Air France-KLM

I Letter from François Robardet

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(Raison d'être of the Air France-KLM group)

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The Monday, January 1, 2024 Press Review features:

Bonus articles, special features and Sustainable Aviation of the year 2023

Dear readers,

Here you'll find 30 (!) bonus articles and features from 2023. Most of them deal with Sustainable Aviation.

I'd like to remind you that there is now a Sustainable Aviation Observatory, whose creation was initiated by the OMNES team I co-chaired.

Here is the list:
. A look back at the Air France Foundation in 2022, the year of its thirtieth anniversary.

.
Climate: the IPCC prepares to publish the "report of reports" .

.

Fuels "E-fuels will make sense for aviation or shipping, not for cars" .

.
How the government gave in on air transport pensions to ensure industrial peace .

. Netherlands: towards the end of the agribusiness model?

.
Europe misses the decarbonization of aviation

.
Green fuels: a budgetary and fiscal time bomb

.
Every hour, European governments lose 4 million euros in aviation taxes .

. Debate: Decarbonization, quotas... what's to be done about air travel, the privilege of a minority?

.
Special file on taxes
June 2019, 1st mention of Air Passenger Duty, an example for E. Borne
October 2019 vote on ecocontribution in France, based on the Chirac tax
October 2019 Germany to drastically increase its tax on airline tickets
September 2020 An ecocontribution of 4 billion euros : the black scenario haunting French air transport
November 2020 The Netherlands to impose a tax of 7.45 euros per air ticket
September 2022 The Netherlands to quadruple its tax on air travel
April 2023 The UK to halve tax on domestic flights
What taxes are already costing us on an air ticket
Ecocontribution in Europe: Summary Should air ecocontribution be increased?

.
Special report Air traffic in 2050
Towards a 4-fold increase in intra-African air traffic

.
Lufthansa estimates that it will need to consume half of Germany's electricity to fly green.

. Do you know why the Air France symbol has been a winged seahorse for 90 years?

. The article by Damien Gaudin (who works closely with me) : Ecological transition and French air transport: a (currently) difficult equation to solve.

.
Insurance: AI joins climate as a major
risk

. COP28 sustainable aviation special :
60 chairmen of major French companies call for acceleration of the ecological transition
The European aviation sector and IATA welcome the adoption of the interim decarbonization
target.

.
Special Report on Sustainable Aviation
Fewer sustainable contrails by modifying aircraft altitude
Sustainable aviation fuels: new €200 million
call for projects

. Earthquake in world trade: China bans exports of strategic metals technologies .

Enjoy your reading
François

> A look back at the Air France Foundation in 2022, the year of its thirtieth anniversary

(source Air Journal) December 28, 2022 - **The Air France Foundation celebrated its thirtieth anniversary in 2022**, organizing a series of events around the world highlighting **its commitment to improving the living conditions of disadvantaged and disabled children.**

While the Foundation has announced that it will broaden the scope of its actions in 2023 to include "sustainable development projects and raising awareness of environmental challenges", it also looked back on **the "moments of sharing and solidarity" made possible this year by the mobilization of the French national airline's employee-volunteers, who were present at every port of call**.
Throughout the summer, children under the care of partner associations were able to enjoy unique experiences
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At Paris-Charles de Gaulle airport, 120 children from **the Envol Association** (which **organizes tailor-made stays and activities for sick children and their families**) were given a behind-the-scenes tour of France's leading airport, and shown around an Air France Airbus A350-900 in the company of French astronaut Thomas Pesquet.

In Antananarivo (Madagascar), the Air France Foundation celebrated its anniversary alongside the children of the **Akamasoa association** at a popular gathering organized by Father Pedro. Founded by Father Pedro, this association has been supported by the Air France Foundation for many years. **In particular,** it **works for the social reintegration of the poorest, access to sustainable material conditions for all, and access to healthcare.**

In Dakar (Senegal), where the Foundation has historically been very active, Anne Rigail, CEO of Air France and President of the Foundation, took part in a thirtieth anniversary celebration in the presence of Ms. Ndeye Saly Diop, Senegal's Minister for Women, the Family and Child Protection, Mr. Philippe Lalliot, Ambassador of France, and an Air France crew of volunteers from **the L'Empire des Enfants association.** This association **works for the social reintegration and care of children who are victims of violence**. Many of the Foundation's partner associations were also present.

The end of 2022 was also marked by a number of festive moments of solidarity: the Foundation presented the results of a series of projects carried out at the Commandant Sanon school in Abidjan (Côte d'Ivoire). Thanks to work carried out

since 2007 with the Savoir Ivoire association, this school can now welcome children in complete safety and in appropriate sanitary conditions. In Fort-de-France, in support of the Kiwanis and Adapei associations, the Air France Foundation contributed to festive and cultural encounters between a crew of Foundation ambassadors, accompanied by journalist Eglantine Eméyé, and nearly 200 children with disabilities, who are ill or in precarious situations.
Finally, at Roissy, "in a magical atmosphere", 120 children watched Santa Claus come down from the plane, on the initiative of the Club des Acteurs du Grand Roissy. The Air France Foundation also offered gifts ordered from Santa Claus by underprivileged children cared for by the Apprentis d'Auteuil Foundation.

Since its creation, the Air France Foundation has supported over 1,500 projects "**carried out by associations whose expertise and local roots are decisive.** It has taken concrete action in all areas that can make a difference in the lives of children in difficulty: education, social and professional integration, cultural development and sports and artistic activities". With **500 ambassadors mobilized at all Air France stopovers, the Foundation acts** "**as close as possible to the children's daily environment**, in order to have a direct and significant impact. It relies on the proximity of the company's employees to the field and their knowledge of the players involved, a guarantee of the effectiveness of the actions supported".

My comment: *The Foundation was created in 1992 by Air France. A pioneer in the field of corporate foundations, it has chosen to support the cause of childhood, which is so dear to the hearts of Air France employees.*

FONDATION D'ENTREPRISE AIRFRANCE

For over twenty-nine years, it has studied, selected and financed projects to help sick, disabled or extremely disadvantaged children in countries where Air France operates.
In France, the Air France Foundation funds projects in the Île-de-France region, and in a French region chosen each year.

The next call for projects will be open from January 3 to March 31, 2022.

It's important to remember that the Air France Foundation only funds long-term projects that correspond to its field of action: education and training for children and young people who are ill, disabled or in great difficulty. (0 to 18 years).

If you would like to submit a project, please visit the Air France Foundation website.

> Climate: the IPCC prepares to publish the "report of reports".

(source Les Echos) March 20, 2023 - **Six years of work and over 10,000 pages summarized in just a few dozen pages. This is the crazy exercise that the IPCC, the Intergovernmental Panel on Climate Change, has just undertaken** by condensing all the major reports it has produced during its sixth assessment cycle. This synthesis, due to be published this Monday afternoon, therefore concentrates the information contained both in its main report (the three parts of which were published between 2021 and 2022) and in the three special opuses produced in parallel - on the impact of 1.5°C warming, its effect on the oceans and cryosphere, and on land masses.
Above all, **this "report of reports", which has just been adopted by the UN's climate experts who spent a week conferring at a plenary meeting in Interlaken, Switzerland, is accompanied by a particularly eagerly-awaited text: a "summary for decision-makers" which was examined and then approved sentence by sentence by the governments**, each with one vote.
Compact though they are, **these texts are fundamental**. For **they will "form the scientific basis for international climate negotiations for many years to come",** explains climatologist Gerhard Krinner, one of the thirty scientists on the main drafting team. An indisputable tool on which all States will rely. "
It's a fairly political document, a sort of 'roadbook' for governments. With it, they say: here's what we recognize about climate change and what we validate as a scientific reference", explains political scientist François Gemenne, lead author for the IPCC.

This report will therefore shape political decisions at the next COP, the global climate conferences. Starting with COP28 in Dubai at the end of the year. In particular, it **will serve as the "backbone" of the first-ever global assessment of the implementation of the Paris Agreement**. As the World Resources Institute (WRI) points out, this review is intended to assess the progress made by countries in tackling the climate crisis, and to identify ways of speeding up progress "to avoid catastrophe".
The IPCC
report "comes at a pivotal moment", insisted the UN Secretary General at the opening of the working session. "We are approaching the point of no return, exceeding the internationally agreed limit of 1.5°C of warming", warned Antonio Guterres once again.
But "it's not too late, as you have shown", he said, urging leaders to "understand the enormous consequences of delay, and the enormous benefits of making difficult but essential choices".

As its experts tirelessly repeat: **the IPCC does not recommend anything, nor is it**

part of its mission. The hundreds of authors of its reports sift through tens of thousands of scientific studies already published in peer-reviewed journals. And while it has discussed all possible solutions for reducing greenhouse gas emissions and adapting to global warming, it does not recommend any policy to governments.

When it comes to global warming, the experts' basic message remains unchanged. Even if some things have changed in recent years. "Science is talking about the urgency of climate change, which it didn't do much before. And **the scientific literature is now saying that we need to act during this decade**", notes Yamina Saheb, an energy policy specialist and also a member of the main editorial team.

In the synthesis, a few messages could be clarified. At the time of the IPCC 's last publication in 2022, the (false) idea that there were "three years left to act" was widely taken up by the media and politicians. In fact, it was the result of an unfortunate interpretation of a sentence. Several authors tried to correct the record in an article for Le Monde, assuring us that "there is no deadline". For scientists there is no question of "giving the impression that if 1.5°C is exceeded, it's the end of the world", says Gerhard Krinner.

My comment: *Please note that the text below is taken in its entirety from the franceinfo website. It is Anne Le Gall's science post, dated March 20, 2023. I did not see fit to amend it.*

For 35 years, the mission of the Intergovernmental Panel on Climate Change (IPCC) has been to inform decision-makers and citizens about the reality of climate disruption, and to do this it has regularly produced critical summaries of the thousands of scientific publications on the subject. This means that the IPCC scientists, who represent 195 countries, are obliged to respond to all the questions, doubts and comments sent to them by their colleagues around the world. And every sentence written in the various reports is scrupulously weighed up and validated by the entire scientific community.

The synthesis published on Monday March 20, 2023 summarizes the 10,000 pages of previous work. It shows that our world is 1.1°C warmer than it was at the start of the industrial era in 1850. Also worth noting: this is a climate change unprecedented in the last 125,000 years, and there is no longer any scientific doubt that it is the result of greenhouse gas emissions caused by human activity.

To limit the risk of irreversible damage, we need to stay below 1.5°C or 2°C of warming by the end of the century, but that's not the trajectory we're on. Today, we're heading more towards a warming that could reach 2.7°C by 2100.

We can be reasonable, if...

What gives us hope is that there is also a scientific consensus on certain solutions to get us out of this situation. It is still possible to mitigate climate change by adopting appropriate policies as a matter of urgency. For example, in the world of agriculture, by thinking about the place of livestock farming, which is a major emitter of greenhouse gases, or by restoring forests and human areas, or by adapting energy choices, urban architecture, transport, etc.

Another scientific certainty is that the longer we wait to take measures to limit greenhouse gas emissions, the greater the effort required.

> Fuels "E-fuels will make sense for aviation and shipping, not for cars".

(source Libération) March 23, 2023 - Responsible for a quarter of the world's greenhouse gas emissions, and 90% dependent on oil, **the transport sector needs to decarbonize. In addition to the electric alternative**, the most mature for individual vehicles, and to an altogether different extent hydrogen and biofuels, **another path is emerging: that of synthetic fuels, or "e-fuels".** This nascent technology involves producing fuel from CO2 using low-carbon electricity. Currently championed by Germany as a way of prolonging the use of internal combustion engine vehicles, which the EU has pledged to ban from sale by 2035, it is contested by environmental NGOs as costly and energy-intensive. Thibault Cantat, Director of Research at the French Atomic Energy and Alternative Energies Commission (CEA-Saclay) and head of the Carbon Circular Economy program, explains the advantages, challenges and potential risks of these electrofuels.

What needs do synthetic fuels meet?

We're all working towards the same goal: carbon neutrality by 2050. But depending on the industry to which we belong, there are several ways of approaching it. First and foremost, we need to be energy sober: the less energy we consume, the less CO2 we emit. Then there's energy efficiency, and everything to do with the electrification of processes and uses. For example, for personal vehicles, you don't need a high energy density, and a battery does the trick. But **other sectors are much harder to electrify. These include long-distance transport, aviation and shipping, which have to use very high energy density fuels**. That's why we're looking for ways to produce these liquid fuels, such as kerosene, in a carbon-neutral way.

How are e-fuels produced?

There are three main ingredients: CO2 - captured from the air when the technology is ready, but initially from sources where carbon is highly concentrated, such as steelworks or cement plants - water, and low-carbon electricity, from solar and wind

power, and after much debate at European level, from nuclear power. There are several ways of combining these ingredients. **The most mature technique involves electrolysis of water to produce hydrogen. This allows electrons to be stored in a chemical form, since the energy is contained in the hydrogen molecule. By combining this hydrogen with CO2, using catalysts, we obtain a synthetic crude oil that we then need to refine,** as we do with kerosene and diesel.

Unlike fossil fuels, which emit CO2 that accumulates in the atmosphere, synthetic fuel does not emit CO2 when it is burned. **But low-carbon doesn't mean zero-carbon: you have to build the infrastructure for all the conversion processes**. And that requires materials and energy, all of which have a carbon footprint. **European regulations stipulate that a synthetic fuel must emit 70% less CO2 than a fossil fuel over its entire life cycle.**

Does it make sense to use them to decarbonize passenger cars, as Germany wants to do?

Quite honestly, no. **Synthetic fuels make sense for aviation and shipping, and for the plastics industry too, but not for cars**. The efficiency of storing low-carbon electricity in a battery is around 80%. With e-fuels, this rises to 50-55%. The battery does the job better. In the short term, low-carbon electricity is going to be scarce: we need to use it wisely and avoid conflicts of use. But if you can't produce enough low-carbon electricity on your own soil, as is the case in Germany, which has opted to do without nuclear power, then you have to import renewable electricity from other countries. And the best way to do this is in the form of fuel. Hence the interest in developing the e-fuel sector. Not all German manufacturers have the same position on the subject. For example, Porsche's classic cars are not going to change their engines: having synthetic fuels would enable it to continue in this business. Mercedes-Benz, on the other hand, is interested in electric vehicles.

Do e-fuels make sense for consumers?

In the next few months, we'll be having a discussion about the fact that electric vehicles are too expensive for private individuals, that the social cost is too high... We need to remember that synthetic fuel is very expensive, on the order of two to three times more expensive than fossil fuel.

How do they fit in with biofuels?

The e-fuels sector is based on the principle that to decarbonize both aviation and shipping, we don't have enough biomass [organic matter that can become a source of energy, either directly, like wood, or after methanization, like biogas, or chemical transformation, like biofuels, editor's note] **available to produce enough biofuels**. European regulations have set out the roadmap for the maritime and aviation sectors: **by 2050, aircraft fuels at all European airports will have to be 63% low-carbon. Part of this will be biofuels, and around half will be e-fuels. We need to get to work right away. For France, this represents the production of 6 million tonnes of synthetic fuels by 2050. That's massive.**

What problems do they pose?

They generate two major conflicts of use. Firstly, a conflict of use over low-carbon electricity, which we'll have to avoid. It's going to be a real planning challenge to establish which industrial sector uses how much low-carbon electricity. **And then there's the conflict over biomass. It's cheaper to make biofuels than synthetic fuels, but there isn't enough biomass to meet the needs of many sectors**. We're going to have to face up to these challenges while leaving the current system behind. We have to leave behind this age of fire, where we burn fossil carbon resources, for another with low-carbon electricity, which we will have learned to store.

My comment: *I advise you to read (and treasure) this article.*

It sums up the problem of choosing the future fuel for aviation.

> How the government gave in on airline pensions to ensure industrial peace

(source Les Echos) April 4, 2023 - **Compared to other sectors, the air transport industry has weathered the turbulence of the pension reform rather well**. Although a few minority unions affiliated to the major unions, such as Usac-CGT among air traffic controllers, have issued one notice after another, disruptions have remained limited, with little more than 20% of flights cancelled, mainly at Orly, Marseille, Toulouse and Bordeaux airports.

The sector's most powerful unions - the SNPL for pilots and the SNCTA for air traffic controllers - did not follow the strike calls of the major unions. Not because they are not concerned by the postponement of retirement to 64. But **because their representatives had discreetly obtained, sometimes well in advance of the reform, guarantees from the government that their various statuses would be maintained.**

These confidential negotiations between the government and the main players in the air transport sector **have not yet been completed**. However, according to our information, **the government has already made a commitment to the FNAM, the French federation of airlines, to pay the financial aid required to maintain the provisions of the French Transport Code, which sets the retirement age at 60 for pilots and 55 for flight attendants.**

Pilots, and even more so cabin crew, are in a special situation. Like all private-sector employees, they are covered by the general pension scheme, and are therefore not entitled to a full pension until they reach the statutory retirement age. That's 62 today and 64 tomorrow. However, the French Transport Code allows pilots

to stop working at the age of 60, and cabin crew at the age of 55, unless the employee requests otherwise and can produce a certificate of medical fitness (every six months in the case of pilots).
In the event of cessation of activity or loss of license before full retirement, the CRPN (Caisse complémentaire des personnels navigants), financed by flight crews and their employers, is responsible for supplementing retirement benefits up to legal retirement age. So far, it has managed to do so, thanks to a sufficiently young seafarer population and good management. But the longer the period between the end of service and the age of full retirement, the greater the cost to the CRPN. Hence the determination of the aircrew unions and their employers, the airlines, to obtain from the French government at least partial coverage of the additional costs generated by the postponement of retirement from 62 to 64.

The only notable change is that Air France has abolished its internal system encouraging flight attendants to retire before the age of 56, in line with the government's new priority of keeping "seniors" in employment. This was one of the reasons why most cabin crew stop flying at 55, whereas the effective average retirement age for pilots is 62.5.

As for air traffic controllers, who are civil servants, the French government has again pledged to maintain the retirement age limit at 59, "taking into account the medical and cognitive requirements of the missions performed", as well as the "active category" classification, which justifies the right to early retirement in the name of hardship. The only concession: the age of entitlement for those with 17 years' service will be gradually raised from 52 to 54.

The French government has also guaranteed to maintain the various benefits that enable air traffic controllers to retire with a full pension, despite having contributed less than the required 43 years, such as the "bonification du cinquième" (one-fifth bonus), originally designed for military personnel, which entitles them to one additional year of contributions for every five (up to a limit of 5 free years). Or the "complément individuel temporaire" (CIT), created in 2015, which grants up to 16 free quarters to air traffic controllers who have not reached the required number of quarters by age 59.
This explains why the pension reform did not provoke a massive mobilization among flight crews or air traffic controllers. All the more so as they have already moved on to the next stage. This involves negotiating the next DGAC protocol, with the central demand being an increase in the replacement rate, in order to reduce the gap between final salary (around 8,000 euros, including bonuses, at the end of a career) and retirement pension, in the region of 40% to 50%.

My comment: *With regard to the retirement age of air traffic controllers, the arduous nature of their activity has been taken into account in setting the new rules.*

This approach (taking into account the hardship involved in setting the new rules) was one of the union's demands for all employees affected by the pension reform.

According to this week's APNA review, the average effective retirement age is 62.4 for French pilots and 56 for cabin crew, due to a cut-off retirement bonus system at Air France (a system which is evolving towards a smoothing system).

The CRPN bridging bonus compensates for the absence of a pension from the general scheme until the age of entitlement, which will be 64 after implementation of the reform. It is the increase in the connection premium (induced by the reform) that should be compensated.

It should be noted that CRPN statistics show that French flight crews have a life expectancy at age 60 that is 4 years higher than the national average (91 years for women and 87 years for men).

> Netherlands: towards the end of the agribusiness model?

(source Radio France) April 10, 2023 - **The roll-out of a plan to halve nitrogen emissions by 2030 has set the world alight**. The plan calls for a drastic reduction in Dutch livestock numbers.

In front of Richard Veeraaf's farm stands a brand-new tractor bought for his 26-year-old daughter Lotte, who wants to take over the farm. "But the government doesn't want us any more!" complains the beef cow and pig farmer based near Breda in the Netherlands. The farmer dreads having to part with at least 35% of his livestock, he estimates. In some areas, he claims, some farmers will lose 94% of their livestock: "How can we cope with that on our income? How are we going to make a living?"

But in the Netherlands, between farms and the 160 or so Natura 2000 nature parks protected by European Nature and Biodiversity legislation, cohabitation is no longer possible! **The air is becoming unbreathable and the soil is saturated with nitrogen, a gas produced in particular by animal waste**. A few dozen kilometers to the east of Richard Verhaaf's farm lies the Oisterwijk nature reserve, where Lex Querelle can be found. Lex is one of the curators of this magnificent place, a mix of forest and marsh. But here, nitrogen is everywhere. It kills trees and biodiversity, says the conservationist: "**Nitrogen kills the fungi around the roots of oak trees, and they slowly die. Instead of living between 400 and 600 years, they die after just 80 years**". With a flick of his finger, Lex rips off a chunk of bark. Around us, the trees are as if "peeled off", and many species are threatened. 70% of birds are born with bones that

are too fragile because of nitrogen, says the curator, who nevertheless acknowledges that "farmers have made great efforts to reduce pollution thanks to technology". But that's no longer enough: "Look at nature and act! We need to make radical decisions, because enough is enough!" says the 50-year-old.

In North Brabant, the local government is also tackling nitrogen emissions in the building sector. Most building permits have now been suspended. Only building sites that do not emit greenhouse gases will be spared. For Erik Marteens, spokesman for the southern Netherlands area of the LTO, the country's main farmers' union, all this is neither acceptable nor realistic, and is at the root of the deep-seated anger of voters in the Citizens' Farmers' Movement.
"**When we want to invest, build, everything is blocked here, because nitrogen is everywhere**," laments the unionist. "It's a problem we've created ourselves and which we have to solve ourselves", he acknowledges, even if the equation is complicated. **The Netherlands produces a lot: vegetables, flowers, meat.** We recognize that the world is changing," says Erik Martens, "but we're a small country, we don't have the same space as France, and we still have a responsibility to feed people!

The Netherlands is the world's leading meat exporter, with a population of 17.5 million and an area no larger than the Pays de la Loire region.

To make her movement the leading party in the Senate, BBB leader Caroline van der Plas **capitalized on the anger of the rural world, but also on the rejection of the ruling urban elite**. We need to change our methods," admits a dejected Micky Adriaansens, the Dutch Minister for Economic Affairs: "We were a little surprised and a little frightened by the emergence of this new party," she admits. The challenge will be to reach these people and help them make the ecological transition."

For Philippe Lamberts, chairman of the Greens group in the European Parliament, these radical but necessary changes need to be accompanied, as was done in another era with the end of coal: "It means a change of profession. We need to see what the government wants to do to sweeten the pill. Politicians have to accept their responsibility, because today we're paying the price for inaction."
And he insists: "These changes will affect everyone's lifestyle. But when it's a question of survival, you do what you have to do!**The economic model of Dutch agriculture is unsustainable! After the United States, the Netherlands is the world's leading agricultural exporter!** There's something wrong, it's not possible."
To support the transition, the government has set aside 24 billion euros.

My comment: *I owe you an explanation as to why this article should be included in a press review devoted to aviation.*

It's been a long time since I read the Dutch press and realized that nitrogen pollution

(in the Netherlands, we call it NOx) was more of a concern for the Dutch than CO pollution$_2$.

As a result, activity reductions at Schiphol are aimed more at reducing NOx emissions than CO_2 , whereas in France, only CO_2 is associated with aviation.

The Netherlands, with more than half its surface area devoted to agriculture, is a pioneer in greenhouse horticulture. Dutch farmers are developing innovative methods to produce more food with fewer resources. The Netherlands has become one of the world's leading producers of tomatoes and the leading exporter of onions and potatoes.

More surprisingly, Schiphol can offset its nitrogen emissions by buying up farms and land that will then no longer be farmed.

While this article helps us to understand the reasons for this, it also raises a question: how did the Netherlands become the world's second-largest agricultural exporter?

I found it hard to believe. And yet, according to Business France, here are the 10 countries that exported the most food products worldwide in 2019, based on customs data:

10. Belgium - €41.27 bn: Belgium is one of the world's biggest beer exporters.
9. Italy - €44.79 bn: Italy dominates tomato products thanks to its canned tomato exports. 8
. Canada - €45.48 bn: Canada is the world's leading producer of maple syrup. 7
. Spain - €53.57 bn: Spain is the world's leading producer of olive oil. It produces over 50% of the world's olive oil.
6. France - €65.03 bn: France dominates world wine exports, with a market share of 30% over the last decade. 5
. China - €68.83 bn: China is one of the world's leading tea producers.
4. Brazil - €69.96 bn: Brazil is the world's leading producer and exporter of soybeans, chicken and sugar. 3
. Germany - €76.39 bn: Germany is Europe's leading pork producer.
2. Netherlands - €96.12 bn: One of the world's leading producers of tomatoes and exporter of onions and potatoes.
1. United States - €126.52 bn: The United States is a major exporter of corn and soybeans.

The infographic below is based on 2020 figures.

> Europe misses the decarbonization of aviation

(source Le Soir) June 9 - **Decarbonize aviation**! The expression was inescapable at this week's annual air show in Istanbul. **The International Air Transport Association (IATA) and its 300 airlines (83% of global traffic) have pledged to become carbon neutral by 2050 (reducing CO 2 emissions and offsetting the indispensable),** often signalling that they expect identical commitments from other means of transport on road or water. And yet, among the many challenges involved in moving away from fossil fuels to reduce CO2 emissions, aviation more than any other is often singled out as a target: dispensable for some (arguing for an end to the frenzy of citytrips, private jets...) rather than an example to follow for others. Debates are regular, lively and even passionate. The issue is very much in the air at the moment, but does not seem to be rallying energies at European institutional level. **A number of issues illustrate the extent to which Europe is absent from the major challenges and could miss out on the decarbonization of aviation**. Are we missing the boat?

1 The Single European Sky
Europe's oldest and most obvious failure is the creation of the Single European Sky. Launched in 1999, the concept was not only to open up European airspace to all European airlines without going through the traditional bilateral negotiations between countries, but also to harmonize and simplify air traffic control in the 1.7 million square kilometers of sky over which more than 5 million flights pass every year. A single sky would facilitate travel by integrating the management of reserved

areas (military space, etc.), mandatory national contours (air traffic control remains a national prerogative) but, above all, would avoid detours that would save between 10 and 12% in CO2 emissions into the atmosphere.

Everyone agrees on the principle, but implementation has been stagnating for 20 years. Not least because of resistance from the major national air traffic control authorities (the reform could reduce staff numbers). "Europe committed itself to the Single Sky even before the environmental agenda and scientific evidence demonstrated its urgency," sums up Rafael Schvartzman (regional vice-president of IATA Europe). "Europe has been saying for years that it is determined to achieve sustainability targets, but why is it unable to define the best way to achieve them while maintaining reasonable economic value for living conditions? Industries are obliged to take measures, but states don't apply them to themselves. **Monopolies, such as air traffic management, must presuppose the supervision of an independent authority capable of getting things done. Since no such authority exists, it's political will that can suddenly save over 10% of emissions.** In Europe in particular, there is a disproportionate perception of aviation in terms of the good and the bad. But if Europe is so born towards sustainability, why doesn't it take the decisions it needs to?"

2 Sustainable aviation fuel

Its acronym is SAF (Sustainable Aviation Fuel). Its use should contribute to making aviation CO2-neutral: it represents between 62 and 66% of the effort. **Europe has just spent many long months deciding on the regulations necessary for the use of SAF**. At the end of April, the Union drew up a progressive plan for the use of this green fuel: 2% by 2025, then 6% by 2030, rising to 70% by 2050 (and an obligation to gradually include synthetic fuels). **What she didn't address at all, however, was who was going to manufacture this green fuel and on the basis of what. The result: we've got great regulations, but not a drop of SAF to use.**

Meanwhile, the United States subsidized producers to actually produce FAS and got a head start in its use. Still marginal: by 2022, 300 million liters of SAF would have been produced worldwide (240,000 tons), i.e.... 0.1% of the 254 million tons of jet fuel required by the industry. Nevertheless, progress has been made: in 2019 (three years earlier), production represented just 0.01% of annual consumption, and, as confirmed by IATA, there are many European projects among the 130 currently in potential development. And the target is to reach 55 million tonnes produced by 2028.

3 Taxation

Aviation is often considered a tax haven because its main fuel, kerosene, is not subject to taxation. This is a legacy of the post-war period (World War II) and of economic-strategic realism aimed at avoiding the creation of competition between countries/airports. **IATA insists that the rest of its activities are heavily taxed**

($380 billion in 2018). But what happens to this money? **In Europe, more than anywhere else, aviation-related taxation serves exclusively as a national budgetary adjustment, not to generate a virtuous circle that benefits the sector, for its decarbonization, for example**. Excluding the ETS (see below), there is no tax whose proceeds are used to improve aviation, its operation or its ecological virtue. The latest boarding tax imposed in Belgium is a perfect example: it was introduced as part of a mini-taxshift to make up for the abolition of a "special contribution" paid on salaries since 1994. Europe is now (and has long been) talking about imposing a tax on kerosene. **The EU needs to direct tax efforts in a virtuous direction for the airline industry** (using part of the levies to promote sustainable benefits, for example). **But, let's face it, this is complicated, since taxation also remains a national prerogative, like air traffic control.**

4 Compensation

This is a missed opportunity. Europe was the first to develop and implement a system for offsetting aviation emissions. This is the ETS (Emissions Trading System), a system for purchasing greenhouse gas emission quotas, a kind of "carbon exchange" that encourages airlines to emit as little as possible, since they have to pay for it. The perfect example of the virtuous circle we'd like to see in aviation taxation. **Except that this system, imposed on flights passing through European airspace, is ultimately applied only to intra-European flights, penalizing European airlines in their competition with airlines from the Middle East, Turkey and China for extra-European travel...** At global level, Europe has been unable or unwilling to impose its logic. **Another system, Corsia, has been set up (voluntary until 2025, then imposed). A less efficient but, above all, less expensive system. Do we really need to guess which system is preferred by the world's airlines...?**

5 Intermodality

Europe is the country with the greatest number of possibilities for promoting intermodality. Europe's rail network, particularly its high-speed network, is the densest in the world. There are also under-exploited or untapped opportunities in shipping for the transport of goods. An integrated policy could/should promote the rational, economic and ecological interaction of different modes of transport like nowhere else in the world. **Initiatives are still rare** (the train from Gare du Midi to Charles de Gaulle or Schiphol). France's recent decision to limit intra-French links where a TGV alternative exists is highly symbolic: it currently concerns only three links between Nantes, Bordeaux and Lyon, only with Orly, and represents a gain of 0.3% of Air France's CO2 emissions. With the hypocrisy that flights to these three cities continue from Charles de Gaulle. Harmonize, organize, improve, coordinate, intermodalize... **Europe hesitates, Europe waits. Let's not forget that improving links between airports and the rail network was included in the European White Paper of a certain Jacques Delors, in the mid-1980s.**..

My comment: *When I look at myself I feel sorry, when I compare myself I take comfort.*

Although Europe could do more to decarbonize aviation, it has nothing to be ashamed of in comparison with other regions of the world.

It has taken the lead in the development of sustainable aviation, whether through research into new fuels or by setting decarbonization targets higher than those proposed worldwide.

Europe now needs to give itself the means to provide European airlines with a sufficient supply of sustainable aviation fuels - a major challenge.

> Green fuels: a budgetary and fiscal time bomb

(source La Tribune) July 6 - There's a consensus on the solution: green fuels have emerged as a response to the necessary ecological transition that, like all sectors, the transport sector must make. And in his report on "the development of a biofuels, sustainable synthetic fuels and green hydrogen sector" for the decarbonization of transport, Senator and Quaestor Vincent Capo-Canellas (Union Centriste) is clear: these new energies "will not provide the whole answer, but they will play a central role".

And the 27 proposals in his report all point in the same direction: France must make strategic choices without delay to "stimulate" the creation of green fuel sectors, "support" the development of production and uses, and "simplify" the regulatory and fiscal framework, or risk seeing the gap with other nations widen irretrievably. However, behind this strong desire for a sovereign France on the offensive, a "nebulous" situation is emerging: the question of financing requirements, described as "massive", which are intertwined with revenue losses and the emergence of new costs.

What kind of financial contribution from governments?

Behind the term "nebulous" used by Vincent Capo-Canellas, several phenomena are intertwined. First of all, there is the question of the financial contributions that will be made by the State. For the time being, French and European policies are essentially based on incorporation mandates (a percentage of green fuel integrated into fossil fuels), although Brussels does allow States to grant tax reductions on road biofuels. However, the report advocates the need for temporary incentives to support the entire chain, following the example of the Inflation reduction act in the United States. This includes research & development (R&D), the investments needed to launch the sectors (Capex), but also the financing of operating costs (Opex) until the sectors have reached a sufficient level of maturity, and finally purchase subsidies to support use until the massification of production brings prices down.

An incomplete support system As in the case
of sustainable aviation fuels (SAF), only part of this spectrum is covered today. France has stepped up its support for R&D through the Council for Civil Aeronautics Research (CORAC), with 1.5 billion euros granted between 2020 and 2022, and a further contribution of up to 300 million euros a year over the period 2024-2030 announced by Emmanuel Macron before the Paris Air Show. Even if this envelope is not directly targeted at SAF, it should contribute to the low-carbon aircraft.

Beyond R&D, the rest of the financing needs are less well provided for. In his address on June 16, the French President pledged an additional (one-off) 200 million euros directly earmarked for the creation of a French SAF production sector, but as Vincent Capo-Canellas points out, this may prove insufficient: "It's always a positive thing to help finance a plant, but 200 million euros is just a few barrels of renewable fuel in an ocean of kerosene. A plant costs more than 1 billion euros. If this sum is enough of an impetus, that's a good thing, but we have to bear in mind that the need for investment is still likely to be very substantial."

Not to mention operating costs (Opex), which are not taken into account.

The senator adds that the next priority is to bring prices down. As Anne Rigail, CEO of Air France, explained at the Paris Air Forum: "At present, a tonne of SAF in France costs 5,000 euros. The average price worldwide is 3,500 euros. And we can find a tonne for 2,000 euros in the United States". While Vincent Capo-Canellas admits that the massification of production will contribute to this drop in prices, he believes - contrary to the government - that temporary purchase incentives will also be needed to offset the extra cost compared with fossil kerosene.

Vincent Capo-Canellas, Quaestor at the French Senate, is well aware of government budgetary constraints, but is not calling for spending sprees. He insists on the necessarily temporary nature of these subsidies, to avoid having "an industry on life support". Without denying the principle of technological neutrality, his first proposal calls for "directing public funding towards the launch of new sectors, to create the conditions for mature markets, then evaluating and redirecting public efforts", and thus prioritizing the sectors that are most difficult to decarbonize and where alternatives are lacking.

But the problem is likely to go far beyond direct support for the production or use of biofuels, particularly when it comes to transforming the energy mix. Transport is the biggest consumer of final energy in France, with 501 terawatt-hours (TWh) consumed in 2021, out of a total of 1,618 TWh. Ninety-one percent of this energy comes from petroleum products (gasoline, diesel, jet fuel), 7% from incorporated biofuels and only 2% from electricity (mainly for rail use).

Doing without fossil fuels will mean mobilizing biomass, which will require infrastructure and logistical capacity, to produce biofuels. Above all, it will require increased use of electricity to power vehicles directly - particularly with the migration of passenger cars to all-electric - but also for the production of synthetic fuels that are to succeed biofuels. All this will require the rapid development of low-carbon electricity production capacity in France, as well as connections to distribution

infrastructures and synthetic fuel and hydrogen production facilities. These too will require substantial investment.

The Senate report points out that electricity needs are set to grow exponentially, citing RTE's latest assessment for France: electricity consumption is set to rise from 460 terawatt-hours to between 580 and 640 terawatt-hours by 2035. And this could be largely due to transport. For synthetic aviation fuels alone, the report cites an initial estimate by Ademe which "shows that to meet the RefuelEU Aviation targets, additional electricity consumption of 80 to 130 TWh would be required by 2050 to produce the necessary e-kerosene". This is equivalent to the annual production of more than ten nuclear power plants.

Less petrol, less tax revenue

These additional expenses could well be combined with a loss of revenue for the State. The drop in fossil fuel consumption in the road
sector will inevitably lead to a reduction in the tax base, and therefore in revenues from the domestic consumption tax on energy products (TICPE) and value-added tax (VAT), which bring in some 45 billion euros for the State every year. For the time being, only the Direction Générale de l'Energie et du Climat (DGEC) has put the net loss of tax revenue at 4.1 billion euros between 2019 and 2030, mainly as a result of the drop in diesel. But Vincent Capo-Canellas regrets that this point is never clearly addressed in depth, and therefore calls on the government "to assess the loss of tax revenue on fossil fuels as soon as possible".

The report is also concerned about the consequences for consumers, from road hauliers to air travellers, who will see their bills swell as a result of the higher price of non-fossil fuels. It also points to the problem of social acceptability, especially as this movement will also affect other sectors such as housing. According to the text, certain sectors require an adapted transition.

The time bomb from Brussels

The report also detects what Vincent Capo-Canellas describes as "a small time bomb" with the evolution of the European tax framework on fossil fuels. Specifically, he refers to the reform of the EU Emissions Trading Scheme (EU ETS), which provides for an annual reduction in the emissions cap, the gradual disappearance of free allowances by 2026, and an increase in the cost of allowances. As a result of these changes, the Air France group estimates that the EU ETS will cost it more than 100 million euros in 2023, more than 300 million euros in 2027, and 450 million euros in 2030.

But it could also affect a much wider audience with the extension of the mechanism. In 2025, it will apply to "entities releasing for consumption" fuels for road transport and housing (EU ETS2). Initially declaratory, from 2027 the system will represent "a financial burden that is intended to be passed on to end consumers", i.e. households.

This rise in the price of fossil fuels could also coincide with a rise in the price of... non-fossil fuels. On
June 23, the European Commission adopted a revision of the General Block Exemption Regulation (GBER), which excludes first-generation biofuels - such as biodiesel and bioethanol - from the list of energies eligible for reduced national

taxation. This "concomitance of two European regulatory evolutions may prove disruptive, and in any case, the bill for the consumer will increase", says the report. When questioned on these issues, the Minister for Energy Transition, Agnès Pannier-Runacher, "was reassuring during her hearing", but that doesn't stop Vincent Capo-Canellas from worrying that there is too little awareness of what could be "a fiscal wall in front of us", which "could spell trouble for the future". He therefore calls on the government to "take the offensive in defending first-generation biofuels with the European Commission".

Figures yet to be compiled

Vincent Capo-Canellas is reluctant to put a figure on the energy transition in the transport sector. For him, his mission over the past four and a half months has been to clarify a situation that is far more complex than it first appears, and to draw lines that will make it easier to understand the issues and identify possible solutions. In short, to clear the way. Above all, he does not want these walls of investment or consumer spending to discourage the boldest, slowing the momentum of decarbonization and delaying decisions that are becoming urgent.

Nevertheless, the senator acknowledges that the next step is most certainly to put a figure on it. And that, above all, involves the State. In fact, several recommendations are along these lines, calling on the government to establish precise figures for the coming years.

Nevertheless, the report cites several sources on the subject, most notably the report "Les incidences économiques de l'action pour le climat", by economists Jean Pisani-Ferry and Selma Mahfouz for France Stratégie. **To reach the target of a 55% reduction in greenhouse gases by 2030, the report states that additional investments of €66 billion a year are needed in all sectors combined, part of which will be spent on transport**.

The Institut de l'économie pour le climat (I4CE), based on Ademe 's "Transition(s) 2050" scenarios, estimates an average requirement of 22 billion euros per year (with a range between 14 and 30 billion euros). This is the minimum amount that needs to be invested in addition "in buildings, transport and energy production to get us on the road to carbon neutrality, as these minimum amounts do not cover the needs in agriculture, industry or adaptation to climate change", says the Senate report. The figures could therefore turn out to be even higher.

My comment: Little by little, *each sector of the economy is drawing up its own decarbonization roadmap.*

These roadmaps should make it possible to identify decarbonization levers and any obstacles to be overcome, as well as the levers mobilized by each party to achieve France's greenhouse gas emissions reduction targets.

To date, most sectors are focusing on replacing their fossil fuel sources (gas or oil) with electricity. This is particularly true of the aviation sector, which will need a huge

volume of electrical energy to manufacture the sustainable aviation fuels it requires.

But this is almost the first time that the electricity needs of the French aviation industry have been quantified (in this article): 10 nuclear power plants would be needed, by 2050, to produce the volume of synthetic kerosene that airlines operating from France will need!

Is this financially feasible, and will it be accepted by public opinion?

Or, as the Senate report suggests, will we have to resort to first-generation biofuels, a type of fuel strongly criticized for competing with food?

As a reminder, a first-generation biofuel is an agrofuel produced from crops traditionally used for food. More specifically, the reserve organs of oil or sugar plants are used to produce biodiesel or bioethanol, or even biokerosene...
es

> Every hour, European governments lose 4 million euros in aviation taxes.

(source Transport & Environment, translated with Deepl) July 12 - **European governments lost 34.2 billion euros in revenue last year due to very low levels of taxation in the aviation sector**, according to a new study by the environmental group Transport & Environment. The 34.2 billion euros would finance 1,400 km of high-speed rail infrastructure, equivalent to the distance between Hamburg and Rome[1].

The analysis focuses on the revenues that would have been generated by air transport pricing had the sector not benefited from exemptions. It compares these revenues with those actually collected over the course of a year. This is known as the "fiscal deficit". **The sector pays no kerosene tax, little or no ticket tax or VAT, and a carbon price on intra-European flights only.**

The British and French governments would have collected an extra 5.5 and 4.7 billion euros respectively if aviation had been taxed appropriately. The four European countries with the widest tax differentials are the UK, France, Spain and Germany, mainly due to the size of their aviation sectors. Although France, Germany and the UK levy a ticket tax, their low levels of taxation do not close the gap.
Air France and Lufthansa are the two biggest contributors to the tax gap in Europe, due to the size of their business. Europe lost 2.4 and 2.3 billion euros in revenue thanks to the activities of these airlines. **The study distinguishes between taxes imposed on passengers and those imposed on airlines. Ticket taxes and VAT**

are imposed on passengers, while fuel taxes and carbon pricing are directly attributable to airlines. Of the 34.2 billion euro difference, 20.5 billion euros should have been paid by the carriers in fuel taxes and carbon pricing.

Jo Dardenne, aviation director at T&E, explains: "Europe is losing money by not taxing the aviation sector. Airlines are closing in on record profits this year, as they spew polluting fuels into our skies. But **governments don't want to touch their precious national airlines**. How can they justify to the public that drivers pay more in fuel taxes than Air France and Lufthansa?

If no action is taken, the tax gap will increase by 38% by 2025, as the sector is set to expand in the years ahead. Eurocontrol estimates that traffic will reach 92% of pre-COVID levels by 2023, and will fully recover by 2025. By then, the fiscal gap could reach 47.1 billion euros, according to T&E.

Closing this gap and remedying aviation's under-taxation should be a top priority for governments. **The study recommends applying a kerosene tax, a 20% VAT rate on tickets and extending the aviation carbon market to all departing flights.** These changes would make it possible to close government budget deficits. In the absence of these measures, T&E recommends applying a ticket tax equivalent to the gap found in each country.

The study shows that higher taxes will have an impact on passenger ticket prices. **This could lead to a drop in demand** and a reduction in CO2 emissions. The study finds that the end of exemptions in 2022 would have saved 35 Mt of CO2, with an even higher total climate impact if the effects of aviation on emissions other than CO2 are taken into account. As the sector seeks to decarbonize, the revenues generated by taxation should be partly reinvested in green technologies, including e-kerosene.

Jo Dardenne concludes: "**Taxation should not be seen as a punishment, but as a way of making those who benefit most from aviation's under-regulation pay fairly**. The better-off in society have paid far too little for their flying habits. Furthermore, taxation will not limit aviation's investment capacity. On the contrary, **taxing aviation will benefit citizens and the sector in the long term, as governments will step in to finance the transition to clean energy, including for aviation**. It's time to put an end to the era of cheap flights and rising emissions."

[1] According to a report by the European Court of Auditors, building a TGV line in the EU costs an average of €25 million per kilometer. We have calculated that 1,368 km of track could be built for a total of 34.2 billion euros. This would cover the distance between Hamburg and Rome (1309 km).

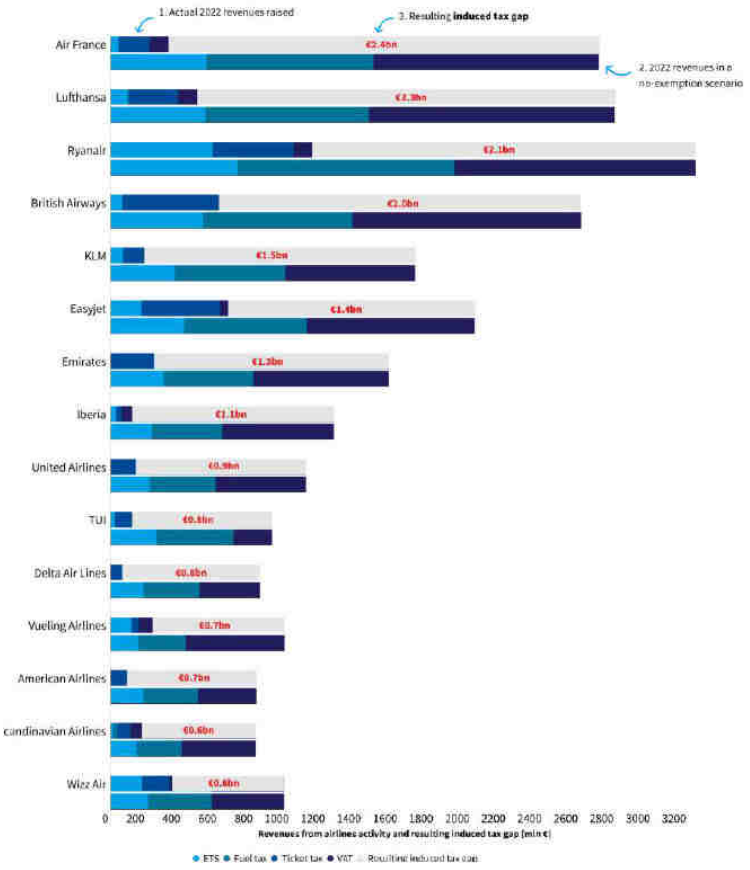


Figure 10: Induced tax gaps for the top 15 emitting passenger airlines in 2022

My comment: *Several media (Le Monde, Air Journal) have reported on the study published by the Brussels-based NGO Transport & Environment.*

Rather than offer you an article, I preferred to publish a summary of the study extracted from the NGO's website.

During the work carried out by my team (which led to the creation of the Sustainable Aviation Observatory), I had the opportunity to exchange views with some of the report's authors. My interlocutors were sincere people seeking to understand the problems of air transport.

The full 78-page study is available here.

According to the NGO, tax differentials (VAT, fuel taxes, carbon prices) between European countries are significant. Similar discrepancies are found between airlines operating in Europe (see table above).

To remedy this, the NGO proposes (page 39) a variable tax depending on the route:
●
€23 for domestic travel ●
€51 for intra-European travel

● €259 for extra-European travel.

The proceeds from these taxes would be used in part to finance the decarbonization of air transport in Europe.

But as is often the case, the study fails to address the economic and social impacts. A few examples:
● What will happen to jobs in the tourism sector?
● What will be the consequences for North African countries if passengers from Europe have to pay an additional €259 tax?

More generally, in the fight against climate change, two questions are, in my view, at the heart of the debate:
● how should the efforts required be distributed within a country?
● should the inhabitants of countries with a lower standard of living than Westerners be allowed to erase the differences?

The example of Morocco (see previous article) is typical.

Anecdotally, the study highlights the extra aid granted to Ryanair (page 46): for the same flight, the Irish airline pays 2 to 3 times less tax than traditional airlines.

> Debate: Decarbonization, quotas... what to do with airplanes, the privilege of a minority?

(source The Conversation) August 2 - President Emmanuel Macron recently stated his intention to invest several billion euros in decarbonizing aviation. Several voices have been raised to underline the risky, even illusory nature of this ambition, and the urgent need to reduce air traffic.

A few weeks earlier, the engineer Jean-Marc Jancovici proposed limiting the number of flights in a lifetime to four, sparking a heated debate on reducing the use of airplanes by individuals.

However, these polemics overlook a central aspect of the problem: **air travel is a privilege that maintains relations of domination within and between countries.**

Air travel, a privilege of the global North
Emmanuel Macron's speech, Jean-Marc Jancovici's proposal and most of the reactions they provoke are based on a presupposition: air travel is an unavoidable means of transport, and the problem is that it pollutes. Yet between 80% and 90% of human beings have never taken a plane in their lives. In **2018, only 4% of the world's population took an international flight**.

This minority who do travel by air are not evenly distributed across the planet: they live in wealthy countries. Around 40% of people in the wealthiest countries have flown at least once in the year, compared with less than 1% in the poorest countries.

If we relate the distances flown from a continent to its population, the distance per head is 3,000 km in Europe, compared with 100 km in Africa. **Most airlines connect countries in the global North. They are used to move people between these countries, for leisure, but also to fuel trade and economic exchanges**.

The airplane is therefore a mode of transport that supports the economic and political domination of the countries of the North, and contributes to class domination within them.

Let's take France as an example: air travel is far from commonplace, and remains the prerogative of the wealthiest and most highly educated. More than half of the wealthiest 10% of French people fly at least once a year, compared with 13% of the poorest 50%. This is the case for a third of people with higher education qualifications, compared with 10% of those with fewer qualifications.

Travel has long played an important role in the socialization of the elite. Whether as part of a cultural or study trip abroad, they help to prepare them to occupy dominant positions. Later on, they help them maintain a cosmopolitan lifestyle or career that indicates their class allegiance.

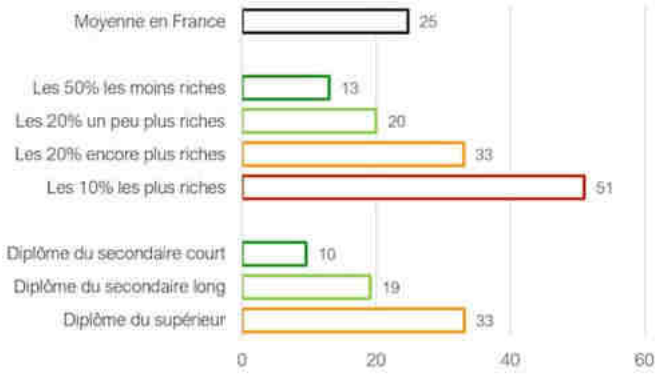
Flying is therefore a privilege that enables the accumulation of lasting resources - or capital - of many kinds: social, cultural and economic. As a result, the social trajectories of members of the dominant classes are marked by a significant number of airplane flights.

And yet, the strong social selectivity of air travel is barely visible in public debate. This is because the people who take part - economic or political leaders, scientists, journalists - speak from their class position.

For them, air travel is familiar, even if they now consider it a problem or have given it up. This leads them to spread the - false - idea that a flight quota is a limitation for everyone. They fail to see that this is mainly the case when the aircraft is crucial to maintaining a dominant position or passing it on to one's children. Jean-Marc Jancovici can thus generalize:

"Four flights in a lifetime is not zero, we could very well set up a system in which, when you're young, you have two of the four flights to go and discover the world."

Annual air travel rate (%) by standard of living and level of education



33% of university graduates have flown at least once in the year. Eurobarometer 2014, Enquête nationale transports 2008, Demoli and Subtil, 2019.

The carbon footprint issue A
marker of class domination, air travel is an excessive emitter of greenhouse gases (GHGs), far more than any other means of transport.

Every year, on average, an upper-class person emits several tonnes of GHGs when travelling by air. As a result, the carbon footprint of her social trajectory is out of all proportion to that of most individuals, who have never flown in their lives, or only flown exceptionally.

As a result, the sustainable resources she has accumulated through these trips have come at a very high ecological cost. Whether or not this person has stopped flying in recent years only marginally changes the cost of their privilege.

The debate on the future of air travel is therefore primarily about the ecological footprint of dominant social positions, and not about universal individual behavior that needs to be corrected.

Quotas, an ambivalent proposal
From this perspective, **how should we interpret the idea of a quota of four airplane flights in a person's life?**

The first interpretation is progressive. It could be argued that extending the privilege of flying four times to the whole of society would enable all young people, without distinction, to "discover the world". However, this interpretation is extremely costly in ecological terms.

Flying each person four times in his or her life would consume a very large proportion of the carbon budget remaining to mankind. To
give an order of magnitude, offering every Frenchman and woman four Paris-New

York
round-trips in their lifetime would consume the equivalent of 6% of the vastly overestimated carbon budget that the National Low-Carbon Strategy allocates to transport by the end of the 2020 decade.

As the carbon budget decreases over the years, this would weigh even more heavily: these flights would be equivalent to 5 to 10% of France's total carbon budget in 2050.

This progressive interpretation is hardly conceivable. Another, probably more in line with Jean-Marc Jancovici's vision, would be not to encourage people who don't fly to fly, but to limit those who do.

Ultimately, this means allowing members of the upper classes in Northern countries to continue to enjoy the privilege of flying a little. So it's their privileges that should be the focus of the debate, like that emerging around the decarbonization of aviation.

Decarbonizing for a minority?
If we want to keep global warming to a minimum, continuing to fly airplanes means rapidly decarbonizing them. This is the case even if we decide to limit flights by the upper classes of the richest countries.

However, in the short term, there is no solution that will enable us to fly as much without emitting GHGs. **Emmanuel Macron has** therefore **proposed an investment of 8.5 billion euros between now and 2027 to develop "ultra-clean aircraft" and sustainable fuels.**

The ambition appeals to the world of engineers, whose properties are in affinity with both the aircraft standard and this type of technological reasoning. It also provokes a great deal of opposition: ultra-clean
aviation will not exist in the foreseeable future, and it would in any case require a very large amount of farmland or low-carbon electricity.

But **the question is not just whether it's possible, but whether it's desirable**. Before deciding whether a sector merits such an investment, let's get back to the heart of the debate on more thorny issues than technological feasibility: who are we giving the opportunity to consume such a large share of humanity's remaining carbon budget? To what collective ends?

A necessary democratic debate
Asking these questions would make it possible to address a central dimension of the ecological catastrophe: it is first and foremost the work of the planet's most privileged fractions, in terms of class as well as gender and race.

Such a debate would help to make more acceptable the necessary downsizing of a sector which, while a symbol of French industry, is also one of the most unfair and carbon-intensive in recent history.

To make it more acceptable, including in the eyes of those who will suffer most: those who work in it. This would be an interesting democratic exercise, which should be followed by many others.

My comment: *The authors of this article are Yoann Demoli , Senior Lecturer in Sociology, Université de Versailles Saint-Quentin-en-Yvelines (UVSQ) and Julien Gros, CNRS Research Associate, affiliated with LISST (Université Toulouse Jean-Jaurès).*

Among other things, they address an often-heard question: is air travel a means of transport for the rich?

On a global scale, the answer is clear: yes.

40% of people in the wealthiest countries have flown at least once in the year, compared with less than 1% in the poorest countries.

I've been wondering about this for a long time. Is aviation destined to carry 40% of the world's population by 2050?

If so, how can we hope to limit the impact of aviation on the climate? If not, how can we explain to those who don't travel today that they won't be traveling tomorrow?

This question applies to all aspects of the fight against climate change. Should inequalities persist in the name of this fight, or should we develop decarbonization scenarios that incorporate a reduction in global inequalities?

According to Céline Guivarch, economist at CIRED:

"Generally speaking, both at country and individual level, the least wealthy are the most vulnerable to climate change, while the richest are responsible for the majority of GHG emissions.
(...)
Because emissions are so low in the least developed countries, it is illusory to think that they will be able to develop without increasing their emissions. This means that very strong action is needed to reduce emissions in developed countries".

Are we ready?

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Special tax file

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My preliminary comment: *The eco-tax on air transport is a subject that has been debated and adopted in several European countries to combat climate change.*

It aims to reduce CO2 emissions by making air transport less financially attractive, while generating revenue that can be reinvested in environmental initiatives.

I've written about this subject on several occasions. Here is a summary.

> June 2019, 1st mention of Air Passenger Duty, an example for E. Borne

(source La Tribune) June 21, 2019 - Rather than a kerosene tax deemed too complex in operational terms, **Transport Minister Élisabeth Borne is raising the idea of a passenger tax along the lines of the Solidarity Tax or the British Air Passenger Duty**. (...)
Contrary to the
wishes of the airlines, the proceeds of this new tax should not be reinjected into air transport, but rather, as will be the case for the surplus from the Solidarity tax, into the financing of land transport: "Isn't investing in the railways a contribution to the environment?" replied Élisabeth Borne when asked about the use of the proceeds of this new tax.
(...)

My comment: *In July 2020, the Citizens' Climate Convention will make a proposal (the sd-e1) to adopt an enhanced eco-kilometre charge. It too will be on similar lines to the British Air Passenger Duty.*

Read more below: A €4 billion ecotax: the dark scenario haunting French air transport.

> October 2019, vote on the ecocontribution in France, based on the

Chirac tax

(source Journal de l'Aviation) October 21, 2019 - Article 20 of the bill provides for the system of the solidarity tax (taxe Chirac) to be modified to include this "eco-tax".

The government estimates that this tax will amount to 180 million euros a year - but the law provides for a ceiling of up to 230 million euros. It will be levied on airline tickets departing from France, at a rate of between 1.5 and 18 euros, depending on the length of the flight and the class of travel.

Its aim is not to help make air transport cleaner, invest in research or create a commercially viable aviation biofuel industry. No, the entire sum should be earmarked for financing so-called clean everyday transport, in particular rail.

My comment at the time: First of all, *a clarification: this new tax, like the solidarity tax (known as the Chirac tax), will not apply to connecting passengers.*

France is not the only country in Europe to apply an eco-tax to air transport:
. The Netherlands announced at the end of last year [2018] that KLM will have to pay an additional 240 million euros: 140 million euros in aviation tax to the Treasury and 100 million euros for noise pollution.
. In Germany, the government has decided to introduce a new tax to benefit the development of rail links, estimated at 740 million euros a year (see below).
.
In Great Britain, the Air Passenger Duty, which aims to limit the climate impact of air transport, will bring in 4.3 billion euros in 2019.

While the amounts vary from country to country, there is one constant: airlines deplore the fact that the proceeds of these taxes are not earmarked for research into alternatives to kerosene, which would help reduce co2 emissions.

> October 2019, Germany will drastically increase its tax on airline tickets

(source Les Échos) October 21, 2019 - **Germany's cabinet on Wednesday passed a bill to increase taxes on airline tickets by 74% for domestic flights and flights within Europe, and by 41% for long-haul flights**. (...)

In detail, taxes on domestic and European flights departing from Germany will rise by 5.53 euros, to 13.03 euros. Taxes on long-haul flights will rise by between 10 and 16 euros, depending on whether or not they exceed a distance of 6,000 kilometers. All in all, the bill could approach 60 euros for the longest routes. (...)

For its part, the German government expects additional tax revenues of 740

million euros, which it will use to finance the lower VAT on long-distance train tickets.

My comment: *For a long time the poor relation of the country's transport policy, rail is the major beneficiary of this shift to drastically reduce CO2 emissions.*

The German climate package also calls for a further €20 billion to be injected between now and 2030 to modernize rail infrastructure and boost Deutsche Bahn' s capacity.

> September 2020, a 4 billion euro eco-tax: the black scenario haunting French air transport

(source La Tribune) September 14, 2020 - (...) **Seven proposals from the citizens' convention on aviation**.

The proposal to significantly increase the ecotax on air passengers would result in an increase in taxation on the sector of almost 4 billion euros based on passenger traffic recorded in 2019.
While the **tax currently ranges from 1.5 euros in economy class on domestic and intra-European flights to 18 euros in business class** on non-EU flights, **the citizens' convention recommends raising it to 30 euros in economy class and 180 euros in business class on flights under 2,000 kilometers, and to 60 euros in economy class and 400 euros in business class on flights over 2,000 kilometers**. Private jets would be even harder hit: 360 euros for flights under 2,000 km and 1,200 euros for longer flights.
In the end, still based on 2019 traffic, **the tax would generate revenues of 4.2 billion euros, compared with 440 million euros in 2020, taking** into account the increase scheduled for the beginning of the year. As a reminder, while last year's ecotax was in fact an increase in the Solidarity tax (Chirac tax)

Option proposée : Tarifs différenciés par distance

	Vols < 2 000 km	Vols > 2 000 km
Classe éco	30	60
Classe affaire	180	400
Jet privé	360	1200

My comment at the time: *Is the eco-tax proposed by the citizens' climate convention a new tax?*
No, it's a modification of an existing tax. The enhanced eco-kilometre charge has been modelled on the Air Passenger Duty, which has existed in the UK for over ten years.

Will this tax distort competition?
Yes, it is far superior to all similar taxes levied on the main European airlines,

whether in the UK, Germany or the Netherlands. What's more, it would add to existing taxes in France that do not exist in other European countries.

Will this tax help reduce CO2 emissions from air travel?
No. As it is presented, it will not be used to finance research into an alternative fuel to kerosene, even though projects do exist: third-generation fuels, use of hydrogen. If successfully implemented, these projects could reduce CO2 emissions from air transport to zero within the next fifteen years.

Have airlines acted, and will they continue to act, to reduce their CO2 footprint?
Yes. By 2020, Air France has committed to offsetting 100% of the CO2 emissions from its domestic flights - some 500 daily flights before the crisis - and to reducing CO2 emissions from its domestic network by 50% by 2025, through fleet modernization and route closures.

Do French airline professionals reject any form of taxation?
No. They are calling for the efforts required of airlines to combat global warming to be decided and harmonized at European level. They are asking that this eco-tax be used to finance projects to reduce airline CO2 emissions. They also ask that the implementation of this tax should only take place once the airlines have returned to financial equilibrium.

> November 2020, the Netherlands to impose a tax of 7.45 euros per airline ticket

(source Air Journal) November 16, 2020 - **Passengers departing from airports in the Netherlands will pay a tax of 7.45 euros per airline ticket from January 1**, according to a decision by the Dutch government.
There will be no tax on cargo flights, however, because, according to the Dutch government, companies could move abroad, with disastrous consequences for Schiphol-Amsterdam airport, for example. The new air tax is expected to raise around 200 million euros a year for the Dutch government. However, it will not apply to transit passengers. The amount will be set annually on the basis of inflation.

Last year, nine European Union member states (France, Germany, Italy, the three Benelux countries, Sweden, Denmark and Bulgaria) urged the European Commission to open the debate on taxing the airline sector, "for example through specific fiscal measures or similar policies".

My comment at the time: *While the amounts vary from country to country, there is one constant: airlines deplore the fact that the proceeds of these taxes are not earmarked for research into alternative solutions to kerosene, which would reduce co2 emissions.*

> September 2022, the Netherlands will quadruple its tax on air travel

(source Le Figaro) September 12, 2022 - **From the beginning of next year**, (...) according to sources interviewed by the Dutch daily De Telegraaf, the country plans to charge more to those who fly out of its territory. Although the news has not yet been officially announced, **the passenger tax could rise from 7.95 euros to 28.58 euros per ticket from January 1, 2023.**

My comment at the time: Little by little, *environmental taxation of air travel is spreading across Europe.*

In November 2020, here's what I wrote on the subject.

As early as the end of 2018, the Netherlands had announced the implementation of this tax [of 7.45 euros at the time], which should impact KLM to the tune of 140 million euros per year.

In Germany, the government has decided to increase its tax on airline tickets. This will bring in an additional 740 million euros a year.

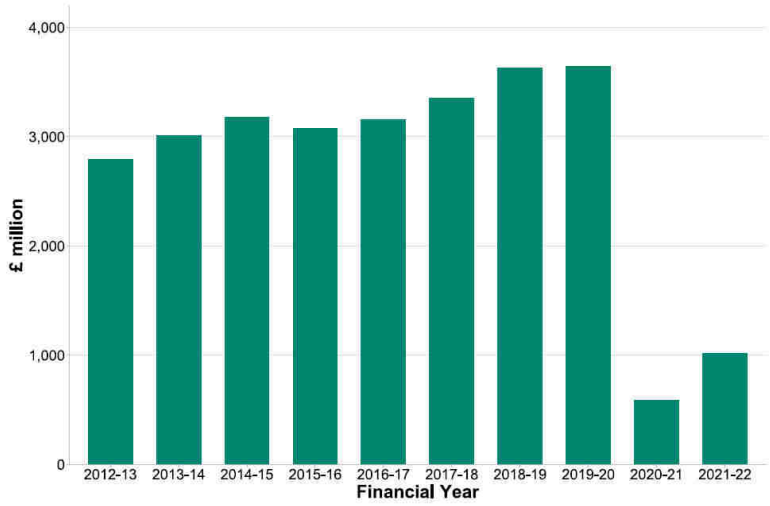
In Great Britain, the Air Passenger Duty, which aims to limit the climate impact of air transport, has been in place for over ten years. In 2019, it brought in 4.3 billion euros for the British government.

> In April 2023, the UK halves the tax on domestic flights

(source Les Echos) April 10, 2023 - - It wasn't an April fool's joke, but a decision that bucked the European trend. On April 1, **the UK halved its Air Passenger Duty (APD) on domestic flights, in a bid to boost air traffic on domestic routes**. The APD tax, which has applied to all flights departing from the UK since 1994 and varies according to the length of the journey, was reduced from £26 to £6.5 per segment (7.5 euros), or £13 for a round trip (15 euros).

However, another facet of the government's measure is also upsetting the airlines. The reduction in APD on domestic flights will be more than offset in the State budget by an increase in the same tax on long-haul flights of over 5,500 miles (8,851 km), which has risen from 82 pounds per flight in "economy" class to 91 pounds (104 euros) and up to 607 pounds (694 euros) in Première.

Figure 1: Total APD receipts for the previous 10 financial years



***My comment at the time: The** overall Air Passenger Duty (APD) revenue collected by the UK government was estimated for the year 2022-2023 at £3.5 billion (€4 billion), close to the maximum seen over the last ten years (see graph above).*

To my knowledge, this tax, whose aim is to limit the climate impact of air transport, is unrivalled in Europe in terms of its size.
Will
the measure (reducing the tax on domestic flights and increasing it on longer flights) in force from April 1 have any impact on the behavior of British travelers?

British airlines have begun to respond: they are increasing their summer program on domestic flights, while continuing to increase their long-haul program.

> What taxes already cost us on a plane ticket

(source Capital, excerpt) July 12, 2019 - To understand why taxes weigh up to 62% in the price of a ticket, all you have to do is look at airline taxation.

The civil aviation tax, specific to France and collected by the State, enables the DGAC (Direction Générale de l'Aviation Civile) to operate smoothly. It amounts to 4.58 euros per passenger for flights from France to the 28 countries of the European Union, Switzerland, Iceland, Norway and Liechtenstein. For journeys beyond these countries, you should expect to pay 8.24 euros. **Airports**
then **collect a tax in their name, which is used to finance security services** (baggage screening, detection equipment, etc.), **safety services** (fire, terrorist attacks) **and environmental controls**". The levy varies from airport to airport, which goes some way to explaining why the total amount of taxes varies from one ticket to another.
Then, effective in only 9 countries, comes the **solidarity tax, also known as the "Chirac" tax, the** proceeds of which go to UNITAID for vaccination aid in developing

countries. This time, airlines pay 1.13 euros per economy-class ticket (11.27 euros per first- or business-class ticket) to France, the 28 countries of the European Union, Switzerland, Iceland, Norway and Liechtenstein. For travel to other countries, the Chirac tax rises to 4.51 euros per economy ticket and 45.07 euros per first or business class ticket.
Last but not least, airlines pay **the noise tax,** which also varies according to the noise level of each aircraft and the time of day it flies. Revenues from this tax are used to finance the insulation of homes located in a defined area around France's 11 main airports.

Other obligations for airlines are more in the nature of fees. The most notable of these is the "passenger" fee, paid by airlines to airports for the use of infrastructures designed to receive passengers and the public. Naturally, the amount of this fee varies according to the number of passengers carried by the airline, and also varies from airport to airport according to passenger flow. Expect to pay between €4.30 and €13 per ticket.

And don't forget VAT (10%) on domestic flights, which also applies to most of the above taxes.

My comment: *The ecocontribution is in addition to the various taxes and fees described above.*

> Ecocontribution in Europe: Summary

(various sources) September 8, 2023 - Eco-taxes on air transport are a topic that has been debated and adopted in several European countries to combat climate change. These taxes aim to reduce CO2 emissions by making air transport less financially attractive, while generating revenue that can be reinvested in environmental initiatives. Here's a comparison of eco-taxes on air travel in selected European countries

France:
In 2019, France has announced an eco-tax on airline tickets for all flights departing from France, except to Corsica and overseas territories.
This tax varies from €1.50 for a domestic or intra-European flight in economy class to €18 for a flight outside the EU in business class.

Germany:
Germany introduced a tax on airline tickets in 2011.
Fares vary according to distance: around €7.50 for short-haul flights, €23.43 for medium-haul flights and €42.18 for long-haul flights.

United Kingdom:

The UK has an "Air Passenger Duty" (APD) which is one of the highest air taxes in Europe.
It varies according to distance and class of travel, ranging from €7.50 for short economy flights to over €600 for long-haul flights in premium classes.

Sweden:
Sweden introduced a tax on airline tickets in 2018.
It varies from SEK 60 (approx. €6) for short flights to SEK 400 (approx. €40) for long-haul flights.

Norway:
Although not a member of the EU, Norway has also had a tax on airline tickets since 2016.
It is around 80 NOK (around €8) regardless of destination.

Netherlands:
The Netherlands has introduced an air ticket tax of €7.95 per passenger from 2021, but plans to increase this to €28.58.

My comment: *Some of the amounts quoted are approximate or have not yet been definitively adopted.*

To my knowledge, these six countries are the only ones in Europe to have adopted an eco-tax.

> Should we increase the air ecocontribution?

(source Les Echos / Opinion) September 6 - Announced several months ago, **the increase in the ecocontribution paid by airlines seems to be taking shape**. While the scope and amount of this tax are still under discussion, it is nevertheless worth considering whether it is justified.

The ecocontribution is used to fund the Agence de financements des infrastructures de transport de France (Afitf), whose aim is to invest in rail, port and road infrastructure. Air transport has already been subject to this tax since 2020.

Why ask the air transport sector alone to increase its contribution? Air transport accounts for between 2% and 3% of global CO2 emissions, compared with 8% for road haulage, which is not affected by such an increase.
It will be objected that air transport pays no taxes on kerosene, either for international or domestic flights. But there's a quid pro quo: all airlines must pay the safety and security tariff, which finances a mission of the French government. They are also subject to no less than five specific taxes.

This transfer of revenue from air to rail is all the more paradoxical in that a tax is being increased in a highly competitive sector to finance a rail sector that remains a virtual monopoly. Contrary to popular belief, air travel is a low-margin business. According to the International Air Transport Association (IATA), **worldwide profit per air passenger in 2023 is expected to be $2.25** - half the price of a coffee [in Geneva], to use IATA's image. In other words, any increase in the ecocontribution will be passed on in full to passengers.
Beyond its targeting of the airline sector alone, the **increase in the ecocontribution raises two questions: that of its base and that of the allocation of revenues**.
With regard to the tax base, **it currently applies only to flights departing from France**, with the amount differentiated according to flight length and travel class.
Such a limited geographical scope is likely to generate distortions of competition. Indeed, a passenger departing from the provinces and making a connection in Paris on a long-haul flight will have to pay this ecocontribution twice.
Conversely, if they make their connection in Germany or the UK, they will only have to pay once, and on the shortest flight. **Such a situation will undermine the competitiveness of an already ailing French flag**. Ecocontribution should be designed at least on a European, if not global, scale, to limit traffic leakage and connections to more distant hubs, which ultimately increase CO2 emissions.
If the tax is too high, business-class passengers will prefer to travel in economy class or on other airlines, which will lead the latter to sharply increase the price of economy-class tickets to compensate for the loss of revenue.

As for the allocation of revenues, these should continue to finance the rail network. But the ecocontribution will not encourage the environmental transition of air transport. Paradoxically, it could even delay it: by reducing airline margins, it will slow down their investments in newer fleets or in the use of sustainable fuels.

These revenues should be redirected to R&D for green aviation or to encourage the use of sustainable fuels. Failing that, Aftitf could decide to allocate the revenues to strengthening modal complementarity between rail and air. For example, by improving rail services to airports, in order to develop genuine intermodality. This allocation of the eco-tax would also have a symbolic merit: it would finally put an end to the opposition between rail and air.
Paul Chiambaretto is Professor at Montpellier Business School and Director of the Pégase Chair in Air Transport Economics and Management.
Emmanuel Combe is a university professor at Paris-I Panthéon-Sorbonne and Skema Business School.

***My comment: It** bears repeating.*

Air transport may emit CO2, but it brings people together to build the world of

tomorrow. For many countries, tourism is a necessary, even indispensable resource. And it very often depends on air transport.

Unless we want to make all airplanes disappear, ecocontribution revenues should be earmarked for Research & Development in sustainable aviation and to encourage the use of sustainable fuels.

Finally, there is often talk of distortion of competition when a new tax is introduced.

It should be borne in mind that airlines have much lower margins than most other businesses. On average in 2023, according to IATA, this margin represents 2.50 euros per passenger.

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Air transport in 2050

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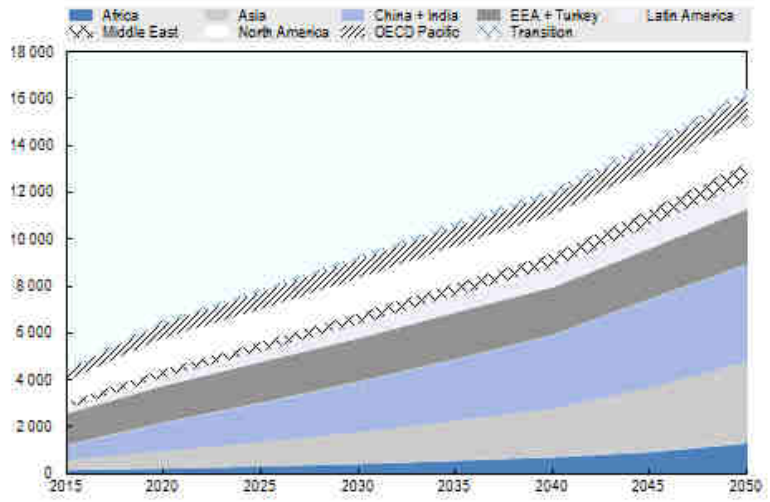
> Towards a 4-fold increase in intra-African air traffic

(source CercleFinance) September 13 - **Boeing reports that, according to its forecasts, intra-African air passenger traffic is set to more than quadruple over the next twenty years**. The aircraft manufacturer estimates that 1,025 new aircraft will be needed to support this growth over the next two decades.
Also according to Boeing, overall growth in African air traffic is expected to reach 7.4%, the third highest among the world's regions and surpassing the global average of 6.1%. **African carriers are well positioned to support intra-regional traffic growth and capture market share**, developing both passenger services and trade within the continent," said Randy Heisey, Boeing's General Manager of Commercial Marketing for the Middle East and Africa.
(...)

My comment: *The development of air traffic in Africa seems impressive, but it should be put into perspective, as current traffic is relatively low.*

Here is a table entitled "Projected international air transport demand by world region, 2015-50" taken from a report published in 2019 by the OECD.



Over the period 2015-2050, the OECD forecasts a fourfold increase in air traffic, with major disparities between geographical areas.

Here are the details:
. Africa: traffic multiplied by 9.5
*. **Asia: traffic multiplied by 8***
.
China+India: traffic multiplied by 6.8
.
Europe+Turkey: traffic multiplied by 1.7
.
Latin America: traffic multiplied by 4.4
.
Middle East: traffic multiplied by 3.2
.
North America: traffic multiplied by 2
. Pacific: traffic multiplied by 2.3

Traffic shares will be fundamentally altered:
. Africa: from 3% in 2015 to 8% in 2050
. Asia: from 10% in 2015 to 21% in 2050
. China+India: from 14% in 2015 to 25% in 2050
. Europe+Turkey: from 30% in 2015 to 14% in 2050
. Latin America: from 6% in 2015 to 7% in 2050
. Middle East: from 6% in 2015 to 5% in 2050
. North America: from 21% in 2015 to 11% in 2050
. Pacific: from 9% in 2015 to 6% in 2050

The question that IATA (the International Air Transport Association) must examine without delay is whether these trends are compatible with the decarbonization of air transport.

As a reminder, Europe requires airlines to incorporate 20% SAF (sustainable aviation fuels) by 2035.

To date, this target seems hard to achieve, especially if airlines stick to their growth plans.

> Ecological transition and French air transport: a (currently) difficult equation to solve

I invite you to read the excellent article by Damien Gaudin (who works closely with me):
Ecological transition and French air transport: a (currently) difficult equation to solve

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Special report: Tomorrow's sustainable aviation
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> Rolls-Royce moves towards the propulsion of the future

(source Journal de l'Aviation) September 28 - **Rolls-Royce is conducting research on a number of fronts to offer low-emission systems to power future aircraft**. Two advances have just been made by the engine manufacturer, one in **hydrogen propulsion** (in partnership with easyJet) **and the** other in **hybrid electric systems**. With regard to the latter,
a compact turbine specifically designed for **hybrid-electric flights** has successfully completed its first burn. It is destined to be integrated into a light turbogenerator system, **aimed at the urban mobility market or even applications on helicopters or auxiliary power generators.**
Before that can happen, Rolls-Royce teams will have to learn from the trials to develop their knowledge of the system, analyze the data and verify the technical choices, in order to adapt the design for future trials and bring it to greater maturity. Rolls-Royce is nevertheless delighted to have achieved this result in such a short space of time. "The first fuel burn of our brand new small gas turbine represents a significant step forward, with successful milestones throughout the test, from ignition to system shutdown. This significant achievement follows the rapid development of the new turbine, which went from design freeze to test in less than two years," says Matheu Parr, Customer Director, Electrical Division, Rolls-Royce.
Hybridization of propulsion systems is a key step towards decarbonizing aviation, but **it does not blind us to another challenge: that of developing a hydrogen-powered engine**. This is the subject of another strand of research, carried out in partnership with easyJet and with the support of Loughborough University in the UK

and the German aerospace center DLR.
Here, tests have been successfully carried out on a complete annular combustion chamber of a Pearl 700 engine with 100% hydrogen, showing that the fuel can be burned under conditions corresponding to an aircraft's maximum take-off thrust. After running an AE2100 engine on green hydrogen last year, Rolls-Royce believes that "the combustion element of the hydrogen program is now well understood". But the real work lies ahead, with the design and integration of the engine's fuel supply systems.
In the meantime, for these tests on the Pearl's combustion chamber, the engine manufacturer has designed new fuel spray nozzles to control the combustion process of hydrogen - which burns faster and at higher temperatures than kerosene. By gradually mixing the air with the hydrogen, they help manage the fuel's reactivity.

My comment: *The devil is in the detail.*

This formula applies well to the two announcements made here.

Hybrid-electric flights only concern very short routes; a solution that ADP is also testing (see Letter n°930), for medical and emergency routes.

Experts hope to see hybrid-electric aircraft in service from 2040 onwards, for routes of less than 500 km - routes not currently operated by most airlines.

Clearly, this solution will do nothing to facilitate the decarbonization of air travel by 2050.

As for the second announcement, hydrogen, we're only talking about engine development here. There is no question of the consequences for aircraft structure.

To be transported in liquid form (an imperative, as gaseous hydrogen takes up too much space), hydrogen has to be cooled to -253°C and kept at this temperature in a cryogenic tank. This solution is used on Ariane rockets (after the first two minutes required to leave the atmosphere, during which the fuel is solid propellant).

But this is a colossal challenge for aircraft manufacturers:
. in terms of safety (the slightest leak is fatal),
. in terms of duration (the need for a rocket is counted in minutes, a far cry from the ten hours or so required for an aircraft).

As for storage, liquid hydrogen tanks have to be cylindrical, which means fundamentally changing the structure of aircraft. The tank must either withstand high pressures, or have secondary systems to keep the hydrogen at low temperature, and at a pressure at least slightly higher than atmospheric pressure. What's more,

liquefying hydrogen and keeping it at temperature has a high energy cost.

Here's what a hydrogen-powered aircraft might look like:

> Lufthansa estimates that it will have to consume half of Germany's electricity to fly green

((source Novethic) September 28 - The great disillusion (or not). **At a national aviation conference in Hamburg** on Monday September 25, Carsten Spohr**, CEO of Lufthansa, Europe's leading carrier, estimated that the company "would need around half of Germany's electricity to convert its entire current fleet to synthetic fuel**". All of which goes to undermine the myth of the green aircraft, on which the industry relies to achieve carbon neutrality.

Synthetic fuels, also known as e-fuels, combine hydrogen and CO2 captured from the air or industrial fumes. **To be considered green, they must be produced from decarbonized sources such as renewable energies.** These synthetic fuels are part of the family of sustainable aviation fuels (SAF), alongside biofuels, the only ones used today, and green hydrogen, still at the prototype stage.
And **the Federal Network Agency** and Federal Economics Minister Robert Habeck (Greens) "won't give me this **astronomical amount of electricity**", admits a lucid Carsten Spohr, who isn't giving up just yet. In his view, **the "realistic" solution is to buy this synthetic fuel "abroad, where wind or solar energy is available in practically unlimited quantities**", he added, without naming any specific countries. This will be a "long road, but it's the right one", said Carsten Spohr with conviction. "
The observation he makes is correct, but the conclusion he draws from it is not," comments engineer Maxence Cordiez on Linkedin. According to this energy specialist, "the priority is to decarbonize electricity for its current uses, before converting it to synthetic fuels". He also points out that **most of the countries positioning themselves to produce hydrogen for export are "countries whose electricity mix has a very high carbon intensity and/or where the population as a whole does not have access to electricity and/or where there are constraints on access to water (needed to produce hydrogen)**".

In fact, it seems rather unrealistic that these countries will manage to meet this triple requirement: decarbonize their electricity, offer access to electricity for all, and produce enough electricity to produce synthetic fuels for export, in a relatively short timeframe. "Maxence Cordiez concludes: "In the end, the - hardly acceptable - conclusion that Lufthansa's CEO should have drawn is that **decarbonizing air traffic will also, and above all, require a sharp reduction in usage.**

But the question of traffic reduction remains taboo. To achieve zero net emissions by 2050, the main lever envisaged is offsetting, through the Corsia mechanism. This system, adopted in 2016, should enable the sector to compensate for the rise in its emissions in order to maintain them at their average 2019-2020 level, on a voluntary basis from 2024 and then compulsory from 2027. However, the system was once again revised downwards at the ICAO meeting. According to calculations by Transport & Environment (T&E), only 22% of total international emissions will be offset by 2030.

The other lever is based on sustainable air fuels, whose limitations are clear to see (not to mention soaring costs). For example, from 2025, the European Union will require an average 2% SAF content in kerosene for flights within and from Europe. In 2030, this percentage will rise to 6%, then progressively to 20% in 2035, 34% in 2040, 42% in 2045, rising to 70% by 2050, the date by which air transport is committed to achieving carbon neutrality.

Most of this SAF volume will come from biofuels. **But from 2030, it will also include a proportion of synthetic fuels**. It will be 1.2% in 2030, then 5% in 2035, and 35% in 2050. If this trajectory is respected, synthetic fuels will account for half of all sustainable fuels in Europe. **All that remains is to produce enough decarbonated electricity to make our planes really fly green...**

My comment: *I have a lot to say about the Lufthansa CEO's comments.*

The African continent is currently the continent with the lowest electricity consumption: in 2019, average electricity consumption per capita was 560 kWh in Africa, just 17.2% of the global average of 3,265 kWh (7,043 kWh in France, 12,744 kWh in the USA, 5,119 kWh in China). The amount of electricity consumed in 2019 on the continent, 732 TWh, is barely higher than that of Germany: 644 TWh.

How can the CEO of Lufthansa claim to produce e-fuel in countries (in Africa, a priori) that are short of water and electricity?

How can he ask these countries to produce enough green electricity for Lufthansa to meet the needs of more than half of Africa's population?

Behind this kind of talk lies the idea that science will solve all problems. We call this

scientism.

(The term scientism is used to designate the approach according to which problems concerning humanity and the world could best, if not perfectly, be solved according to the paradigm of the scientific method).

Nevertheless, it is possible to envisage that the problems of decarbonizing the air will find an answer in science. But not within the allotted timeframe, i.e. by 2050.

By 2050, there will be no long-haul electric aircraft, or even short-haul electric aircraft.

By 2050, there will be no hydrogen-powered aircraft: specialists envisage them only for the second half of the century.

By 2050, there will be no e-fuel (fuels made from CO2 captured from the atmosphere, hydrogen extracted from water, green electricity). The amount of green energy needed to produce them will not be available (for Air France-KLM, this would require six nuclear reactors). This option mentioned by the CEO of Lufthansa is a figment of his imagination, greenwashing without foundation.

So, what are the solutions available to airlines?

There are many. They include fleet renewal, improved flight conditions (more direct trajectories, continuous descent approaches, etc., most of which are described in my letter n°835). Airlines will also have to implement CO2 capture solutions.

And if that's not enough, they'll have to demonstrate sobriety, a word that's still taboo. This is
especially true for Asian and African airlines, which are planning to increase their activity tenfold by 2050 (see my newsletter n°930).

Reminder: It's important not to forget the terms of the Paris Agreement: carbon neutrality is understood as the achievement of a balance between greenhouse gas emissions and carbon sinks, i.e. absorptions by ecosystems such as forests, grasslands, agricultural soils and wetlands, and by certain industrial processes, such as carbon capture and storage.

> Do you know why the Air France symbol has been a winged seahorse for 90 years?

Far from being a mere graphic coquetry, Air France's winged seahorse is a testament to the identity of the company, which celebrates its anniversary on October 7, 2023.

Here's how it works.

(source Le Figaro) October 6 - If you've ever taken an Air France flight, chances are the company's emblematic symbol has caught your eye: an elegant winged seahorse. But how many of us have really wondered about the origin of this symbolic choice? **Where does this "shrimp", as it's nicknamed by Air France employees, come from,** and what does it mean for a company that dominates the sky rather than the sea?

The origins

It all goes back to 1933. It was on August 30 that Société Centrale pour l'Exploitation de Lignes Aériennes officially took the name Air France. Born of a merger in the spring of the same year between the five main French airlines of the time - including Air Orient - it soon grouped together all the national airlines. On October 7, 1933, Air France's "christening" took place at Le Bourget airfield, in the presence of Pierre Cot, Minister of the Air Ministry. At a press conference, Louis Allègre, president of the new airline, confessed that he still had no name. "

Why not Air France?" suggested Georges Raffalovich, a journalist with the daily Le Journal. Agreed. Now they needed a logo to embody their identity. Costa de Beauregard, a former Air Orient employee, suggested the seahorse as an emblem, the sea horse evoking the seaplane, widely used at the time. Adopted. At a time when global tourism was in its infancy, the winged seahorse was an invitation to dream, explore and discover faraway lands.

The winged seahorse: between land, sea and sky

While, at first glance, choosing a seahorse for an airline may seem incongruous, the choice is rich in meaning when placed in context. A variation on a protome, it's made up of the bust of Pegasus, the winged horse of Greek mythology (symbolizing power) and the tail of the Annamese dragon (reminiscent of the seaplane), symbol of the imperial family of Vietnam. The result is a seahorse with wings. While the debate rages between the airplane and the seaplane, the marvellous animal is the consensus, as much at home in the sky as on the water. Legend has it that Maurice Noguès, one of the aviators on Air France's inaugural adventure, spotted this enigmatic fish while shipwrecked in the Bay of Naples in 1928.

In an article published in 1952 in the magazine Publimondial, Jacques Albert Deport, then Head of Advertising at Air Orient from 1930, and later in charge of Air France's "propaganda services", recalls the creation of this emblem and the difficulty in constructing the graphics. "How, without detracting from its solid character, could these three disparate elements be amalgamated? It was Marrast (the company's architect, editor's note) who came up with the solution, advising me to use the cut, as found in the chess knight." In 2000, the Air France Museum recovered a drawing from June 1933, validated by Marrast, to create the logo with the À and F letters, which disappeared in December 1934. This drawing explains why there are in fact two logos, one for each side of the aircraft, so that the horse's head always faces forward.

A symbol widely used Over the
years, Air France has obviously modernized its image, but the winged seahorse remains a testament to the company's attachment to its roots and history. Airline tickets, uniforms, travel items, advertising, in-flight magazines and even infrastructure buildings: over the century, Air France has used this emblematic symbol in a wide variety of ways. In its most recent stylized version, known as "au fil", it symbolizes the world of La Première, the airline's most exclusive travel experience. It's also a way of showing that, even in the age of mass tourism, the company remains true to its values of exploration, adventure and discovery.



My comment: *The "crevette" is now everywhere at Air France, whether on the winglets (the fins at the end of the wings), on the staff uniforms ... or on my desk.*

> Insurance: AI joins climate as a major risk

(source Les Echos) October 30 - **One month ahead of COP28, climate change risks are still a cause for concern. And for the first time, they top the list of emerging risks in every region of the world**, according to the tenth edition of the Futures Risks Report published by insurer AXA on Monday. Conducted among 3,300 experts in 50 countries and 19,000 members of the general public in 15 countries last June, the Futures Risks Report annually measures and ranks people's perceptions of risk evolution and emergence. By studying new risks "we identify new solutions", explains the group.
Other major sources of concern continue to include cybersecurity
risks, pandemics and infectious diseases, geopolitical instability and social tensions.

In AXA's view, the study shows that crises no longer follow one another, but rather overlap.
And yet, **this year, artificial intelligence (AI) and Big Data are making a dramatic entry into the emerging risks ranking, rising from 14th place in 2022 to 4th place this year on the experts' side.** And while these technologies are less cited by the general public, globally, they come in sixth place in Asia and seventh in America.
"
Technology-related risks in general are perceived as the most rapidly emerging," explains Etienne Mercier, Director of Opinion at Ipsos, with whom AXA is carrying out the study. It has to be said that the arrival of ChatGPT and generative AI caused quite a stir, and provoked an outcry in many sectors, due to fears for jobs.
In addition to Big Data, **experts and the general public are concerned about disruptive technologies in general, the ethical and economic risks associated with their use, and their consequences for the future of work.** In particular, the future of employment is a major concern in Asia, and particularly in China, a region that is often a rapid adopter of cutting-edge technologies. **In Europe, however, the general public is not yet fully aware of these risks.**

The majority of experts even rank this technology as a risk because of the "existential threat that the advance of AI could represent for humanity", explains the report. The majority of experts (64%) and the general population (70%) even believe that **AI research should be halted.**
Overall, the opinion that technological advances create more risks than they solve continues to grow. It is now shared by half the population (52% in France, 49% in the USA). **The feeling of vulnerability in the face of the risk posed by AI is** also **on the rise**, as overall public authorities and the private sector are seen as less well-prepared to deal with it, unlike other risks.
"This is a subject that is at the heart of European reflections with the need to strike the right balance," explained Frédéric de Courtois, Deputy CEO of AXA. We are very much in favor of responsible and balanced regulation." In particular, he warned against adopting overly harsh regulations on AI, "as we are competing with the US and China and our companies need to have data to move forward on these subjects."
On the subject of natural disasters, which are on the increase, Frédéric de Courtois explained that AXA believed that all risks of this type were insurable provided they were fairly priced, which was not yet quite the case. The violence of these recent phenomena is still poorly documented.
The deputy CEO of the world's second-largest insurer also highlighted the effectiveness of the public/private partnership that exists in France, and praised the Langreney
report on the evolution of the insurance system in the face of climate change, "which will be extremely useful".

My comment: *I'm working with my team to assess how the use of artificial intelligence and big data will impact jobs in the air transport industry.*

We have already identified some positive contributions, such as improved information transmitted in real time to pilots, call center staff and sales staff, and time savings for IT development.

New skill profiles will be needed to make the most of artificial intelligence resources.

On the other hand, it is likely that some jobs will disappear.

It will be up to human resources managers, in collaboration with employee representative bodies, to quantify these changes.

To this end, they have a tool at their disposal, the Gestion des Emplois et des Parcours Professionnels (Job and Career Management), designed to enable dynamic, proactive management of skills and professions.

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Sustainable Aviation Special

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> COP28: 60 chairmen of major French companies call for faster ecological transition

(source tribune collective) November 26 - **COP28 is about to get underway**, and the preparatory work is confirming the diversity of national trajectories for reducing greenhouse gas emissions and making the ecological transition. **Europe and France have made some of the most ambitious commitments on the planet**. In line with the Paris and Kunming-Montreal agreements, they aim to achieve carbon neutrality and restore biodiversity by 2050, without further straining the resources of the rest of the world, and to do our part to preserve the planet's habitability.

Scientists, as well as the French High Council for the Climate, **indicate that we are not on an emissions trajectory compatible with these commitments**. It is essential to further accelerate the already considerable transition investments made by public authorities, the French and our businesses to reduce our emissions, switch energy sources and invest rapidly in a decarbonized production and consumption model, adapt and train the players involved.

This will be the subject of the ÉTÉ 2030 study by the Entreprises pour l'Environnement association, to be published in December, with priorities for 2030. We also need to integrate our efforts to adapt to climate change and regenerate nature with our efforts to reduce emissions.

We already proved together last year that sobriety is possible. The collective Winter 2022 plan saved 12% on gas and electricity combined. We now need to invest further to reinforce and sustain these energy savings.

We believe it is possible to build together a new prosperity compatible with the limits of our planet; we propose to base it on innovations and investments that develop circularity, this structural sobriety, and a new relationship with living beings. We believe it will create jobs, be rich in meaning, and be a source of health and better living.

That's why we're launching this joint appeal. **This transformation will involve everyone**: economic players (we have solutions and the capacity to innovate, drive, finance and take collective action); public authorities, because the transition requires support through clear frameworks and mechanisms, and fairness of effort; citizens and residents, consumers, elected representatives, managers, employees or shareholders... We can all choose to play an active role and adopt the new lifestyles proposed.

We call on everyone to make concrete progress on two priorities. The first is for all of us to reallocate our spending and our time, to reinvent and reinvest in our production, distribution and service tools, our housing, our transport and our consumption patterns, in order to decarbonize, limit waste, recycle and regenerate nature. Long-term savings in energy, materials and soil are essential to reduce pressure on the planet and our vulnerabilities. We believe it is possible to combine increased well-being with a reduction in our material footprint. We should live better, in a new economic prosperity, if we decide together to consume differently: better food and environment for our health, comfortable housing and accessible services.

The other priority is to work together to reinvent our model of society: our companies are working and investing to strengthen our positive impacts and limit our negative ones. Over and above this, we need to establish rules for our collective life, to manage the scarcity of resources sustainably and fairly, to support the most vulnerable in this transformation that will protect them, and to strengthen our resilience in anticipation of crises of all kinds. For the French to embrace this transformation dynamic, it must also be perceived as leading to greater equity.

The majority's support for this transformation is a prerequisite for its success. We're committed to it ourselves. We are convinced that it represents a realistic path to prosperity, health and better living. The stakes are well worth the effort: the situation is urgent, and we all need solutions to meet a challenge unprecedented in human history. We are mobilized and ready to listen, and together we can show that it's possible.

My comment: *"The other priority is to reinvent our model of society together" (sic).*

Only one word comes to mind: CHICHE!

But that's not on the agenda at COP28, which is just getting underway.

COP28 is being held this year in Dubai. It is chaired by Sultan al-Jaber, the head of the Emirati national oil company, which has given rise to major reservations about its outcome.

=== source FranceInfo
Founder of Masdar, the Emirati renewable energy giant, and director of Adnoc, the national oil company, the just-fifty-year-old has worked throughout his career to turn his country into a two-headed energy superpower.

According to a BBC investigation published on Monday, while the COP28 summit is intended to give a boost to clean energies, his team has also taken advantage of the preparations for the summit to prospect for new markets in fossil 2NERGIES.

While only a drastic and rapid reduction in our dependence on hydrocarbons will enable us to halt the rise in greenhouse gas emissions responsible for global warming, as hammered home by the latest IPCC
report, Sultan al-Jaber's oilman's hat overshadows the stakes of this crucial COP.

But it does shed light on the complexity of the transition expected of oil-producing countries.
=== end of quote

Similarly, the participation of Total's CEO in the above panel drew fire.

In both cases (this forum and COP28), the involvement of oil
company CEOs is in the process of undermining the credibility of the actions undertaken.

> European aviation industry and IATA welcome adoption of interim decarbonization target

(source Air & Cosmos) November 24 - At the third "Conference on Alternative Aviation Fuels" (CAAF/3) recently held in Dubai, **ICAO** (International Civil Aviation Organization) **member states adopted a resolution requiring aviation fuels to emit 5% less than fossil fuels by 2030**. This intermediate step is necessary to achieve the "LTAG" (Long Term Aspirational Goal) adopted during the last ICAO General Assembly, which aims for the international aviation sector to reach "0% emissions" by 2050 by various means.

Following this adoption, the five main European associations representing airlines, airports, air navigation service providers and the aviation industry were delighted, hailing this as a major step forward. These associations are A4E (Airlines For Europe), ACI Europe (the European branch of Airports Council International), ASD (European Aerospace, Security and Defence Industries Association), CANSO Europe (Civil Air Navigation Services Organisation) and ERA (European Regions Airline Association).
The CAAF/3 conclusions were also welcomed by IATA (International Air Transport Association). "Governments have understood the critical role of SAF in achieving the goal of eliminating net aviation emissions by 2050. The CAAF/3 results add an ambitious vision for closer to 2030," said Willie Walsh, IATA Director General. "There is no time to lose. IATA now expects governments to put in place the strongest possible policies to unlock the full potential of a global SAF market, with an exponential increase in production," he added.

My comment: *The art of shooting yourself in the foot!*

Having doubts about the translation of the ICAO resolution, I went to the source. Here is the original text, in English.

The Third International Civil Aviation Organization (ICAO) Conference on Aviation and Alternative Fuels agreed to "strive to achieve a collective global aspirational Vision" to reduce carbon dioxide (CO2) emissions in international aviation by 5% by 2030, compared to "**zero cleaner energy use**."

Machine translations (Google, Deepl) stumble over the phrase "zero cleaner energy use." (I'll spare you the incomprehensible translations).

Looking through nouvelles.paxeditions com, my fears were confirmed. The ICAO resolution reads as follows:

A global framework to promote the production of sustainable aviation fuels (SAF) in all regions of the world. The target for 2030 is for aviation fuel to be 5% lower in carbon than the fossil fuels currently used by the industry.

To put it plainly, airlines have pledged to put 5% sustainable aviation fuel in the fuel tanks of their aircraft, without committing themselves to limiting their kerosene consumption.

The following criticisms, made following the ICAO General Assembly (in October 2022), are still valid:

=== source actu-environnement

"The General Assembly's decision shows that ICAO continues to adopt measures that benefit industry, but not the climate," insists Jo Dardenne, Director of Transport & Environment's aviation program.

Member states, particularly those of the European Union, must open their eyes and move towards the adoption of genuine ecological measures."
=== end of quote

I should point out that the Air France-KLM group has set itself more ambitious targets:

- *+10% use of sustainable aviation fuel (SAF) by 2030*
- *-30% lower CO2 emissions per passenger/km by 2030 than in 2019*

So, except in the highly unlikely event that Air France-KLM's business grows by 30% between now and 2030, the Franco-Dutch group will emit far less CO^2 in 2030 than it did in 2019.

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Sustainable Aviation Special
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> Fewer long-lasting condensation trails by modifying aircraft altitude

(source DPA) December 11 - **Long-lasting aircraft contrails can often be avoided by a slight change in flight altitude**. This was demonstrated by collaborators from the German Aerospace Center (DLR) in Koln and Eurocontrol's Maastricht Upper Area Control Centre (MUAC) in an experiment conducted during the Corona pandemic. According to DLR and MUAC, this is an important step towards significantly reducing the long-term climate impact of air traffic.
For their research, the researchers used the situation during the 2021 pandemic, when there was less air traffic. During this period, they studied the formation of contrails in the upper airspace over northwest Germany and the Benelux countries.

According to DLR, contrails form when aircraft engines discharge soot particles which, at typical flight altitudes, often act as condensation nuclei for small drops of water. These then congeal into ice crystals, visible in the sky as white contrails. According to the authors of the study, whether or not this happens, and to what extent, depends among other things on the air temperature and humidity on the flight route.

When weather forecasts predicted the presence of long-lasting contrails at the usual flight altitude, the route was maintained on some days, while on others an "avoidance procedure" was implemented. In concrete terms, this meant that the aircraft's flight altitude was altered upwards or downwards by around 660 metres.

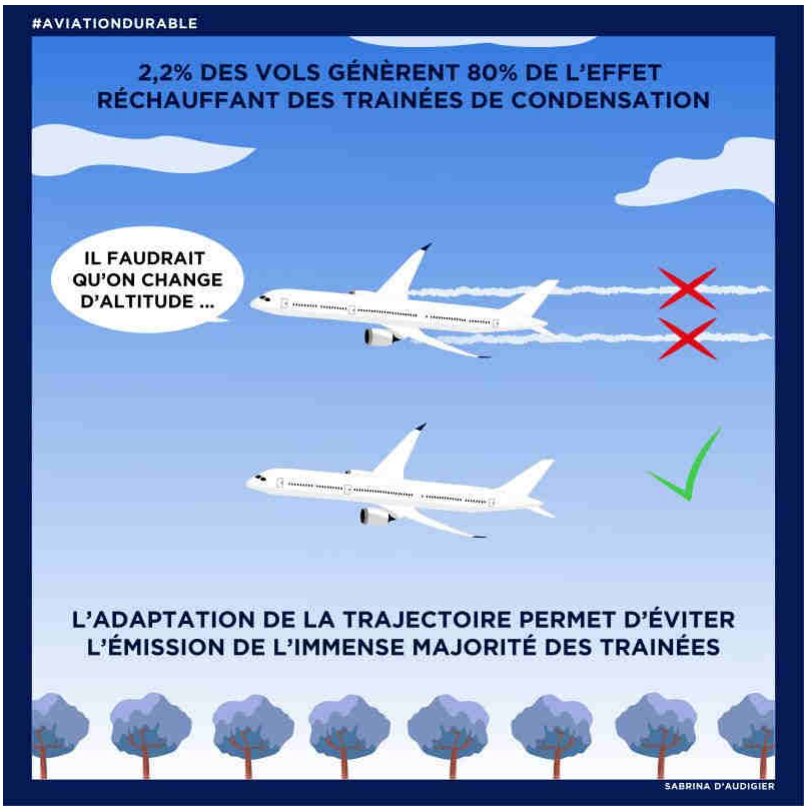
The researchers used satellite images to check whether or not long-lasting contrails had formed. Flights made on days when air traffic was not disrupted were used as a reference. The result showed that long-lasting contrails were indeed less frequent when flight altitudes were changed, reports the team of Robert Sausen from DLR's Institute of Atmospheric Physics and Rüdiger Ehrmanntraut from MUAC in the "Meteorologische Zeitschrift".

However, changes to flight routes generally result in higher CO2 emissions. Itineraries must therefore be chosen in such a way as to reduce the overall climatic impact of the flight concerned, writes DLR. It must also be ensured that all air traffic can continue to operate safely.

My comment: *The drop in air transport activity during the Covid period has made it possible to test various ways of reducing CO2 emissions.*

In addition to the possibilities of reducing condensation trails, flights in squadrons, trajectory modification and continuous descent were evaluated.

*In my letter n°835 of November 22, 2021
, you will find various infographics produced by the OMNES team, including this one and the one in the next commentary.*



> Sustainable aviation fuels: new €200 million call for projects

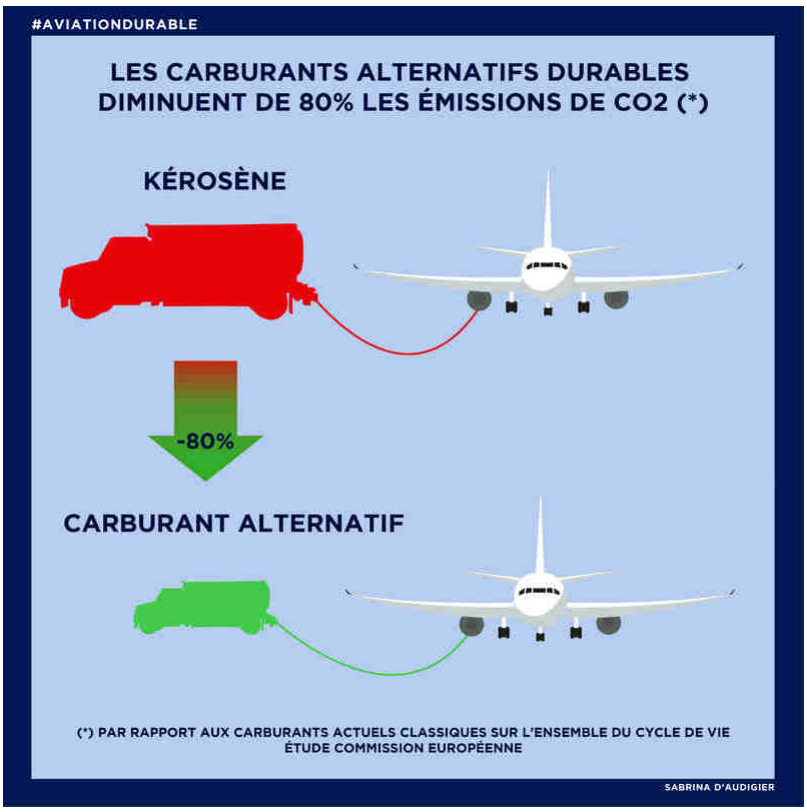
(source AOF) December 15 - "**Support projects for the industrial production of sustainable aviation fuels in France**". This is the aim of the new call for projects launched this Friday by ministers Agnès Pannier-Runacher (Energy Transition), Roland Lescure (Industry) and Clément Beaune (Transport), with Bruno Bonnell, Secretary General for Investment, in charge of France 2030. With a **provisional budget of up to 200 million euros, this scheme follows the announcement made by the French President at the Paris Air Show in June 2023**.
At that time, Emmanuel Macron pledged the State's support for the development of a national industry capable of producing 500,000 tonnes per year by 2030.

According to the French government, the aim is to "enable the aviation sector to achieve its objectives of reducing greenhouse gas emissions and decarbonizing by 2050", while preserving the country's energy independence and creating jobs in the regions in conjunction with our agricultural and waste industries.

Sustainable fuels, whether biofuels derived from biomass or synthetic fuels (e-fuels), can reduce greenhouse gas emissions by 70% to 95% over their entire life cycle, compared with fossil kerosene.

My comment: *This call for projects responds to the concerns of airlines about the lack of sustainable fuel available to them.*

If the French industry succeeds in producing 500,000 tonnes of sustainable aviation fuels by 2030, French airlines will be able to meet their targets in this area.



> Earthquake in world trade: China bans exports of strategic metals technologies

(source La Tribune) December 21 - The threat had been looming for several months. Having already made the export of two strategic metals (gallium and germanium) subject to central government approval, **China announced on Thursday that it would halt the export of a series of technologies linked to the extraction of rare earths. A turning point in the history of world trade.**

And for good reason: **these metals are essential to the development of numerous technologies (batteries, chips, smartphones, LCD screens, Internet, wind turbines, military equipment...).** As a reminder, rare earths are a group of 17 elements used in cutting-edge technological products. Their extraction is therefore crucial.

Clearly, against a backdrop of growing rivalry with the United States, the Middle Kingdom is going to deprive its trading partners of several materials in order to dominate the stakes of technological independence. From its first warning shot last July, **China has now taken a further step**
with this stop. Overall, the world's second-largest economy, determined to take the lead, now controls around three-quarters of rare earth production.
In concrete terms, **it will henceforth ban the export of "rare earth mining,**

processing and smelting technologies", according to a lengthy document published on Thursday by the Ministry of Commerce. However, the new regulations have no impact on exports of rare earth products themselves. On the other hand, it could hinder efforts to develop this sector outside China.

Contrary to what their name suggests, this group of 17 metals essential to cutting-edge technologies is relatively abundant. But their highly sought-after electromagnetic properties make them "strategic metals".

In 2022, China extracted 58% of global production and refined 89% of rare earths. According to the International Energy Agency (IAEA), the need for low-carbon technologies, notably for electric vehicle engines or offshore wind turbines, could increase global demand sevenfold by 2040, to almost 2 million tonnes a year, compared with 280,000 tonnes in 2022.

As a result, Western countries, notably the United States, but also the European Union (EU), are increasingly considering the supply of these metals as a matter of national security, especially as the global energy transition fuels fears of potential shortages in the future.

In addition to the permanent magnets used in wind turbines and electric cars, some rare metals are used in TV screens, drones and hard disks. In response, the EU is considering "action within the WTO framework". But "the WTO is an empty shell, as the United States and China have been making decisions outside this institution for several years
now", Sylvain Bersinger of the research firm Astérès explained to La Tribune.

On the same day, the United States announced that it would launch a survey of its companies to determine how they source semiconductors from China.

This survey "will inform U.S. policy to strengthen the semiconductor supply chain, promote a level playing field for traditional chip production, and reduce national security risks posed by China," explained the Commerce Department in a press release.

The stated aim: to ensure that the United States maintains its "multi-year" lead over China in semiconductor design. "Over the **past few years, we have seen potential signs of worrisome practices on the part of China aimed at increasing semiconductor production by their companies and making it more difficult for American companies to compete**," Commerce Secretary Gina Raimondo also explained in the press release, referring to a report issued on December 12 by a U.S. congressional committee calling for a "reset" of the economic relationship between the United States and China.

My comment: First, *an important note: contrary to what their name might suggest, rare earths (17 metals) are not rare.*

Secondly, in 2018, Japan announced that it had discovered at the bottom of its waters the equivalent of hundreds of years of the world's supply of rare earths: 780

years of yttrium, 620 years of europium, 730 years of dysprosium...

The techniques needed to exploit this deposit, located 2,200 kilometers southeast of Tokyo in Japanese territorial waters and at a depth of 5,500 meters, have yet to be developed.

In the meantime, companies will continue to be dependent on China's goodwill.

End of press review

Details

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By return, you can ask me any questions you may have about the Air France-KLM group or employee share ownership...

See you soon.

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François Robardet

former Director of Air France-KLM.
You can find me on my twitter account @FrRobardet

During our election, Nicolas and I received the support of the CFDT and the UNPNC.

This press review deals with subjects linked to Air France-KLM shareholding.

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