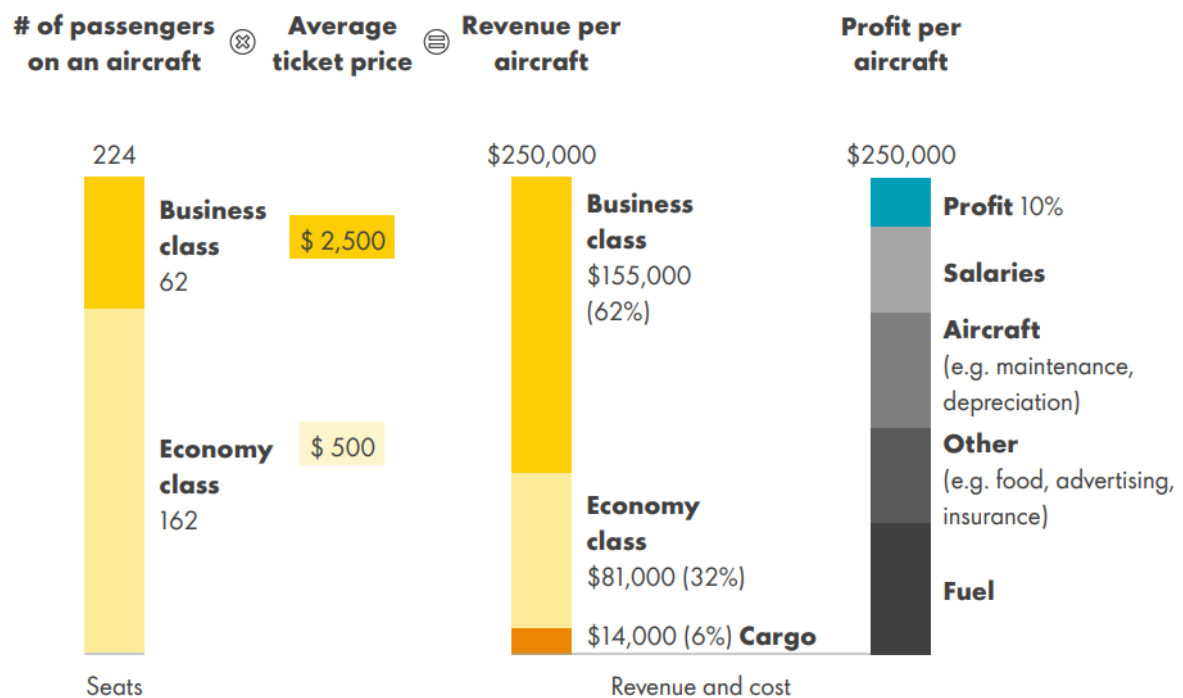
So let's forget the ulterior motives which probably preside over certain operations of denigration of European aviation and aeronautical construction, and which make aviation too easy a scapegoat (even if there are others also targeted) and every trip by plane, a sin. And let's try to approach this question calmly, which has no reason to be taboo. Sobriety (in the sense that we have given it: sobriety of uses) poses complex, new and all the more stimulating questions for air transport.

Among aviation users, who are also citizens, there are traditionally two categories: professional travelers and "leisure" travelers, the former in the order of 30%.

For professionals, a new balance will certainly be established, and not only for environmental reasons, thanks to the effectiveness of long-distance relationships demonstrated by the health crisis – it is a de facto sobriety, not necessarily claimed as such, which is also a source of savings for companies. However, it seems easy, but this "particular decrease" (because it is one!) calls into question the economic model of airlines, in particular traditional companies, a very important subject but which we will not attempt to deal with here, as much as it is a movement already committed and which, once again, does not have environmental sobriety as its primary objective – the latter is just a beneficiary of it. This impact on the economic model is linked in particular to the profits made by companies on business class seats. (Of course, not all professional travelers travel in business class, but vice versa, it owes them most of its existence). The

example of the London - New York flight mentioned in the study “Decarbonising Aviation: cleared for take-off”<sup>1</sup> is very significant in this regard:

Based on a typical journey from London Heathrow to New York JFK by Boeing 777<sup>1</sup>



The other category is often referred to as “recreational travel”. It should be noted right away that this word “leisure” is not insignificant, because it places these trips in the category of the superfluous. It would be better to speak of “individual journeys”. Going to bury your Mexican grandmother when you live in the United States, is it a hobby? The fact remains that tourism, which is indeed a leisure activity, constitutes a large part of these private air travels.

It is quite logical to think that air sobriety at the individual, private level would apply more easily to tourism than to “VFR” (Visiting Friends and Relatives) reasons, which are certainly more dear to the heart of passengers; and that study-related grounds should not be affected.

Remains, at the heart of the subject, tourism. It is natural to consider the economic consequences of “tourist sobriety” resulting from air sobriety, which can mean a reduction in stays abroad (but in number and frequency more than in duration). However, it is necessary to put things into perspective; for a country like France, tourism represents about 7% of GDP, but divided between 5% for French tourism in France, and 2% for foreigners (to whom the French also go, reciprocally); on the other hand, other countries with a smaller population and less wealth see their economy partially built on regional or global tourism: 14% in Tunisia, 28% in the Seychelles...

<sup>1</sup> Decarbonising Aviation: Cleared for Take-off (shell.com)

However, we must question the "sustainability" of tourism in itself, and not only as a consequence of the development of aviation; in the order of causes, it is almost the reverse. So-called "mass" tourism (with a pejorative or even contemptuous connotation) is confronted with the consequences of overdevelopment – what is sometimes called overtourism – by which it tends to self-destruct. The excess of tourists at the same time, in the same place, kills the beauty and the pleasure whose search was the very reason for the trip. Moreover, overtourism artificializes the local cultures it is supposed to allow to discover, and transforms social relations, not always for the better. People are starting to rise up against it. It is therefore plausible that a certain "sobriety" will also end up imposing itself in this area, independently of the means of transport. "Doing Bali" in a week to be able to tell friends and neighbors about it when you get back is not necessarily "sustainable" from the point of view of the social marker that this trip still represents today (cf. 4.10).

However, it should be borne in mind that many relatively distant stays are chosen because they are cheaper than an equivalent in one's own developed European country: low-cost stay in a relatively close developing country, combined with cheap theft on promotion. In such cases, sobriety goes against the individual economic equation.

Let us insist on the fact that it would be absurd and reprehensible to recommend an end to long-distance tourism. This is an integral part of our planetary civilization, despite the inequalities that mark it. Getting to know other countries and other cultures, even superficially, is an essential element of the feeling of belonging "to the planet". It is even plausible that without the ability to travel far, environmental awareness would not be where it is. We only care about the planet if we leave our garden.

To travel, of course, but by making longer stays, in conditions that are themselves more sober in energy, and avoiding weekend round trips to the other end of Europe, even giving up certain trips to the bottom think about it, ask yourself in any case the question "is it really useful" (without ruling out the least in the world the search for approval), this is perhaps what we can recommend as "chosen" aerial sobriety to Europeans, right now. While waiting for the rise in ticket prices to impose such choices?

## **9. A thirst for flying that counteracts the “shame of flying »**

The health crisis has been the occasion for predictions, even wishes, that the resumption of air transport will take place slowly, and will never even reach pre-COVID levels again. It is the opposite that happened, the summer of 2022, in particular, showing in Europe a real rush for airports, for reasons of "leisure" (tourism) above all, it seems. Among these impatient travelers are many young people, often described elsewhere as “eco-anxious”. We can be tempted to draw a “marketing” conclusion: no problem, customers are back, it was a false alarm, the shame of flying does not exist.

However, the “consumption” of CO<sub>2</sub>-generating activities is not incompatible with eco-anxiety: it is even exactly the opposite. It is the conflict felt between "carrying on as before" and the panicked perception of a sort of end of the world that causes this anxiety, which is sometimes genuinely pathological. But this is not our point.

It is certainly to be rejoiced that the trip (far away – the one that only the plane can provide and which is even the *raison d'être* of the latter) has remained very high in the desires of the population. But it would be wrong to stop there. Indeed, we should certainly not consider “air sobriety” as a sad necessity imposed on transport actors by new behaviors, in particular “young people” who are in the process of building another world. This generational approach, moreover, is very reductive. In addition, if no sobriety has visibly imposed itself for air transport after the Covid, the same is true for all the other fields of activity. Apart from the growing use of scooters (electric, anyway).

It is more fruitful for reflection to consider sobriety as we have done above, "in itself", and with an open mind, not as a series of new uses "underwent" by the aviation sector, but as uses to be proactively revisited in order to develop a vision of the (global) air transport of tomorrow.

## 10. Flying is still a cultural marker

Flying, especially to go far, still has social connotations, despite its undeniable democratization (certainly more marked, moreover, for short-medium-haul, because of low cost, than for long-haul).

“Considered as a means of access to superior services and goods, air travel thus makes it possible to maintain and grow cultural capital: “Cultural capital accumulates [...] through the experience of travel. The knowledge of the world and of oneself that travel allows are valuable and recognized as legitimate in almost all social contexts. [...] Travel is also a means of expressing tastes that reinforce the status of the upper classes.). Souvenirs brought back from travel, visas on passports, the "travel" section of CVs, participation in international seminars or colloquia, follow-up of training courses or linguistic stays abroad are all indications of the objectified forms and institutionalized cultural capital, although the lifestyles strongly mark the types of trips and the ways of living them and valuing them socially.

That said, the image of certain types of travel, especially those associated with “mass tourism”, can be reversed in the collective imagination. In any case in Europe, it is not at all impossible that in a few years, it will become "frowned upon" (outdated?) by society to engage in "unsustainable" tourism wrongly and through: take the plane or not, in this debate, is an almost secondary subject, a simple consequence.

Moreover, it has almost become commonplace: 50% of aviation emissions are generated by 1% of the world's population. , according to

The global scale, distribution and growth of aviation: Implications for climate change

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

This fact is partly due to the wide disparity in the use of air transport depending on the country: high in the developed countries, low in the others (precisely where its growth is strong). This is a reflection of global inequalities. But this is not specific to the plane! Indeed, globally these same richest 1% emit 75 tons per person, for a world average of 4.5 tons

It cannot be that because of a particular addiction to the plane! In fact, the upper categories generally consume much more energy than the others, regardless of the sector or almost (larger homes, more consuming automobiles, clothing, etc.). For this reason, making aviation "a rich man's business" is completely excessive... and leads nowhere.

The table below, taken from a survey conducted on behalf of the DGAC in 2016<sup>2</sup>, gives the breakdown by age and professional situation of French air transport users; these statistics probably translate quite well to Europe as a whole.

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<sup>2</sup> [https://www.ecologie.gouv.fr/sites/default/files/ENPA\\_2015\\_2016.pdf](https://www.ecologie.gouv.fr/sites/default/files/ENPA_2015_2016.pdf)

<b>Age</b>	<b>15-24</b>	<b>25-34</b>	<b>35-44</b>	<b>45-54</b>	<b>55-64</b>	<b>more</b>
<b>%</b>	<b>15</b>	<b>25</b>	<b>21</b>	<b>19</b>	<b>13</b>	<b>7</b>

<b>Situation</b>	<b>Top manager</b>	<b>Middle manager</b>	<b>Merchant Craftsman Farmer</b>	<b>White Collard</b>	<b>Blue collard</b>	<b>Retired</b>	<b>Student</b>	<b>Unemployed</b>
<b>%</b>	<b>27</b>	<b>19</b>	<b>4</b>	<b>22</b>	<b>2</b>	<b>10</b>	<b>12</b>	<b>4</b>
<b>%</b>	<b>50</b>			<b>24</b>		<b>26</b>		

We note that, if there is a certain distortion in favor of highest social categories , the distribution of travelers is however far from an image of "transport of the rich", if we consider for example the part taken by " intermediate professions" and employees. (Note that this distribution is no more "elitist" than that of the fast trains But this does not directly concern our subject of sobriety and will be discussed in another chapter OF AAE work).

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## **11. For the decarbonisation of air transport, a measure of sobriety may well be necessary**

The various forecasts, forecasts and roadmaps from the aviation sector itself point to several means of decarbonising air transport: improving aircraft performance (which can reach around 30%), operational optimization of roads and traffic (5%), sustainable alternative fuels (with an impact that is still difficult to predict given the scale of the investments required), and to a lesser extent, possibly for specific segments that are not the most emitters of CO<sub>2</sub> (short routes), hydrogen or even electric propulsion. These points are or will be extensively addressed elsewhere on this site.

From now on, these forecasts all aim for "carbon neutrality" in 2050. However, none of them suggests that this is achievable only with the help of these technical and operational means by this horizon. This is particularly because of the limitations in the production of primary energy, whether organic or carbon-free electricity; but also reasons why alternative fuels themselves will not be absolutely carbon-free over their entire cycle. (Let us remember, however: it is essential and urgent that the public authorities and industry give themselves the means to move forward as quickly as possible in this direction, in particular by developing SAF and low-carbon energy production. forced march, which is far from the case today.)

It follows that a certain "residue" more or less important, but very far from being negligible (we will not attempt a quantification here!), must be treated differently. The answer generally given is that of compensation. Either in the current way (for example, planting trees), or by switching to the capture of CO<sub>2</sub> from the air, which would be financed in proportion to the emissions. But we guess that these compensations are not unlimited either (see below).

Unless we count on "unheard-of" progress (in the original sense of the word: which we have not heard of until now), voluntarily blindly trusting the omnipotence of technology and human intelligence, we are therefore led almost mechanically to think of a certain sobriety in the future uses of aviation, even if this sobriety is calibrated according to an optimized global approach across the various sectors, among which Air Transport plays a socio-economic role. - leading economic-cultural (see 4.1 on the disadvantages of the "silo vision").

One of the advantages praised by the proponents of sobriety is its relative speed of implementation. In short, it would suffice to decide on it, which makes it a more effective solution than any other. This remains to be seen, because if we exclude restrictive measures of the "rationing" type, if we have to wait for European harmonization of a restrictive policy at slot level or if we count on the evolution of mentalities, we find ourselves faced with another process that will have nothing to envy to the complex stages of R&T!



## 12. Carbon offsets are not in competition with sobriety

Carbon offsetting consists of balancing all or part of your CO<sub>2</sub> emissions by financing reduction projects elsewhere. In particular, by planting forests somewhere in the world, which is the example most often cited but not the only case of application. It can be part of institutional mechanisms or be voluntary.

On the mechanism side, the CORSIA system was set up by ICAO in 2016, aiming for carbon neutral growth from 2021. It operates on a voluntary basis (by country) until 2026 and has not been accepted by all countries. It concerns international flights. Some airlines (starting with Air France from 2020) have started to fully and voluntarily offset their domestic flights.

Offsets are serious and controlled processes. Their rules are measurability, additionality (a compensation action can only be considered as such if the project it generates would not have seen the light of day without it) and uniqueness (a complicated criterion because it implies that the financed project offsets only one emission source).

However, they are the subject of sometimes virulent criticism, among other reasons because the trees that are planted will very gradually begin to absorb carbon, while the emissions they offset are almost instantaneous, even though the climate emergency is in all speeches; or again, because the additionality of the projects has not been established.

Beyond planting trees or investing in renewable energies, a new form of compensation will probably develop: investment in the capture and storage of atmospheric carbon, for an amount equivalent to that which has been emitted. .

Whatever these criticisms, there can be no doubt that offsets have a place in all decarbonization efforts, failing which we would have to reject the natural mechanisms themselves, where plants absorb the CO<sub>2</sub> emitted by animals and vice versa for oxygen!

But it would seem just as unrealistic to consider that the (promise of) even total compensation for the emissions of a given sector, in the case of aviation, would be enough to close the subject. To generalize this reasoning, we would come to the conclusion that decarbonization efforts as a whole, all sectors combined, are in vain since it is enough to invest massively in forests and wind turbines! The surface of the Earth would not suffice (especially since it is necessary to choose). Moreover, the argument of temporality (slow absorption by new forests) would not disappear. As for the capture of atmospheric CO<sub>2</sub>, it is certainly the most "indisputable" compensation solution but it has not yet been proven at an industrial stage, and it also comes up against limits: of green energy available , ramp-up time and storage locations, limits that are still very poorly understood.

Far from a certain "trade in indulgences" that threatens, offsets are admissible insofar as they make it possible to complete a decarbonization process, provided that all efforts

have been made to physically reduce emissions. The compensations are what remains. This is how the airline industry views them.

It is clear that the aviation sector must “do its part” (we will not attempt to precisely define it here) and not just “buy it”. This would not be politically acceptable, especially since solutions exist, at least partial. Sobriety is part of it, without being the main lever.

Could sobriety, energy efficiency and compensation be the three sides of the virtuous triangle of sustainable aviation? In proportions to be defined according to the social acceptability of sobriety, the progress achievable in the medium term in terms of performance and fuels, and finally, the real offsetting capacities using the various means of CO<sub>2</sub> absorption available.

### 13. Differentiated energy efficiency in transitional phase?

The mobility of tomorrow is no longer simply a question of vehicles, trains or planes, it is a question of sustainable mobility experiences and aviation must position itself on these new issues. New behaviors seem to be emerging, and if sobriety becomes one of them, what impact can it have on air travel? One could be tempted to dismiss this question by considering that the post-Covid period shows on the contrary, as we said above (4.9) an unchanged "desire to fly", even (and above all?) among young people. But this reasoning could obscure the fact that the concept of sobriety has only just emerged.

We can hypothesize that some passengers will be willing to integrate their "choice" of sobriety (for those who lean on this side), whether it is a leisure or professional trip. What will be their number and their weight? It is impossible to estimate at this time. It will be important for airlines, aircraft manufacturers and airport managers to listen and work together on these new behaviors. The passengers in question will no longer ignore their concern for sobriety. The consequence is that they will have to be given reliable information allowing them to make an informed choice. Air transport communication, which has already evolved a lot in the field of climate change, will probably have to adapt further, anticipating new practices and new offers.

For long distances, the only possible means of transport is the plane, but how to convince, without deceiving, the passenger who is ready not to travel far, or to do so sparingly, because it would be contrary to his desire for sobriety?

Here we can more closely associate sobriety (which affects behavior) with energy efficiency (which affects supply and means). For example, we could introduce "low carbon" flights in a differentiated way that would bring together as many future technological and operational innovations as possible, which cannot be applied all at once to the entire fleet: flights that do not leave without being almost completely full, with new-generation aircraft and engines that consume less fuel, using new sustainable fuels, such as SAF, with an optimized cruising speed and route, without waiting for take-off, electrically towed on the runways, less expensive, with also, it is very important although located on a completely different level, an optimized passage experience from check-in to arrival, etc. Depending on the evolution of the price of kerosene, it is plausible that the SAF, in this intermediate phase, lead to a substantial (but not necessarily prohibitive: around 20%?) increase in the price of the ticket: the choices we are talking about here are also economical... but unlike the example of speed reduction on the motorway, sobriety can lead to paying more!

In summary, it is a question of identifying new practices in the hope that these can gradually become the "rule".

First of all, it will be necessary to plan for the cohabitation of more or less "low-energy" flights - the respective prices of which constitute a key question for the emergence of a system with greater energy efficiency. But the emergence of air transport reconciled with the whole of society and once again endowed with the positive image that it should never have lost, may well pass through this.



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