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January 2021

Sustainable reading
from the Oeko-Institut

Better stay on the ground?

Aviation and climate action

Social norms are changing Interview with Prof. Stefan Gössling

Linking people, but sustainably



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For now, the times in which the aviation industry experienced nothing but growth are over. As a result of the Covid-19 pandemic, countless planes remain grounded. Moreover, many people are asking whether they really need to fly. It has quickly become apparent that many business trips are unnecessary. Video conferencing works. And holidaying in your own country can be a delight.

However, I know from my work in development cooperation how important direct contact with people in other countries and on other continents can be. And thus how important flying is for cultural exchange and the international cooperation that is needed to address the global challenges we face. Meeting face-to-face enhances mutual understanding and helps develop trust. But in view of the harmful impact on the climate, we must all ask ourselves which flights are really necessary and how we can make them as sustainable as possible. In my first months at the Oeko-Institut I was very impressed by the close attention given to this issue at the institute. For example, it is taken for granted that no one will take a domestic flight. But it is also commendable that the need to keep flying to a minimum is considered, too, in the planning of international projects. As a result, maximum emphasis is placed on building the capacity of local partners in an efficient manner so that they can assume responsibility for tasks themselves.

It would be catastrophic for the climate if aviation were to resume its relentless pre-pandemic growth when the pandemic is over. There is therefore no alternative to reducing subsidies and increasing taxes and levies. In addition, there must be climate-friendly options for those flights that are unavoidable. This means new, CO₂-neutral fuels and, where possible, electrification.

Stay interested – and stay on the ground as much as you can!

Yours,
Jan Peter Schemmel

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“Jetting around the world is no longer trendy and cool”



The tickets are cheap and the next attractive destination is not far away: for many people, a flight to a European city was for a long time no more unusual than a trip to the neighbouring town. How can they be persuaded to fly less? What personal responsibility do they have and what must policy-makers do to curb the growth of flying? We talked to Prof. Stefan Gössling about these things. In his research at Linnaeus University in Sweden he focuses on tourism, which means that he also looks at how travel and mobility can become more sustainable.



Professor Gössling, what can we learn from the Covid-19 pandemic with regard to climate change mitigation in aviation?

The first lesson must be that there is far more air travel than we really need. Basically we had already shown previously that there is so much flying because aviation is heavily subsidised and prices are low as a result. But when you ask people what flights are really important to them, it turns out that only a fraction are.

How can people be persuaded to fly less?

If you raise the price, people automatically fly less. This is a way of reaching in particular the relatively large group of people who aren't much interested in climate change mitigation in aviation. In addition, subsidies should be abolished and a carbon tax introduced. I am also in favour of a risk tax. The fact that Covid-19 – and SARS and MERS before that – were able to spread so quickly is a result of the huge amount of air travel. But alongside the costs, social norms also play an important role in this.

What does that mean exactly?

For one thing, there are the super-rich people, who in my view have been far too widely ignored. Rich people, celebrities and superstars with their energy-intensive lifestyles not only cause vast quantities of emissions but are also taken as a model by many people.

How can that be changed?

Social pressure could help here. For example, the business model of Bill Gates – currently the third-richest person in

the world – is based on being associated with good deeds. He could easily afford to have the fuel for his private jet produced synthetically using renewable energies. So why don't we urge him to do that?

Leaving aside the super-rich, how else can social norms be changed?

In my view, a big step was taken by Greta Thunberg and Fridays for Future. They managed to question the image of the trendy jetsetter and demand individual responsibility for emissions. So Greta has set in motion a change in social norms. All of a sudden, frequent flyers are environmental sinners – jetting around the world is no longer trendy and cool.

What messages are best for getting people to change their behaviour?

Action on climate change is often approached by invoking dystopian images that involve abstract threats to people and the environment or restrictions on personal freedoms. We live in a society that is already beset by many risks that make people anxious – like the present pandemic. But anxiety is a paralysing feeling, not an activating one. If we really want to tackle climate change, we need inner stability, the feeling of security and positive visions.

What might these visions look like?

They must involve attractive alternatives – such as fast and punctual trains that are superior to flying. This means investing in the long-distance railway network: night train services must be expanded rather than abolished. Abolishing subsidies could be combined

with using the money thus freed up for projects that promote the positive development of society – such as better cycling infrastructure in cities.

Why are policy-makers not doing enough?

Transport is an issue that policy-makers always shrink from addressing, because mobility is very closely linked to our identity. In connection with air travel this means that a tiny proportion of the world population flies and people who do – especially the frequent flyers – build part of their individuality on it. Moreover, the small elite of people who fly often includes the politicians who should really be restricting air travel.

Thank you for talking to eco@work.

The interviewer was Christiane Weihe.



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Nothing harms the climate more

How can aviation become more sustainable?

When a plane takes off in Frankfurt for New York, a journey that is particularly climate-damaging begins: in the course of the return flight, each passenger causes global warming equivalent to the impact of almost four tonnes of CO₂. It would take a car journey of 21,900 kilometres to generate the same emissions. In other words, no form of transport is as damaging as the aeroplane. Despite this,

air travel has increased steadily over the years and no effective policies are being put in place to reduce the greenhouse gas emissions of the aviation sector. In its current donation-funded project the Oeko-Institut has looked in detail at climate change mitigation in aviation. This has included analysing and evaluating regulations and subsidies in the industry.



Some people may perhaps regard the direct emissions of aviation as negligible – they account for around 2.5 percent of global CO₂ emissions. But this fails to take account of non-CO₂ effects. “Unlike vehicles such as a car or motor bike, aircraft release their emissions ten kilometres above the ground – which means that they have a far more damaging effect on the climate,” explains Jakob Graichen, Senior Researcher at the Oeko-Institut. “Aircraft contribute to cloud formation and have complex impacts on the climate: the contribution of their emissions to global warming is three times that of ‘normal’ CO₂ emissions from the combustion of fuels.” Moreover, because the non-CO₂ effects are significant only at higher flying altitudes, the harmful effect of aircraft on the climate is far more severe on long-haul routes than on short-haul ones.



In addition, air travel has been steadily increasing – by 4-5 percent annually in recent years. Before the Covid-19 pandemic, further strong growth was pre-

dicted. For example, the German Aerospace Center (DLR) projected at the end of 2019 that worldwide passenger numbers would rise from around four billion in 2016 to more than nine billion in 2040. “The pandemic caused a huge collapse that will remain noticeable in the coming years,” says Graichen. “The number of business trips is likely to reduce – now that we have found that video conferencing is a convenient and genuine alternative.” The researcher from the Energy & Climate Division also anticipates that in the short term people will plan fewer long-haul holidays and will be more likely to holiday in their own country. “However, I don’t believe we will see a permanent change in travel behaviour,” he says. “We can assume that in a couple of years tourism will return to something like the pre-2020 situation and that aviation will increase again – with all its negative consequences.”

AT THE START OF THE ROAD

The aviation industry needs to become climate-neutral by 2050 if climate targets are to be met. Yet how the sector can achieve this is still not entirely clear. “It is true that there have been improvements in energy efficiency, but they are nowhere near enough to offset the growth in flying, let alone reduce greenhouse gas emissions,” says Jakob Graichen. Alternative drives, too, are regarded by the senior researcher as still some way off. “Short-haul flights could become electrically powered in the medium term: Norway is planning to introduce electric aircraft by 2040,” he says. “For long-haul flights, synthetic fuels are the most likely climate-friendly option, because they can be produced using renewable energies.” But the expert also stresses that these fuels will not achieve rapid emissions reductions in aviation. “At the moment they are still significantly more expensive and in some respects the technology is not yet mature. It will take decades for global infrastructure and production capacities to reach an appropriate level,” says Graichen. “To evaluate the potential it

is also helpful to make a comparison: if all the world’s aircraft were to operate on climate-friendly e-fuel today, the world’s entire production of renewable electricity would have to be used solely to power aircraft.”

THE TAX EXEMPTION ON KEROSENE DEPRIVES THE STATE COFFERS OF



And while there is still much to be done on the technical side, national and international policy-makers are also not doing enough to improve climate change mitigation in aviation to the extent that would already be possible today. Quite the opposite: the sector is heavily subsidised. “The price of flying is kept artificially low,” explains Graichen. “For example, there is no value-added tax on international flight tickets and no taxation of aviation fuel – when the fuel used by all other modes of transport is taxed.” Through the exemption from energy tax Germany alone subsidises aviation to the tune of eight billion euros per year; EU-wide the subsidies

amount to around 27 billion euros. The VAT exemption costs Germany around five billion euros, while the cost to the EU is around 30 billion. "Moreover, this mainly benefits people on higher incomes, because they fly more frequently." The senior researcher believes that it is time to treat aviation in the same way as every other sector for tax purposes – by levying VAT or imposing a significantly higher ticket tax, especially on medium-haul and long-haul flights. "If it becomes more expensive, fewer people will fly," says Graichen. "However, introducing a kerosene tax would provide an even better incentive to protect the climate, because it increases the cost of using energy and thus directly incentivises moves to reduce emissions."

As part of the donation-funded project "Above the clouds or staying on the ground?" the Oeko-Institut has analysed various aviation regulation measures and their emissions and evaluated their (possible) contribution to climate change mitigation. For example, intra-European aviation is part of the EU emissions trading system (EU-ETS). Yet Jakob Graichen regards this instrument as having very little effect on the sector. "For one thing, the emissions trading system has only a very limited sphere of influence and it covers only CO₂ emissions and not the indirect climate impact of flying," he says. "In addition, the aviation industry receives many of the certificates free of charge for no justifiable reason." This is because EU-ETS certificates can be issued for free if there is a risk of "carbon leakage" – i.e. of a climate-damaging activity migrating to a non-EU country. "But in aviation the passengers do not migrate. They want to continue flying from home," says the researcher. "The free allowances should therefore be abolished to create stronger incentives to reduce emissions."

INEFFECTIVE: CORSIA

Jakob Graichen also has clear views on CORSIA, the Carbon Offsetting and Reduction Scheme for International Aviation managed by the International Civil

Aviation Organization (ICAO). "It doesn't work," he says. The scheme is supposed to stabilise emissions, since from 2021 airlines will be required to purchase off-setting certificates from climate change mitigation projects if their emissions exceed a baseline level. "This baseline was originally going to be defined on the basis of average emissions in 2019 and 2020," explains Jakob Graichen. "The aviation industry would of course like these baseline levels to be as high as possible. This spring, as aviation collapsed as a result of the Covid-19 pandemic, the industry argued that 2019 alone should be defined as the baseline year. The airlines feared that the very low level of aviation emissions in 2020 would cause the baseline to be set particularly low and require a very large quantity of emissions to be offset." The Council of ICAO, supported by EU member states, accepted this point of view and defined 2019 as the baseline year.

However, the Oeko-Institut believes that aviation emissions will remain significantly below the originally assumed level for some time. This is one of the conclusions of the brief analysis titled "Should CORSIA be changed due to the COVID-19 crisis?". "The aviation industry has been hit significantly harder by the pandemic than other sectors. We assume that it will take some time for it to return to pre-crisis levels," says Graichen. After previous crises such as the Gulf War and the financial crisis of 2008, this recovery took two to six years. "CORSIA would therefore have made very little difference to the off-setting requirements: the effects of the lower baseline and the lower emissions would have counterbalanced each other," says the senior researcher. He stresses that CORSIA had significant weaknesses even before these changes. "The system only addresses the growth in emissions, covers only some of the global emissions, and the quality of the permitted offsetting certificates is questionable. For example, forestry projects only need to guarantee that the forest remains standing for around twenty years. In its present form, CORSIA does nothing for climate change mitigation."

A FRESH START?

Does this then mean that there is no hope of action on climate change in the aviation industry? Not entirely, says Jakob Graichen. There is some movement among policy-makers. In November 2019, nine EU member states – including Germany – expressed support for higher taxation. The European Commission plans to address the tax exemptions for kerosene as part of its Green Deal. "A proposal for a revision of the Energy Taxation Directive is due to be on the table by June 2021," says the senior researcher. "All previous revision attempts have failed, partly because there has to be unanimity on tax law and some countries always object. Perhaps there will now be a more successful attempt – or an 'alliance of the willing' that would involve member states reaching agreement on kerosene taxation bilaterally."

When a plane takes off from Frankfurt for New York in future, this could make the price of the ticket quite a bit more expensive. Until now, flying has been inappropriately cheap. Sensible taxation and an effective emissions trading system are essential. "Personally I am not an out-and-out opponent of air travel," says Jakob Graichen, "but we do now need more thorough measures to curb unlimited growth, reduce air travel and make it climate-neutral."

Christiane Weihe



Jakob Graichen is a Senior Researcher in the Oeko-Institut's Energy & Climate Division. He studies policies and measures that could reduce aviation and shipping emissions. The physicist is also working on the EU's Green Deal and on refinement of the European Emissions Trading System.
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Avoid, switch, improve

Alternatives to flying – and carbon offsetting

A 22-hour train journey instead of a three-hour flight? Most people would regard taking the train from Berlin to Barcelona instead of flying as an option not worth even considering. Yet just this one journey within Europe offers more alternatives than are perhaps apparent at first glance – including the question of whether travelling to the much closer town of Bamberg might not be equally nice. In view of the hugely damaging impact of flying on the climate we must rethink our travel habits and give good alternatives a real chance.

Per kilometre travelled, someone in Germany causes more harm to the climate by taking a flight than by using any other form of transport: flight emissions amount to around 230 grams of CO₂e (carbon dioxide equivalent) for each kilometre. According to the German Environment Agency (UBA), the corresponding figure for car journeys is 147 g CO₂e and for journeys by rail just 32 g CO₂e. “For this reason we should not take flights unless they are absolutely essential and no sensible alternatives are available,” says Anne Siemons, Senior Researcher at the Oeko-Institut.

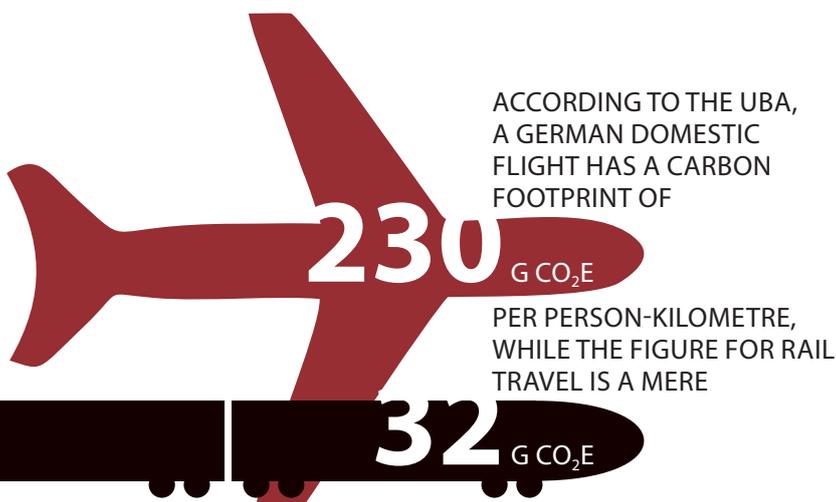
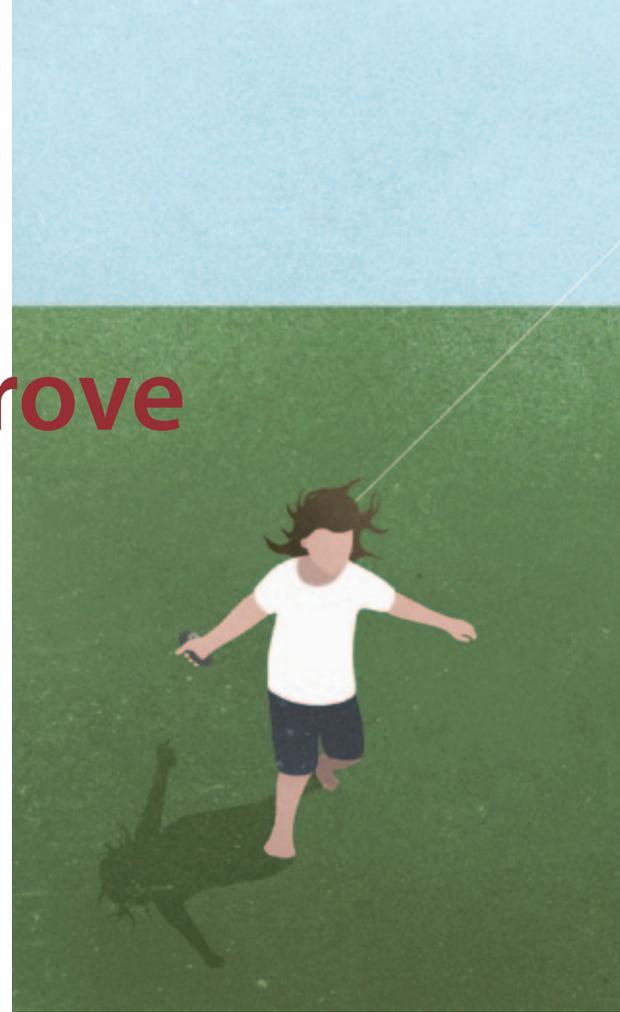
“For example, for trips within Germany it is not that difficult to switch to the train. Moreover, flying is often no faster, and in the train you can use the travel time more effectively.”

In the donation-funded project “Above the clouds or staying on the ground?” the Oeko-Institut has carefully considered the alternatives to flying. “During the project we talked to people who have cut down on flying or stopped flying completely, and we looked at companies that encourage their employees to use other modes of travel,” explains

the researcher. “We also studied protest movements that oppose the growth in air travel and the expansion of airports, because they play an important part in shaping the new discourse.” Anne Siemons sees the collapse of aviation as a result of the Covid-19 pandemic as an opportunity to review and question existing travel patterns. “Despite the fact that we can expect tourism to return to something like its previous level of growth within a few years, this is still an opportunity to discover alternatives and to stick with them when the pandemic is over.”

ON THE RAILS

How can we successfully promote alternatives and make them permanent habits? Some companies are already adopting new approaches to business travel, which accounts for 65 percent of domestic German flights. “Some grant additional holiday days for climate-friendly rail travel; others actually ban short-haul flights,” says the researcher. “Many are currently replacing meetings with video conferences and thus saving huge quantities of emissions.” The donation-funded project also has





plenty of suggestions on how people as individuals can contribute to more sustainable mobility. Firstly: rethink. This applies in particular to relatively affluent people from wealthy countries who are responsible for most of the aviation industry's emissions – it is estimated that only three percent of the world population flies each year. Secondly, we can redefine our concept of holidays. This starts with choosing holiday destinations that can be reached by other means of transport, and then booking with travel companies that focus on sustainable tourism. For international travel, night trains are a climate-friendly option. "In 2020 some European countries have agreed new routes or already established them," says

Anne Siemons. "For example, the Swedish government plans to fund new routes from Stockholm and Malmö to Hamburg and Brussels." The Oeko-Institut estimates that 10 to 20 percent of flights could be replaced by laying on more European night trains. "Unfortunately, the German railways completely abolished their cross-border night train services in 2016," says the researcher. "They are not really economic without state subsidy, because of the need to pay track access prices of nine to 22 euros per kilometre." This makes it almost impossible for the railways to compete with highly subsidised air travel.

More freight transport could also be shifted to the railways. In 2019 some 2.4 million tonnes of freight and mail were dispatched from German airports to other countries, while about 2.2 million tonnes arrived. "It is true that that is a relatively small proportion of the total volume of transported freight, and about half of it travels in the belly of passenger planes," says Siemons. "But because most passenger planes have been grounded during the Covid-19 pandemic, the costs have risen sharply. And there are ways of reducing air freight." For the researcher, the most obvious solution is a return to a stronger focus on regional production with businesses, for example, favouring suppliers in their region. "But there are other ways forward too, such as optimising packaging to reduce the weight and volume of consignments."

The donation-funded project also looked at flight offsetting, which involves compensating for the emission of greenhouse gases by funding climate change mitigation projects. "However, we see that as being the last in a series of possible climate change mitigation options in the aviation sector," says Anne Siemons. "First we must avoid flying, switch to other mode of transport for necessary journeys and – if that isn't possible – improve the efficiency of air travel." Besides, offset-

ting is not a long-term solution, because to achieve the Paris climate targets we need to stop using fossil fuels altogether and also remove CO₂ from the atmosphere. Offsetting could also result in alternatives not being considered, says Siemons. "Many people think that if they offset they can carry on flying as before." Furthermore, the climate impact of some offsetting projects is not guaranteed. "For example, with projects that involve afforestation or the prevention of deforestation, there is always a risk that sooner or later the forests will be cut down." The Oeko-Institut is currently working with the WWF and the Environmental Defense Fund in the USA on how consumers can best approach offsetting if flying cannot be avoided. "For instance, offsetting should cover not only the CO₂ emissions but also other climate impacts of flying. In the case of forestry projects it is also very important to check how long the emissions reduction is guaranteed for and whether the provider monitors this regularly."

Another approach of interest to the researcher is the idea of moving from talk of climate neutrality to a focus on real climate responsibility. "This would mean paying not just the price that the market demands for offsetting certificates but the price that is actually needed in order to limit global warming to an acceptable level, or the price of the costs that actually arise as a result of the emissions – the German Environment Agency puts this price at around 180 euros per tonne of CO₂."

According to the values posted by co2online, this would increase the price of a ticket for a return flight from Berlin to Barcelona by around 120 euros. If the tax exemption for flights were also removed, kerosene tax and VAT would be added too. This would make it significantly more attractive to travel by rail to visit the Sagrada Familia and taste Catalan cooking. And perhaps it doesn't need to be a quick trip either – it could be a tranquil journey with the opportunity to visit other beautiful places such as Brussels or Avignon along the way.

Christiane Weihe



Anne Siemons specialises in international and EU climate policy. She has an MA in International Relations and as a Senior Researcher at the Oeko-Institut she covers issues such as transparency in climate financing and accounting rules for the achievement of climate change mitigation targets.
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