STAY GROUNDED
MAY 2025

Greenwashing Fact Sheet Series

"Greenwashing" is misinformation presented in order to mislead others about the environmental impact of current or future activities. Globally, the aviation sector plans to triple in size by 2050 which would see aviation fuel consumption and therefore greenhouse gas (GHG) emissions double. Governments, lobbied by the sector, use unrealistic distracting promises of technological solutions and offsets to greenwash this growth. They also use economic growth and job arguments to justify subsidies and tax breaks for airports, airlines, manufacturers and fossil fuel companies. In this series of Fact Sheets, we examine these claims and debunk common myths and misconceptions.

4 - Biofuels

Aviation biofuel is a liquid hydrocarbon fuel that can be used with existing aircraft blended with fossil kerosene. Like e-fuel (see Fact Sheet #5 Synthetic e-fuels), the sector calls it a "Sustainable Aviation Fuel" (SAF), which it is not, as we demonstrate in this fact sheet.

WHAT THE AVIATION SECTOR TELLS YOU

Biofuels play a key role in decarbonising aviation and are already being used today. There are plans to scale them up which will allow us to meet increasing air travel demand while still reducing emissions.

Aviation biofuels could significantly reduce CO_2 emissions, by up to 80% vs. fossil jet fuel.

Aviation will not use biofuels from crops which have sustainability issues.

Aviation will instead use biofuels from "sustainable waste and residues" that will not compete with agriculture or cause adverse environmental or social impacts.

Government support is required. Due to the significant extra cost, public money is needed to keep travel costs low, so that aviation growth is not affected.

WHAT THEY **DON'T** TELL YOU

Biofuels are a false response to the climate emergency: they divert biomass from food production, biodiversity protection and natural carbon sequestration. They also compete with other sectors for the same scarce resources. Anyway, the transition to biofuels has barely begun (0.3% in 2024) and plans to scale them up are far too slow and unrealistic. **The only way to rapidly reduce aviation emissions is to reduce air traffic now.**

Biofuel still produces significant CO_2 emissions. When made from crops or palm oil mislabeled as used cooking oil, biofuel results in even more GHG emissions than fossil fuels. This would also be the case if the fuels were made from wood or straw.

Biofuels from crops are widely used despite major issues: they account for ⅓ of the current and planned supply worldwide. They compete with food production and have serious humanitarian, environmental, health and biodiversity impacts.

The new generation of biofuels is a smokescreen: only biofuels from "waste" oil & fat are available on the market and only in limited quantities which should be prioritised for other purposes. In addition, they are often fraudulently replaced by virgin palm oil.

Financial support from governments means taxpayers pay, most of whom rarely or never fly. Subsidies divert money needed for more essential sectors.

THERE ARE SEVERAL TYPES OF BIOFUEL

Biofuels for aviation are produced from biomass sources and hydrogen.[1] First generation biofuels use agricultural crops. Due to their drawbacks, the sector is mandated by European legislation to use so-called "waste and residues", either industrial, food, farm or forestry.
At present, the only aviation biofuel of this kind proven at scale, HEFA (Hydrogenated Esters and Fatty Acids), are made from feedstocks labeled as "used cooking oils" or "animal fats" (from slaughterhouse operations).[2] However there is rampant mislabeling of these feedstocks, including, for example, virgin palm oil labeled as used cooking oil. So-called "advanced biofuels" from lignocellulosic biomass (wood, straw…) have never been and are unlikely to ever be technically proven at scale. Hydrogen, although rarely mentioned, is required in all certified aviation biofuel production processes, but is today mostly produced from fossil fuels (see Fact Sheet #3 Hydrogen flight).[3]

BIOFUELS ARE A FALSE RESPONSE TO THE CLIMATE EMERGENCY

The sector's objective is to reach Net Zero in 2050 (see Fact sheet #6 Net Zero), mainly through the progressive introduction of so-called "sustainable" aviation fuels (SAF). The International Air Transport Organisation (IATA) claims that 65% of the decarbonisation of aviation could come from SAF by 2050, starting with biofuel for about half of the total, the other half being provided later on by e-fuels.[4] Long produced for road vehicles, biofuels are now being produced for aviation, **but in 2024, only 0.3% of jet fuel was biofuel.[5] Biofuel scale up has been promised by the aviation sector for more than a decade but this has not materialised.** Targets have been routinely missed by significant margins and then ambition ratcheted down across successive years. For example, in 2009, IATA was aiming for 10% biofuels by 2017[6] and in 2011, the Air Transport Action Group (ATAG) stated: "We are striving to practically replace 6% of our fuel in 2020 with biofuel. We hope this figure can be higher".[7]

Even if we were to accept the industry's continued optimistic projections of aviation biofuel use, **it is not planned that such fuels would provide a significant percentage of total fuel consumption in the short term during the moment when it is crucial to curb CO_2 emissions** (see Fact sheet #6 Net Zero). IATA forecasts that biofuel production in 2030 would only cover 4.7% of global jet fuel requirements.[8] With limited biofuel potential, **the only way to deliver a greater overall percentage within meaningful timescales would be to decrease total fuel consumption, an unattainable goal without reducing air traffic** (see Fact sheet #1 Efficiency improvements).

Although the target percentages for biofuel may seem low, the quantities of biomass at stake are significant and would compete with essential needs. There is a high risk of increasing food prices and shortages, land grabbing, human rights violations, additional GHG emissions through land-use change and exploitation of carbon sinks, high water use, pollution of the environment and biodiversity loss.[9,10]

The planet's land surface and biosphere cannot sustain humanity's essential demands like feeding an increasing population and removing carbon from the atmosphere **while also satisfying luxury consumption** like frequent air travel for leisure and a diet high in meat and dairy. **Not to mention the massive quantities of feedstock that would be required for Bioenergy with Carbon Capture and Storage (BECCS)** – a dangerous plan based on unproven technology (see Factsheet #8 NETs).

WHY TALKING ABOUT "WASTE AND RESIDUES" IS GREENWASHING

Biofuels from "waste and residues" is the latest among a series of attempts of the aviation sector to greenwash their dirty business. They claim that they aim (especially in Europe where it's mandatory) to move away from crops as a feedstock and only use what they call "waste and residues" *, falsely suggesting that the resource would otherwise be thrown away and they are therefore doing something good and sustainable in reusing it. This is not true! It's greenwash.

Those "waste" fats and oils are already in demand for example in producing animal feed, pet foods, candles, oleochemicals and lubricants. When they are diverted to aviation biofuels, producers will seek alternative sources like palm oil (which is usually the least expensive option) or petrochemicals. Ultimately, it is just an added demand for the least costly race to the bottom. Biofuels from so-called "forest-residues", if we ever manage to produce them, are just another smokescreen attempt that would involve stealing biomass from natural forests that would otherwise serve as a natural fertiliser and carbon sink.

This is why we ask you to avoid the terms "waste and residues" and wherever we have to use it, refer to it in quotation marks. Don't let the sector get away with this greenwash!

* Examples of "wastes and residues":
used cooking oil, animal fats from slaughterhouse operations, POME (palm oil mill effluent), tall oil (a product from pulp and paper mill processing) and corn oil from ethanol production.

Policymakers and citizens must not consider biofuels for aviation in isolation but rather within the context of the high demand we already impose onto our biosphere and farmland and of the many other demands planned or envisaged.[11] We must consider the monumental scale of flying aircraft with biofuel and prioritise the use of biomass – as some regions or countries are now considering[12,13] – of land and water, and not leave the aviation sector with complete freedom, let alone incentives. The industry estimates that aviation alone would consume most of the biomass "residue streams" available in 2050 if it were entirely powered by biofuels, leaving no room for other usages.[14] And the National Farmers Union (NFU) of Canada calculated that to produce all 2050 SAFs from oilseeds might take an area equal to 21 times Canada's total cropland area (more than 5 times the US cropland area).[15]

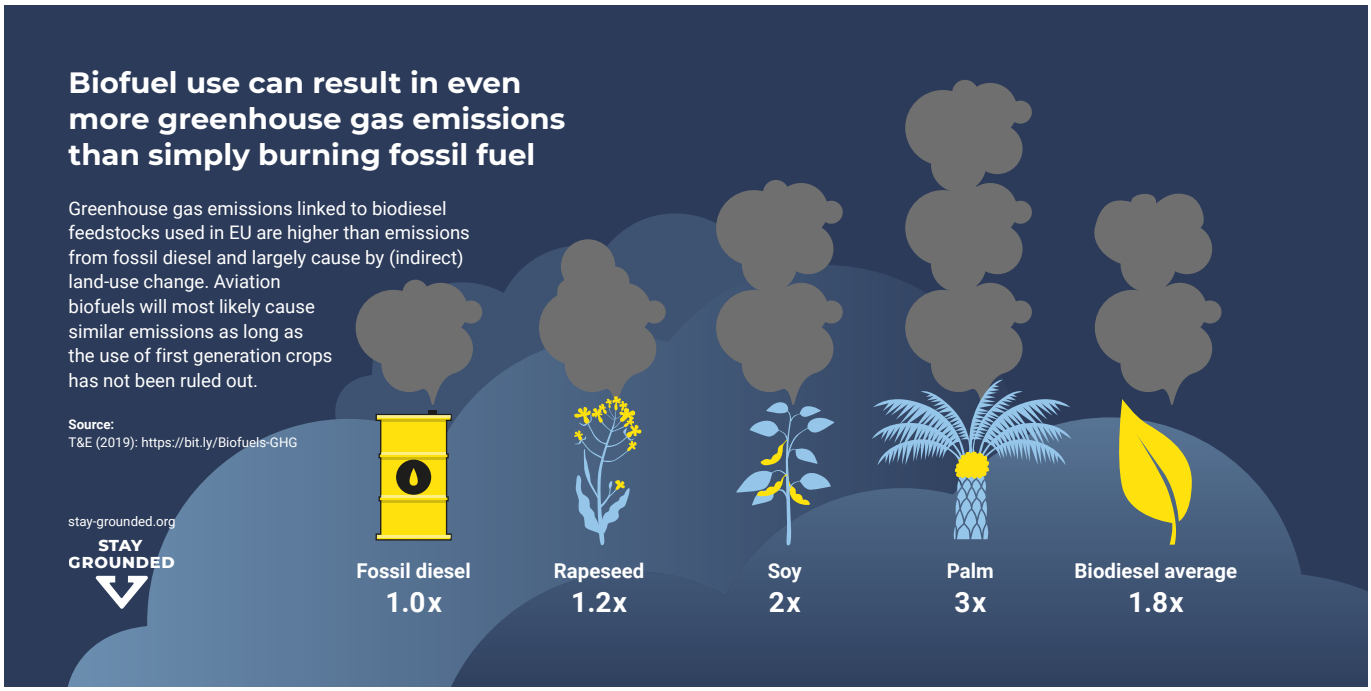
It's worth noting that **the quantity of biomass available for human needs will be increasingly limited by the intensification of climate heating** and of its impacts on agriculture and forestry.

We must also consider the size of the investments required for manufacturing and logistics, with the associated environmental impacts and land grabbing. According to a 2019 study by the International Civil Aviation Organisation (ICAO), 328 new large bio-refineries would need to be built every year by 2035, at an approximate cost of US$29-115 billion a year, to generate enough biofuel for international aviation alone.[16]

BIOFUELS STILL PRODUCE SIGNIFICANT EMISSIONS AND CAN EVEN INCREASE THEM

The sector claims that "SAF can reduce emissions by up to 80% during its full life cycle".[17] However, **GHG savings of only 40 to 65% have been proposed as a threshold[18,19] at national or regional levels and fuels eligible under CORSIA (ICAO's Carbon Offsetting and Reduction Scheme for International Aviation) can have savings of as low as 10%.[20]** In the real world, the only aviation biofuels that could theoretically deliver high reduction rates are the ones made from used cooking oils, which are available in small quantities. **Biofuels from crops that account for ⅓ of the current (2024) and planned supply to aviation worldwide have been shown to result in more GHG emissions than fossil fuel[21]** (see infographic below). Made from virgin vegetable oils, they cause more forests and other carbon-rich ecosystems to be converted to plantations. Genuine used cooking oils are already in short supply encouraging the fraud of mislabeling virgin oils instead. Diverting fats and oils to aviation causes other industries to switch to use more palm, soya and fossil fuels. Biofuels from lignocellulosic residues, though not commercially available, also have indirect emissions that can exceed the claimed reductions in direct emissions.[22]

In addition, aviation also produces non-CO_2 emissions – mainly contrails – which are estimated to cause at least as much global heating as aviation's CO_2.[23] Recent studies have shown that while biofuels might contribute to reducing contrails, they would only be partially reduced[24] and it would take several decades to happen whereas the same reduction could be achieved much faster and cheaper by treating kerosene[25] or by slightly diverting a small proportion of flights.[26]



BIOFUELS FROM CROPS ARE WIDELY USED DESPITE MAJOR ISSUES

It is often claimed that aviation would only use biofuels derived from so-called "waste and residues", to avoid being unsustainable. Yet **biofuels from crops (so-called first generation biofuels) are still widely used and there are no plans to rule them out.** Such fuels are permitted under CORSIA, which is the only internationally agreed policy covering aviation and runs until 2035.[27] The EU and the UK are the only places where their use is banned, though also here the rising demand for used cooking oil drives growth in the amount of land dedicated to the cultivation of oil crops elsewhere. As of 2024 one third of the biofuels used or committed globally by airlines are crop-based[28] and there are plans for huge aviation biofuel refineries in Paraguay using soybeans as a feedstock[29] as well as in other countries. The threat of scaling up the use of commodities like soy or palm oil with high risk of deforestation is increasing as the industry faces resource scarcity and technical difficulties in implementing so-called "advanced" biofuels.

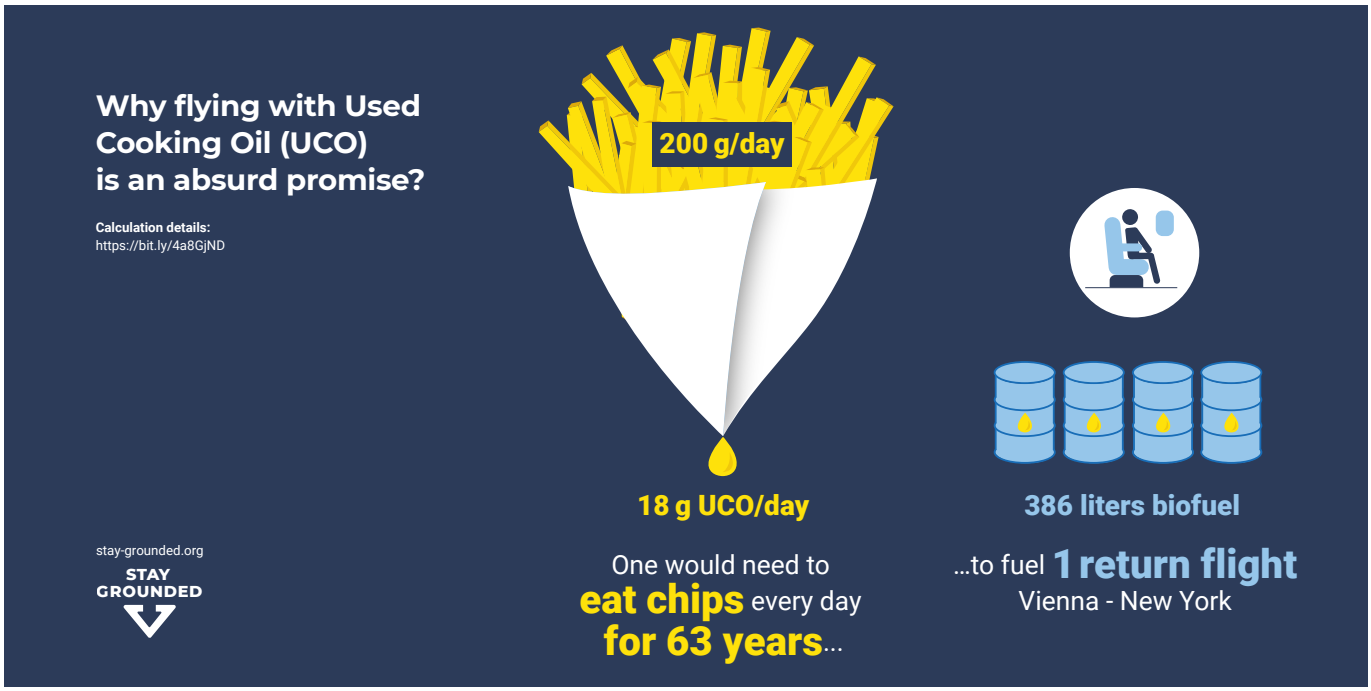
The cultivation of energy crops in large monoculture fields increases the use of fertilisers, pesticides and herbicides; with devastating environmental, biodiversity and health impacts. It can also result in humanitarian impacts[30] like land conflicts, labour abuses, rising food prices and water scarcity.

SO CALLED "ADVANCED" BIOFUELS ARE A SMOKESCREEN

With an increasing amount of studies showing that biofuel made from crops can emit more CO_2 than fossil fuels and present major environmental and societal issues, the aviation sector is pretending to try to move away from those feedstocks. They are pinning their hope on so-called "advanced biofuels" made from so-called "waste and residues" claiming they would not present such issues. This includes farm, forestry and food "waste".

The only process currently able to produce biofuels for aviation from "waste" at a commercial scale (HEFA) uses "waste" cooking oils and animal fats which are already used to produce biodiesel at a limited commercial scale. It has been found that **when "waste" oils are used to produce large quantities of biodiesel, it displaces their use in other sectors, which then transition to other sources, such as palm oil.[31] This also creates the opportunity for fraud,** for example where fresh palm oil has been sold as used cooking oil.[32,33] Most used cooking oil comes from China, followed by Indonesia and Malaysia where there are no meaningful checks.[34]

As "waste" oils and fats are only available in limited quantities, the industry has been trying for a long time to turn lignocellulosic biomass from plants or wood into biofuels using various pathways (mostly Fischer-Tropsch synthesis and Alcohol To Jet), **but it has never reached an industrial stage.[35]** Major players like Shell[36] or Total Energies[37] and others[38] have given up, but new players have plans to produce so-called e-bio-fuels from electricity and wood / forestry residues, whose feasibility and sustainability is highly questionable.[39]



GOVERNMENTS SHOULD NOT SUBSIDISE AVIATION BIOFUELS: THE POLLUTER SHOULD PAY

While biofuels are a false solution, are harmful in many ways and should not be considered for aviation, the sector is arguing that it needs financial support from governments to make up for the higher costs. Even if scaled up further, aviation biofuels will still cost far more than kerosene. **Biofuel from "waste" oil still costs about 3 times the price and other conversion processes cost as much as 4.5 times the price.**[40,41]

Governments are increasingly giving in to the sector's demands instead of aiming for the only real solution, which is a reduction of flights. The EU for example has introduced so-called "Sustainable" Aviation Fuel (SAF) allowances in the Emissions Trading System (ETS) and will distribute 20 million free credits until 2030 to increase the uptake of so-called SAF, covering the difference in price with conventional jet fuel.[42] At a cost of €100 per tonne of CO_2 this is equivalent to a €2 billion subsidy. In the USA, subsidies and tax credits are being pursued through the Inflation Reduction Act (IRA) despite uncertainties surrounding its future and the disputable claims of the SAF Grand Challenge.[43] However, subsidising bio-refineries does not make sense as it is unlikely, for the reasons given here, that aviation biofuels can ever be "sustainable". This would result in facilities that become "stranded assets" with a large loss of investment. **In the end taxpayers, most of whom never or rarely fly,[44] should not be paying for that. Instead, the money should be invested in sustainable public transport infrastructure that serves the mobility needs of everyone.**

Government subsidies would also keep flying artificially cheap, resulting in more air traffic and emissions than if travellers themselves paid.

CONCLUSION

Biofuel is a false solution on many different levels and a clear threat to meeting climate targets in a just way. **The only true solution is to reduce air traffic now.**

While the development of new technologies and fuels may be helpful, it cannot be an excuse to delay emissions reductions that are needed NOW to mitigate the climate crisis. The only way to effectively reduce aviation emissions now is to reduce air travel. To achieve this, we need effective regulations. In our Degrowth of Aviation[45] report, we lay out how a set of measures could lead to a just reduction of air traffic. In our Just Transition[46] paper, we present the idea of how a conversion of the aviation sector can guarantee security for the livelihood of workers.

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By taking a closer look at what the industry tells us and what they don't tell us, in our fact sheet series we debunk common misconceptions and look behind the green curtain of their promises.

Read our Greenwashing Fact Sheet Series online:

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END NOTES & LITERATURE

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[5] IATA (2024): https://bit.ly/IATA-SAF-24
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