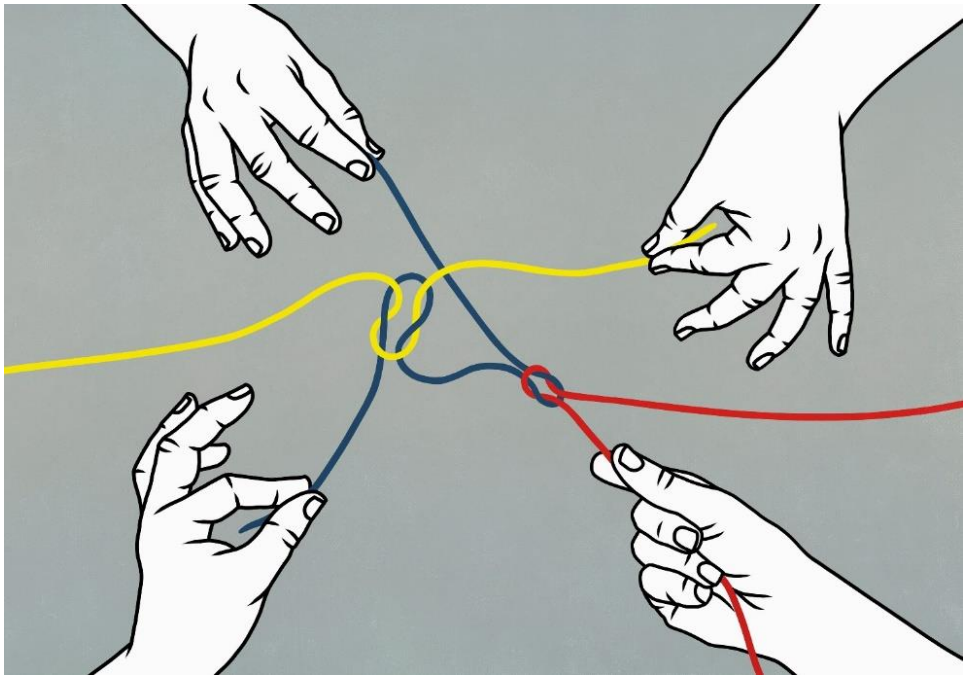
Factsheet 2: Flying and politics



Flying is cheap. And that is precisely why it is so attractive. How is it that travelling by plane costs so little compared to other modes of transport - despite its extremely harmful impact on the climate?

The answer is: unlike most other modes of transport, aviation is only lightly regulated. Other modes of transport have much higher levies and charges. So flying halfway around the world at low cost is only possible because of very high subsidies that are harmful to the environment. Germany alone subsidizes the airline industry to the tune of around €12 million a year (UBA 2019a). Thus, the price of an airline ticket does not reflect the high environmental costs caused by aviation. Precarious working conditions for service personnel underpin the system of cheap air tickets.

Subsidies on many levels

Aviation benefits from the lack of regulation in various ways. For example, flights - unlike travel by car or train – are exempt from energy taxes. There is also no value added tax on international flights. The ticket taxes levied in Germany only compensate for this to a small extent. The airline industry is also indirectly supported by government subsidies, especially with regard to regional airports.

At the European and international level, the market-based instruments of EU Emissions Trading System and the CORSIA system under the International Civil Aviation Organization (ICAO) should bring about more climate protection in aviation. Here (see chapter 3) we explain why the climate protection effects of these systems are low.

Stronger political regulation is the most important lever for influencing our flight behaviour and reducing air travel and decreasing the emissions of air travel. Binding, uniform rules can set incentives for climate-friendly behaviour without each individual having to consider the extent to which a flight can be justified.

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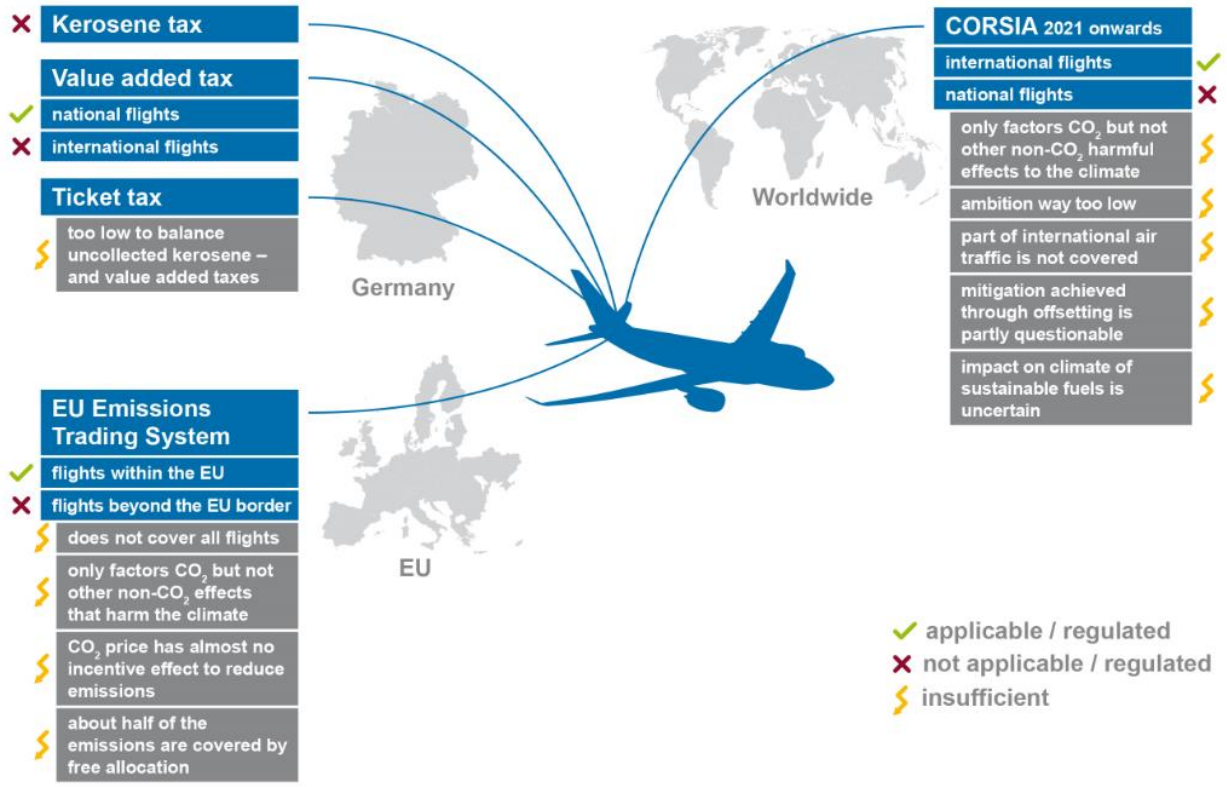
1 Taxes

In 2012, subsidies for the transport sector contributed €28.6 billion to harmful impacts on the environment. A large portion of the existing subsidies, around €12 billion, is attributable to air transport (UBA 2019a). The subsidies consist of missing value added and kerosene taxes as well as ticket taxes that are too low. This distorts competition to the detriment of rail and other more environmentally-friendly modes of transport (UBA 2019a).

Figure 1: Current regulation of aviation



Source: Oeko-Institut 2020

What about competition and infrastructure?

The airline industry's argument against higher taxation is that companies have high costs elsewhere, e.g. airport charges and air traffic control. In addition, higher taxes would lead to competition distortions in international aviation; in addition, other modes of transport are subsidized (BDL 2019a). The aviation industry also claims to be the only mode of transport to entirely finance its own infrastructure costs. Rail travel is also cheaper than air travel in most cases (BDL 2019b).

An analysis conducted by Deutsche Welle (DW) comes to different conclusions. Especially on routes covered by low-cost airlines, a flight is cheaper than a train ride (DW 2018). However, the reduction in VAT for rail travel to the rate of 7% in 2019 should make domestic rail travel in Germany more financially attractive compared with air travel.

Moreover, the cost of airline tickets is in no way commensurate with the environmental impact of air travel. The complete financing of infrastructure by aviation also does not stand up to closer scrutiny: subsidies for regional airports and the financial disaster surrounding the construction of the new BER

airport in Berlin are definitely a burden on the public purse. Taxes are also levied for other reasons, e.g. to finance education or social services and to put together rescue packages in times of crisis. Aviation also benefits from all this. Ultimately, taxes can also develop a steering role: the energy tax, for example, leads to a higher incentive for energy efficiency.

Closer to the desired effect

There is even the political will in the EU for higher taxation of air travel: in November 2019, the finance ministers of Belgium, Bulgaria, Denmark, France, Germany, Italy, Luxembourg, Sweden and the Netherlands expressed their support for an EU initiative to tax air travel (Euractiv 2019). 72% of EU citizens also support a carbon tax on air travel (EIB 2019). Nevertheless, from a climate protection perspective, current regulation is unfortunately far from what would be desirable.

1.1 Energy taxes

What is the current regime for energy taxes?

The energy tax is an excise duty that is currently applied on various fuels. Minimum tax rates are set at the European level, but Member States are allowed to impose higher tax rates. Aviation fuel for commercial operations is exempt from energy tax under the EU's Energy Tax Directive 2003/96/EC. However, under Article 14(2), Member States have the option to remove this exemption for flights within the EU and for domestic flights. The minimum rate for EU energy taxes is 33 cents per litre of kerosene. For Germany, the taxes are set in the Energy Tax Act: For kerosene, the minimum rate here is 65 cents per litre, which is identical to the rate for petrol consumption in road transport.

Energy tax: The energy tax is an excise duty applied in Germany to fossil energy sources (mineral oils, natural gas, liquefied gases and coal), renewable energy products (vegetable oils, biodiesel, bioethanol) and synthetic hydrocarbons from biomass used as fuel, e.g. as heating fuel. No energy tax, however, is levied on kerosene.

Tax exemptions on national, European and international levels

At present, however, not a single EU Member State (including Germany) levies energy taxes on kerosene used on domestic flights. The subsidization of energy tax exemptions on commercial aviation amounts each year to approx. €27 billion across the EU (Graichen 2019b) and approx. €8 billion per year for Germany (Graichen 2019b).

The tax exemption for aviation fuel is based on the agreement of the ICAO Convention signed in Chicago in 1944. However, the International Civil Aviation Organization (ICAO) does not prohibit the taxation of kerosene per se, but only in certain forms. For example, no kerosene may be taxed that is already on board an aircraft to be used on the onward international flight (UBA 2016, p. 44).

ICAO: The ICAO is the International Civil Aviation Organization of the United Nations. 193 national governments are signatories to the Chicago Convention (1944) which established the ICAO with the purpose of strengthening their cooperation in air transport

However, bilateral aviation agreements that regulate air traffic between two countries often mention tax exemption, such as the agreement between the EU and the USA (2007/339/EC). Such agreements are the basis for allowing aircraft to fly between the two countries, regulating ownership and control of airlines, and forming the basis for cooperation between countries with regard to safety and competition, for example. The notion of tax exemption

dates back to the post-World War II era: the agreement not to levy kerosene taxes was widely used at that time to strengthen the expansion of the aviation industry and, in turn, international exchange (see T&E 2019a).

Outside the EU, countries such as the U.S., Canada, Australia, Japan, Saudi Arabia, Thailand and Vietnam impose excise taxes on aviation fuel for national flights. Rates vary from €0.02 per litre in Australia to €0.70 per litre in Hong Kong (CE Delft 2019, p. 29–30).

What should the regulation of energy taxes look like?

It does not make sense for kerosene to be exempt from the energy tax. All fuels should be included.

From a climate protection perspective, a kerosene tax should be introduced as widely as possible, at least across the EU.

Since some Member States reject such a tax and a unanimous decision on taxes must be taken in the EU, it is currently difficult to implement such a tax across the board. However, it would be possible for some Member States to form an “alliance of the willing” and tax kerosene on flights covered by the alliance countries (UBA 2019b, p. 82).

A kerosene tax should definitely be introduced on domestic flights. Legally, this would be possible without any restrictions (UBA 2005). The Energy Tax Act theoretically provides for a levy of 65 cents per litre of kerosene, which would correspond to the tax on petrol. Kerosene refuelled in Germany for international flights could also be taxed. For this, bilateral agreements which currently prevent this would have to be amended (UBA 2016, p. 44). A kerosene tax would directly increase the cost of CO2 emissions and thus take into account negative climate impacts (Graichen 2019c). At the same time, as an excise tax, it could generate additional government revenue that could be used elsewhere for climate protection or other general purposes.

Furthermore, kerosene should be taxed in addition to being included in the EU Emissions Trading System (see chapter 3.1). This is because the EU ETS only takes CO2 emissions into account. An excise tax could additionally put a price on the other negative climate impacts of aviation (see factsheet 1) (UBA 2016, p. 44).

1.2 Value added tax

What is the current regime for valued added tax?

No VAT is charged on international flights. Based on an average VAT rate of 19%, the EU-wide subsidies thus amount to around €30 billion per year (Graichen 2019c). In Germany, the aviation sector thus receives subsidies of approx. €5 billion (Graichen 2019b). Most Member States levy VAT on domestic flights, including Germany. Domestic flights account for only a small share of all flights in Germany (see factsheet 1). However, depending on the EU Member State, they account for between 6% and 27% of total flights (CE Delft 2019, pp. 26–27).

According to the EU VAT Directive, no VAT should be levied in international air transport on the supply of fuel, the delivery, repair or maintenance of the aircraft themselves or their cargo (CE Delft 2019, p. 26). However, countries may levy VAT on airline tickets, as well as on fuel and airport or service charges. For example, the U.S. and Canada impose a sales or transport tax on flights between their countries and, in the case of the U.S., to Mexico. Mexico imposes a general transport tax of 4% on international flights (CE Delft 2019, p. 26).

How should value added taxes in aviation be regulated?

A value added tax is also urgently needed for international flights in order to reduce the subsidization of the most climate-damaging means of transport: the aeroplane.

An EU-wide VAT regime would be the most sensible solution to create a level playing field in the EU single market. This would require amending the EU VAT Directive, which sets the framework for national rules on VAT. A reform process of this directive has been underway since 2019. VAT could be levied in the country of departure for the entire flight. Such a change would be easy to implement and would have a large positive impact on the environment (UBA 2019b, p. 82).

However, it is uncertain whether the EU Member States could agree on such a regulation. There are also major obstacles to the introduction of a value added tax for international aviation beyond the EU. The International Air Transport Association (IATA), for example, justifies the zero-percent VAT rate with the argument that international air transport takes place outside of any tax jurisdiction, thus enabling a level playing field for air traffic across national borders (CE Delft 2019, p. 26).

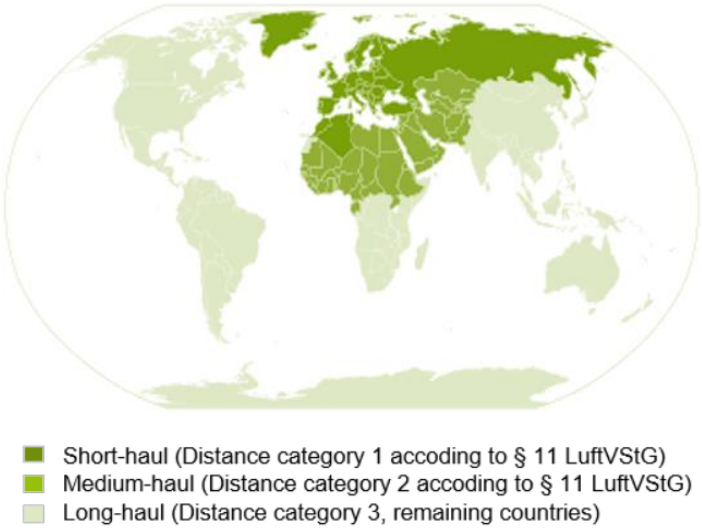
As long as these hurdles remain, it would make sense to raise the already existing ticket tax enough to compensate for the revenue lost due to the lack of VAT on cross-border flights (UBA 2019b, p. 82).

1.3 Ticket taxes

What is the current regime for ticket taxes?

In Germany, ticket taxes – as well as air traffic taxes – are levied on commercial passenger flights departing from a domestic airport (the article of the tax is the legal transaction, e.g. the contract of carriage, which entitles the passenger to take off).

Figure 2: Classification of different distances for ticket taxes in Germany



Source: Oeko-Institut based on Wikipedia 2020

In Germany, ticket taxes are levied depending on the destination region. These are divided into three distance categories; the tax rates in 2020 range from €13.03 to €59.43 per departure in Germany.

For domestic flights, the tax is paid for both the outbound and the return flight. These tax rates have been in effect since April 1, 2020 and were increased as part of the Climate Action Programme 2030 (Deutscher Bundestag 2019). The tax applies to the entire flight from its departure in Germany to the destination airport, thus the distance category is not determined by the airports that serve only a stopover or transfer. Passengers who only change planes in Germany do not pay air traffic tax. Feeder flights within Germany are also not taxed separately; the tax rate for the destination applies. Children un-der the age of two and flights taken solely for official, military or medical purposes are not taxed (BMF n.d.).

The amount of the aviation tax is linked to the auction proceeds of the EU Emissions Trading System. The idea was that the combined total of aviation tax revenues and the auction income under the EU ETS would be one billion Euro per year, adjusted annually (UBA 2019b, pp. 97–98). With the new tax rates from April 2020, the sum has been increased to €1.75 billion.

Ticket taxes vary widely across Europe. In the UK, ticket taxes are comparatively high, averaging around €45 per passenger. Norway and Austria, on the other hand, have lower ticket taxes per passenger compared to Germany (CE Delft 2019, pp. 20–21).

What should the ticket tax regime look like?

The ticket tax is intended to generate government revenue, but also to have an environmental effect. However, without VAT on international flights and without a kerosene tax, the ticket tax can only make a small contribution to reducing tax-based subsidization of air travel (UBA 2019b, p. 97).

As long as no VAT is levied on international flights, the ticket tax should be raised so that it offsets taxes that are not levied.

An air transport tax should also be levied on the transport of freight. This is because current regulation only applies to passenger traffic.

It is particularly important that neighbouring countries coordinate their ticket tax systems. because here, too, it is difficult to find a Europe-wide solution directly. Germany should increase the tax for short-haul flights as a first step. Here, there is no significant risk that passengers will try to avoid the tax by choosing other flight routes (UBA 2019b, pp. 97–98). In other EU countries, furthermore, discussions about the ticket tax are also underway. France, for example, has increased its ticket tax in 2020, and the Netherlands plans to introduce a ticket tax in 2021.

Effects of ticket taxes

On domestic flights, an increased ticket tax could lead to a noticeable drop in demand in the short term, especially for journeys taken privately rather than professionally. This is because inexpensive domestic flights will become more expensive due to the double levy for outbound and return flights and the value-added tax charged. Since average tickets for domestic flights are in the middle price range, even for low-cost airlines, the impact of a higher ticket tax on the ticket price is not very high.

On international routes, the new rates of Germany's Air Traffic Tax Act only lead to a relevant price increase for very low-priced tickets and thus to noticeable effects. For moderate to high ticket prices, the one-off drop in demand is less than 2% (Graichen 2019a). Overall, it is estimated that a 10% higher price would lead to a decrease in demand by 9% to 11% in most EU countries. Moreover, higher ticket prices would not have a negative impact on jobs. Although jobs would be lost in the airline industry, the higher tax revenues would have a positive impact on the overall economy (CE Delft 2019, p. 115).

Another idea for regulating air transport more strongly would be progressive taxation: It could take into account the amount and distances of flights that an individual takes each year. The idea of a Frequent Flyer Levy (FFL) is to make each flight taken within a certain time period progressively more expensive, thus creating an incentive for fewer flights. An Air Miles Levy (AML), in contrast, would increasingly make the cost of the distance flown more expensive (StayGrounded 2019). Since low income groups fly less frequently and over shorter distances, they would not be affected by the price increases as much as high income groups. Nevertheless, these levies would need to be combined with other policy measures to sufficiently address environmental impacts of the aviation sector.

2 Additional subsidies and a lack of political regulation

In addition to taxation, there are other factors that indirectly subsidize air travel or keep ticket costs low:

Subsidization of regional airports

A total of 14 German regional airports receive direct financial subsidies of approximately €39 million per year. While most of these airports generate losses, they keep operating based on these direct subsidies and on indirect subsidies via guarantees, warranties and other grants. This is economically and environmentally nonsensical, as only three of the 14 airports make a relevant contribution to connectivity. The subsidies also increase the environmental costs of flying compared to other modes of transport (FÖS 2020b; 2017). In 2019, it was decided that subsidies for regional airports would increase even further (RND 2019). However, the Covid-19 pandemic will drastically worsen the poor financial situation of airports (FÖS 2020b).

Subsidization of aircraft manufacturers

Since 2004, the EU and the U.S. have been at odds over whether the other economic area pro-vides subsidies to the aircraft manufacturers Boeing and Airbus in violation of applicable global trade law. In 2018 and 2019, the World Trade Organization (WTO) confirmed that the aircraft manufacturers were illegally subsidized. Boeing benefited primarily from a reduced corporate tax, according to the WTO. This gave the company advantages in the competition for orders (HAZ 2019; Zeit Online 2019). In other cases, too, the governments directly subsidized their aircraft manufacturers with large sums of money. This occurred, for example, through guarantees intended to provide security for investors, subsidization of social plans, the granting of favourable loans, the establishment of new airlines after insolvency and aid following the decline in air passenger numbers as a result of the terrorist attacks of September 11 2001 (Germanwatch 2003; DIW 2003).

Working conditions of budget airlines

Cheap tickets from low-cost airlines sometimes conceal poor working conditions for employees. According to reports, at some airlines both pilots and flight attendants often work as (pseudo) self-employed workers or are employed on temporary contracts and are not paid when off sick. Without a set number of hours per month, their earnings are uncertain; they have to pay for training and their work attire themselves (Zeit Online 2018; ZDF 2020; Der Spiegel 2018).

Support given to aircraft industry during the Covid-19 pandemic

The aircraft industry was strongly affected by the Covid-19 pandemic and is recording extremely high losses (see factsheet 1). Nevertheless, it is important not to delay the necessary developments in climate protection in the industry. Several voices including Oeko-Institut and Green Budget Germany (FÖS) advocated linking state aid given to the airline industry with the implementation of climate protection measures, e.g. increased investment in climate-friendly technologies and the switch to more modern aircraft (FÖS 2020a; Öko-Institut 2020b).

By the end of June 2020, European countries pledged a total of approx. €30 billion in aid for airlines. Lufthansa will receive the most extensive state aid, €9 billion in the form of loans and a partial take-over of the airline (T&E et al. 2020). Only two of the 21 European rescue measures – for Austrian Airlines and Air France – are linked to the implementation of climate protection measures; these airlines are to halve their domestic flights emissions by 2030 and 2024, respectively. Austrian Airlines additionally has to reduce total emissions per passenger and kilometer by 30% by 2030 compared to 2005. The airline also needs to reduce domestic flights, particularly on routes where rail journeys take less than three or two and a half hours (T&E 2020a; 2020b). These targets, however, are not legally non-binding.

Poor political conditions for night trains as an alternative to flying

Night trains can be an alternative to flying (see factsheet 3). Various political obstacles would have to be overcome, however, in order to make greater use of them. These obstacles currently prevent the climate protection potential of night trains from being fully tapped.

- **High track access prices:** One of the biggest problems for night trains are the track access charges, which have to be paid per kilometre in rail transport. These charges amount to €9 to €22 per train kilometre (UCI 2013). This makes night trains unprofitable because aeroplanes do not have these costs. If night trains also use high-speed lines, the track access charges are even higher by a factor of 4-5 (Fraunhofer ISI 2017). Track access charges account for 60% of the cost of night trains (UCI 2013). A different model is needed here which takes into account the long routes and off-peak times that apply to night trains.

- **Lack of a purchase organization:** In contrast to all other European countries, Germany lacks a purchase organization for long-distance rail transport that plans and puts night train services out to tender. Without such an organization, no services are created. This lack in Germany, in the centre of Europe, also hinders the planning meetings of the other European countries for cross-border rail transport.

- **Lack of political vision:** Germany's climate protection program for transport includes many billions of Euro for Deutsche Bahn, but no targets for which additional routes and new services are to be created with this money. There is a lack of political will and vision in Germany for modern, comfortable night trains that connect passengers with neighbouring countries without causing emissions. Such services could be fully implemented in one legislative period; many other transport projects in the rail sector that create environmentally-friendly alternatives take 15 to 30 years to implement.

- **Little support from major rail companies:** In countries with high-speed rail services, major rail companies tend to see night trains as competition to high-speed inter-city services. Night train services are therefore more likely to be cancelled than created. This also explains why the Austrian Federal Railways (ÖBB), which does not operate a high-speed network, has

taken over German night train services (T&E 2020c, Fraunhofer ISI 2017). Governments and the EU must not rely on the rail operators but develop their own project plans.

- **Lower capacity:** A normal train car can carry about 60 to 70 passengers; and the train can travel the same route several times a day. A sleeper car can take half this number of passengers at most; the train only travels the route once every 24 hours. In addition, bedding has to be cleaned; and personnel costs can be higher due to extra pay for night work. These factors increase costs. In the past, night train services were discontinued even though they had a high customer utilization. These higher costs will continue to apply in the future so the services should be promoted in competitive procedures that are dependent on the environmental benefit.

- **Use conflicts:** The rail routes are actually much less busy at night and would thus have capacity for night trains. But construction sites are often set up at night, slow freight trains run on some key lines and there are congested junctions. There are also bottlenecks at stations, mostly in the morning. According to an analysis by the International Union of Railways (UIC), however, these problems can be overcome (UIC 2013). An analysis of route utilization in Europe has also shown that most countries have enough spare capacity in their existing rail networks (Steer Davies Gleave 2017).

- **Lack of a coordinated booking and information system:** There is no uniform European cross-border platform of rail operators for night trains, which passengers could use to search services and buy tickets. However, without simple, official booking platforms, the market will not be tapped.

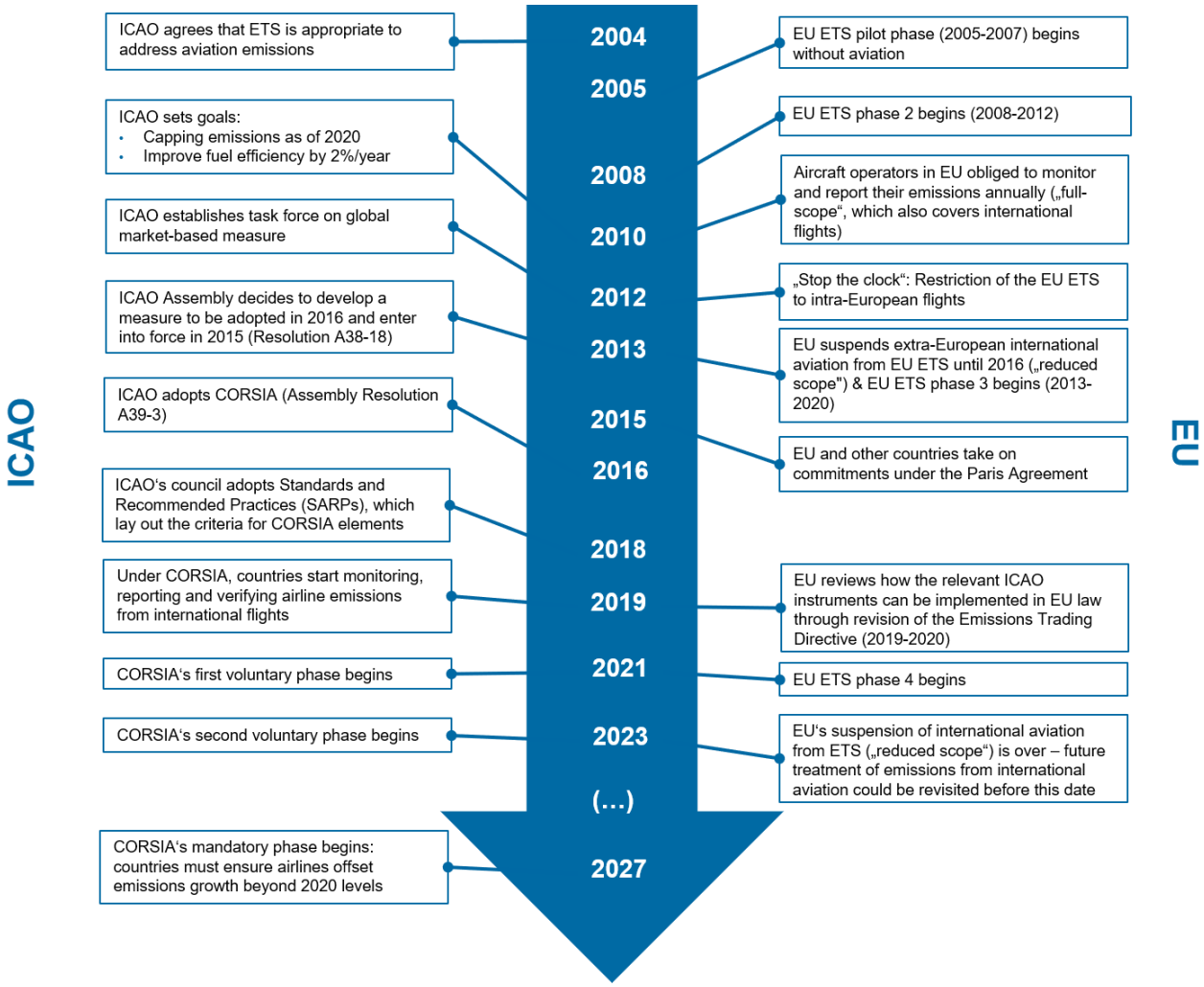
- **Lack of compatibility:** There are technical problems due to different track gauges, electricity supply or signaling systems, which each country develops for itself. Despite European integration, these problems are increasing rather than decreasing. The International Union of Railways (UIC) (2013) believes that these obstacles can be overcome; however, it also requires political will to coordinate this.

3 European and international regulation

Aviation is addressed at the European level by the EU's Emissions Trading System (EU ETS) (see chapter 3.1) and at the international level by ICAO (see chapter 3.2). Reporting under the United Nations Framework Convention on Climate Change (UNFCCC) distinguishes between national and international aviation emissions. A regulation to reduce international emissions is difficult to implement as this requires a worldwide consensus. At the international level, it was decided in 2016 that a global market-based system should regulate aviation; the CORSIA instrument (see chapter 3.2 below) will come into effect from 2021.

In addition, intra-European aviation has been covered by the EU ETS since 2012. The system regulates the emissions of intra-European flights via the trading of emission allowances. Up to 2021, air transport from EU to non-EU countries was therefore not covered by the ETS. The relationship be-tween the EU ETS and the CORSIA system has not yet been clarified. A proposal from the Euro-pean Commission is expected in the second quarter of 2021.

Figure 3: Developments in approaches to aviation on international and EU levels



Source: Oeko-Institut 2020

3.1 EU – emissions trading

Aviation in the EU is covered by the EU Emissions Trading System (EU ETS). CO2 emissions in aviation are therefore assigned a carbon price and their total volume is limited via the trading in emission allowances within the EU ETS. This instrument has not yet been able to achieve its full effect in practice. This is because, firstly, only some of the flights from the EU are covered by the ETS and, secondly, the prices for emission allowances are too low and the supply is too high for the EU ETS alone to be an effective instrument for more climate protection in aviation.

EU Emissions Trading System (EU ETS): this is the trading system by which CO_2 emissions from certain economic sectors are priced and capped within the European Union. The installations covered by the system trade emission allowances to offset excess emissions.

How is aviation covered by the EU ETS?

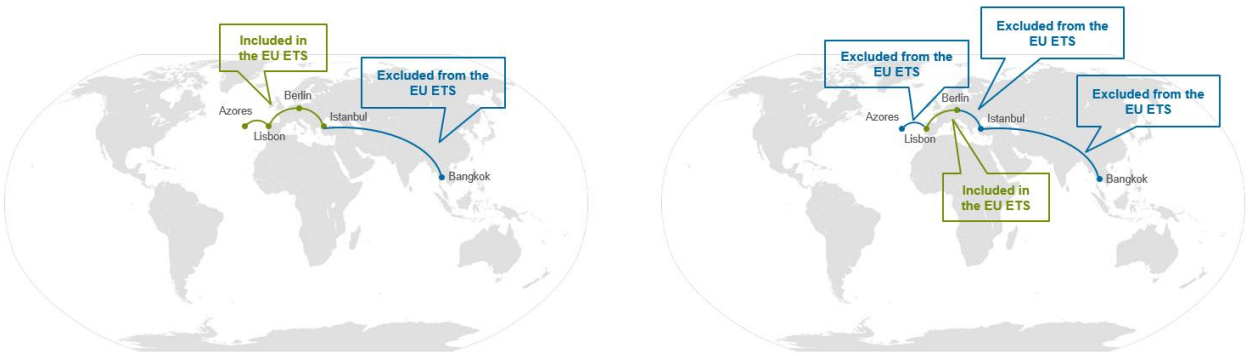
Aviation has been included in the EU's Emissions Trading System since 2012. Prior to this, the EU ETS only covered stationary installations from the energy and industry sectors. Originally, all flights taking off and/or landing in European airports were to be included in the EU ETS (so-called "full-scope").

Stationary ETS: Stationary installations, e.g. power plants or industrial plants that participate in the EU ETS (but not aviation, which is also included in the ETS).

However, various countries – particularly the USA, China and Russia – viewed this as illegal taxation of airlines of countries outside the EU. Thus, the scope of the EU ETS was retroactively limited from the beginning and now only includes intra-European air traffic.

Thus, the EU ETS covers only one third of the scope of air transport that was initially envisaged (see Figure 4). The limited scope still applies. As soon as the exact design of CORSIA has been finalized, the scope of the EU ETS will be reviewed and either permanently reduced or returned to full scope (see chapter 3.2 on CORSIA).

Figure 4: Scope of aviation covered by EU ETS, current vs. originally planned



Source: Oeko-Institut based on Cames (2019)

Under the EU ETS, allowances for CO2 emissions from flights within the European Economic Area have had to be surrendered since 2012. Some flights are not covered by the EU ETS, e.g. small aircraft, very small airlines and government flights (EU 2009).

All airlines operating flights that are subject to the ETS must monitor the emissions of these flights and report them to the EU by 1 April each year. Allowances equivalent to the emissions must be submitted by 1 May each year.

Currently, air operators receive a high proportion of these allowances free of charge. For emission levels above that, operators must purchase allowances at regularly scheduled auctions or directly from stationary installations covered by the EU ETS. In 2019, aviation emissions under the ETS totalled 68 million tons of CO2 or nearly 40% of total aviation emissions. For the period of 2012 to 2020, airlines were allocated over 50% of the emission allowances they needed for free (EEA 2020).

Between 2013 and 2020, the amount of allowances allocated free of charge to airline operators remained the same. From the start of the fourth trading period in 2021, they decrease by 2.2% per year (corresponding to the Linear Reduction Factor (LRF)).

Linear Reduction Factor (LRF): The factor reduces the quantity of emission allowances allocated annually in the EU ETS for market participants.

Is the EU ETS an effective instrument for more climate protection in aviation?

The EU ETS was the first policy measure implemented to reduce emissions in the aviation sector. It thus had a pioneering function and sent an important signal in the right direction.

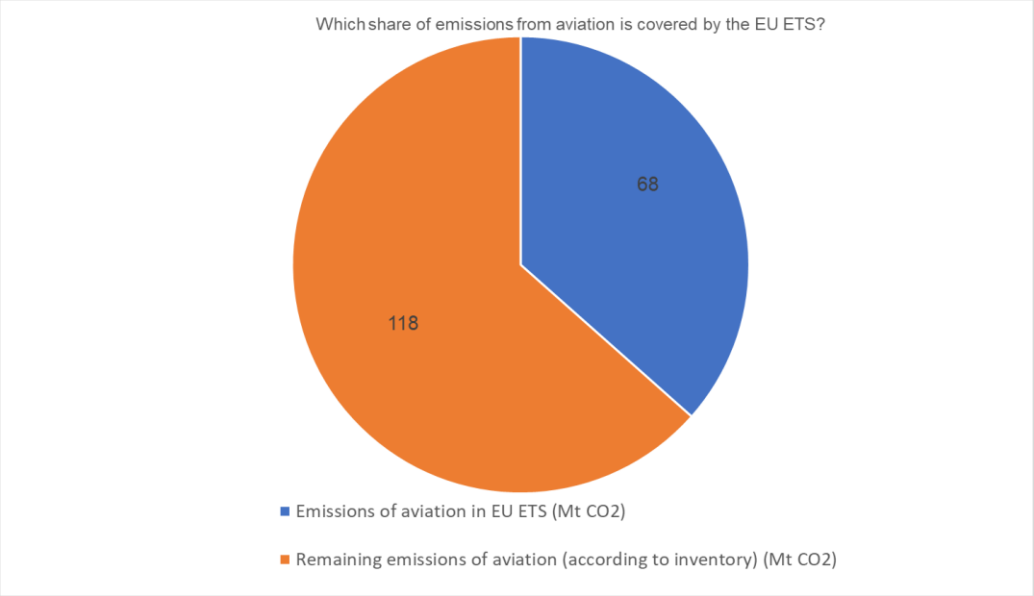
However, as the EU ETS is currently designed, it does not have a strong impact in terms of increasing climate protection in aviation.

The reasons for this are:

1. **Its limited scope:**

As the EU ETS only covers intra-European flights, over 60% of aviation emissions are not currently covered by the GHG inventory.

Figure 5: What share of emissions from aviation are covered by the EU ETS?



Source: Oeko-Institut based on EEA (2019) and EEA (2020)

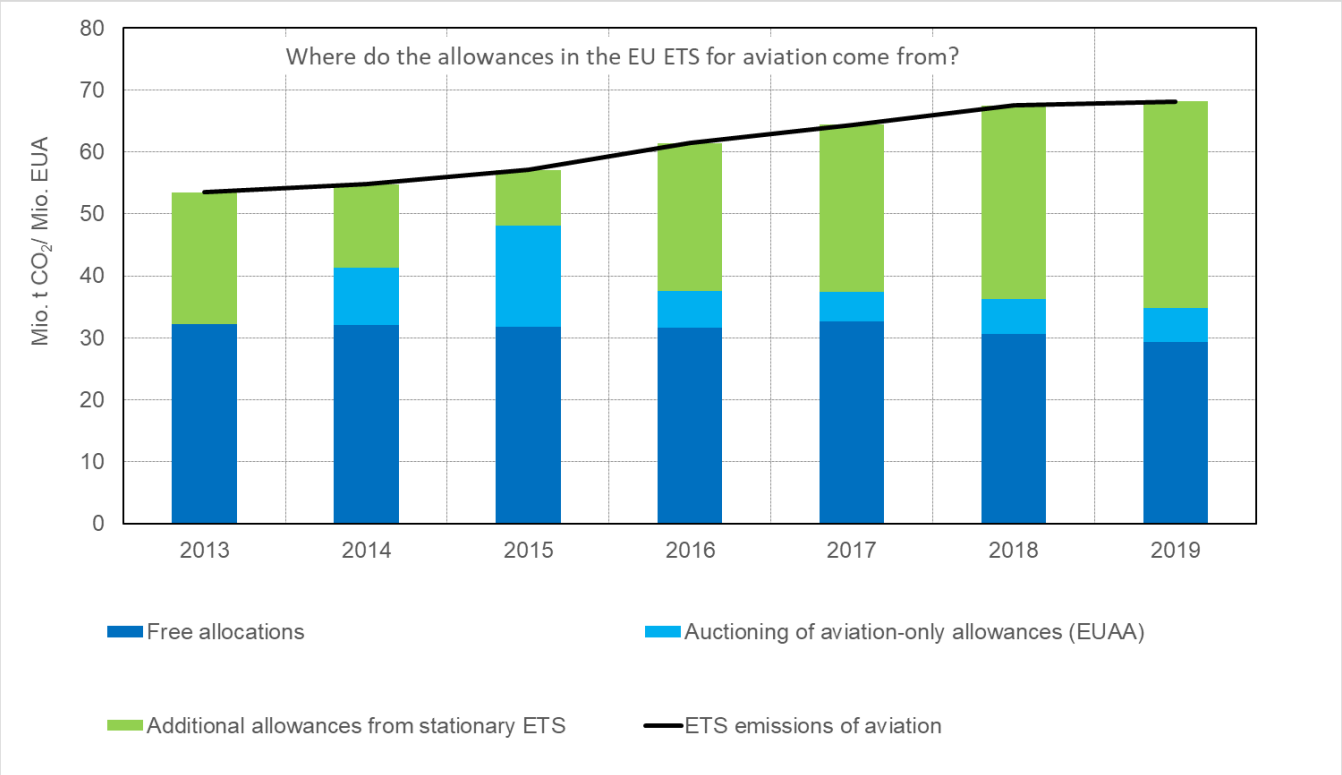
2. Only CO_2 emissions covered rather than all negative climate impacts

The EU ETS regulates only CO2 emissions and not the indirect climate impact of flights. This simplification of the climate impact is particularly problematic in aviation. In addition to direct emissions from kerosene combustion, the gases emitted in high layers of the atmosphere lead to cloud for-mation and other chemical processes. According to current estimates, the GHG impacts of these effects are about one to three times higher than the CO2 emissions generated by combustion (see factsheet 1).

3. Goal of overall EU ETS is too low

The EU ETS limits emissions by setting a so-called cap, i.e., an upper limit of the possible emissions, which the total amount of emissions in the system may not exceed. The cap is calculated roughly from the sum of the freely allocated emission allowances and the allowances (freely allocated or not) that are auctioned. For the period up to 2020, the cap is constant and constitutes 95% of the emissions from 2004 to 2006. Since that time, the emissions have increased significantly. For aviation, the cap is thus significantly lower than actual emissions. Operators must cover the gap between actual and permitted emissions by, for example, purchasing allowances from the stationary installations under the ETS.

Figure 6: Where do the emission allowances for aviation under EU ETS come from?



Source: Oeko-Institut based on EEA (2020)

However, if an aviation operator purchases allowances from an industrial installation, it does not mean that emissions are actually mitigated.

The surplus of allowances is currently so high that the allowances needed by aviation have no effect on the overall ETS.

There is a substantial surplus of allowances in the stationary EU ETS; in 2019 this surplus amounted to over 1000 million European Union Allowances (EUAs) (ETC/CME 2019). Aviation's demand for approximately 30 million allowances from stationary installations is not significant enough in the current oversupply of allowances that it leads to a mitigation of emissions elsewhere.

This situation could change in the future if the EU ETS is reformed. So far, it has been decided that a so-called market stability reserve is introduced to reduce the surplus of allowances. In addition, allowances are to be completely cancelled and the cap for the entire EU ETS is to decrease from 2021 onwards.

European Union Allowances (EUA): These are carbon credits traded at company level for emissions trading within Europe (EU Emissions Trading System). The credits are also referred to as emission rights (ER). They have been tradable within the EU since 2005 and are issued to power plants in the EU that are subject to emissions trading.

Market Stability Reserve: Instrument for the annual reduction of surplus allowances in the European Emissions Trading System. If the surplus exceeds 833 million allowances, the volume of allowances to be auctioned for the respective year is reduced by 24% of the surplus. If the calculated surplus falls below 400 million allowances or if there are sharp price jumps, the annual auction volume in the EU ETS is increased by 100 million allowances.

The prices for emission allowances under the EU ETS are too low to make progress with the decarbonization of aviation.

Only in 2018 did carbon prices in the EU ETS exceeded the limit of €10 per ton of CO2. By mid-2020, these prices were €30 per ton; they are expected to rise further by 2030. Therefore, only low additional costs arise for aviation operators that purchase allowances to offset their emissions that exceed the cap. Thus, the EU ETS currently offers no incentive to reduce emissions, for example by using aircraft with lower emissions. This is because purchasing allowances is much cheaper than implementing such measures. At the moment, a flight from Berlin to Mallorca is about €3 more expensive if the cost of the allowances is added to the ticket price.[1]

4. Uncertain climate footprint of "sustainable fuels":

One option for more sustainable air transport is the use of synthetically produced fuels. In the EU ETS, fuels from renewable sources are in principle assessed as zero emissions if they meet certain criteria in terms of sustainability and mitigated emissions. These follow the criteria of the Renewable Energy Directive (2018/2001) in Articles 25(2), 29(20), 26(1) and 29 (2-7). However, the level of emissions generated by the production of "sustainable aviation fuels" is uncertain for some processes. At present and for the foreseeable future, the prices for emission allowances are significantly lower than the costs for synthetic fuels – so they cannot currently make a significant contribution to more climate protection in aviation (see factsheet 5).

[1] With emissions of 0.27 tons of CO2 per passenger according to calculations on the basis of Atmosfair (https://www.atmosfair.de/en/offset/flight/), a certificate price of €20 per ton of CO2 and free allocation of certificates amounting to 43%.

How could aviation be regulated more effectively under the EU ETS?

The idea of the EU ETS is to limit the total emissions of the system and thus to stimulate trading of allowances between market participants so that emissions are reduced where the costs of doing so are lowest. However, the complex system needs further adjustments to generate sufficient incentive effects. Currently, there are two windows of opportunity to reform the EU ETS and make it more effective. Firstly, the EU ETS needs to be adjusted in the context of the international CORSIA system (see chapter 3.2). Secondly, increases in the EU's climate targets for 2030 are planned, to which the EU ETS will contribute significantly.

The most important options for reforming the EU ETS with a view to aviation are:

1. **Adjustment of the emissions cap:** The decisive factor is the level of the cap, i.e. the total quantity of emissions permitted within the system. As experience gathered in the first years of the EU ETS has shown, a static cap is not enough. It cannot take into account actual developments such as a decrease in emissions due to economic or health crises or faster technological developments such as the use of renewable energies. Adjustments to the cap can involve the absolute level of emissions and the speed of emission reductions.

   The speed at which the cap is reduced is determined by the Linear Reduction Factor (LRF). It has already been decided that the LRF will increase from 1.74% to 2.2% in the fourth trading period starting in 2021. In contrast to previous years, the cap for air transport also decreases annually in parallel with that of the stationary sector.

   The overall cap must be adjusted in view of the substantial surplus of allowances, the effects of the Covid-19 pandemic, which is expected to lead to a collapse in allowance de-mand, and the long-term European climate targets that have been set. According to calculations carried out by Oeko-Institut, the cap should be reduced by 205 million Annual Emission Allowances (AEA) and the LRF should be increased to up to 5.07% (these calculations were made before the Covid-19 pandemic and thus do not include the significant decrease in aviation emissions and other ETS emissions) (Öko-Institut e.V. 2019).

2. **Reduction of free allocation of emission allowances:** Allowances are allocated for free under the EU ETS to avoid carbon leakage, i.e. the migration of activity harmful to the climate to another country or the shifting of CO2 emissions outside the economic area. In the case of aviation, leakage is unlikely – especially for passenger transport: no one will fly from Berlin to Mallorca via Ukraine to stay outside the scope of the EU ETS. It would therefore make sense to abolish free allocation for aviation. This would directly result in higher costs and incentives to reduce emissions.

3. **Additional measures**

   a. Numerous additional measures that are currently being discussed for stationary installations under the EU ETS could also be applied to the aviation covered by the system. These would generally lead to an increase in costs or to a **stabilization of prices** (e.g. carbon floor price).

   Carbon Floor Price: lowest price limit for CO_2 emissions in the EU Emissions Trading System

   b. It makes sense **to continue to separate stationary installations and aviation under the EU ETS**. This will allow the quantity of allowances available for aviation to be more precisely controlled.

c. **Connecting the EU ETS with other emission trading schemes** would increase the system's geographic coverage and its effectiveness, especially as regards aviation. Currently, flights are not covered by the EU ETS if they depart from or arrive at airports outside the European Economic Area. By linking emission trading schemes that include aviation, more flights can be included in the system. It has already been decided that the emissions trading systems of Germany and Switzerland will be linked, but the practical implementation of this has been postponed because of the Covid-19 pandemic.

3.2 CORSIA system under the ICAO

What is CORSIA?

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is a new global climate protection instrument for international flights. Adopted by the International Civil Aviation Organization (ICAO) of the United Nations in 2016, it aims to offset the increase in CO2 emissions after 2020. The system obliges aircraft operators either to limit their CO2 emissions, for example by using more efficient aircraft or so-called "sustainable aviation fuels" or to buy carbon offset credits from climate protection projects.

How did CORSIA come about?

In the negotiations that led to the Kyoto Protocol of 1997, the countries could not agree to which country the CO2 emissions from international flights should be ascribed. Should they be attributed to the country in which kerosene is refuelled or to the country in which the plane takes off or lands? Or should they be allocated according to the nationality of the passengers? It was ultimately decided that international flights would be excluded from the countries' climate targets altogether. The International Civil Aviation Organization (ICAO) was tasked with taking measures to limit these emissions.

The ICAO negotiations initially stalled for many years. In 2008, the EU lost its patience and decided unilaterally to regulate the CO2 emissions of international flights and include these in its Emissions Trading System (see chapter 3.1) from 2012. Many countries objected to this, arguing that the EU was improperly regulating their airspace. A substantial conflict and a trade war threatened. The EU then limited its unilateral regulation to domestic flights on the condition that an agreement was reached under the ICAO. This gave impetus to the negotiations. In 2016, the International Civil Aviation Organization finally adopted CORSIA.

How does CORSIA work?

In recent decades, CO2 emissions from international flights have risen steadily. While emissions per passenger have decreased due to aircrafts being increasingly fuel-efficient, the volume of passengers has grown much faster. CORSIA aims to address this trend by allowing air transport to continue to grow and holding actual CO2 emissions at 2020 levels through mitigation measures and off-sets. Airlines can meet their commitments in three ways:

1. **Less kerosene consumption:** The kerosene consumption can be reduced by, for example, using fuel-efficient aircraft. Among other things, airlines can use more efficient aircraft and thereby decrease kerosene consumption.
2. **Sustainable aviation fuels:** So-called sustainable aviation fuels can lead to lower greenhouse gas emissions. These include biofuels produced from renewable raw materials, synthetic fuels

that obtain carbon in kerosene, for example by capturing CO2 from the air, and fossil fuels that result in lower greenhouse gas emissions during their production.

3. **Offsetting:** Here, the remaining CO2 emissions above the 2020 levels are offset by the purchase of offset credits. Offset projects such as solar installations or reforestation are intended to reduce the same amount of greenhouse gases elsewhere.

It is expected that airlines will primarily use offsetting as this will be the most cost-effective option in the short term.

CORSIA will initially operate from 2021 to 2035. Participation is voluntary until the end of 2026: during this period, CORSIA will only take effect for flights between countries that voluntarily participate. As of 30 June 2020, this includes 88 countries, covering approximately 77% of international flight activity (Carbon Pulse 2020). Of the largest contracting parties, the EU, the U.S. and Japan have participated from the start; China, India and Russia, however, have not. From 2027, participation will be mandatory for most countries with the exception of very poor countries and those without maritime access.

How effective is CORSIA for the climate?

CORSIA is likely to have only a very small climate impact. There are several reasons for this:

1. **Limited to CO_2 emissions:** CORSIA only regulates CO2 emissions and not the indirect climate impacts of flights which, according to previous estimates, could be between the same and three times higher than these CO2 emissions (see factsheet 1).

2. **Ambition of target:** CORSIA only aims at limiting or offsetting the increase of emissions above 2020 levels. How-ever, to meet the climate goals of the Paris Agreement, emissions from all sectors must rapidly decrease.

3. **Quality of carbon offsets:** In the case of offsetting through climate protection projects, it is often uncertain whether the offset credit means that one ton of CO2 has actually been reduced (see factsheet 4). In the case of CORSIA, two aspects are particularly problematic. Firstly, in the first phase from 2021 to 2023, only offsets from old projects can be used. This will hardly result in climate protection (Warnecke et al. 2019). Secondly, the requirements for forest projects are particularly questionable because it needs to be guaranteed that the forest will exist for only 20 years (Schneider et al. 2018).

4. **Risk of double counting:** When using carbon offsets, there is a risk that both the airline and the country in which the cli-mate protection project is implemented count the same CO2 mitigation towards their targets. CORSIA therefore requires programs that issue carbon offsets to avoid this type of double counting. To date, however, there are no international rules under the Paris Agreement to ensure this.

5. **Carbon footprint of "sustainable aviation fuels":** Some of the production of these aviation fuels involves significant greenhouse gas emissions. Furthermore, there are some significant uncertainties in estimating these emissions.

6. **Only international flights are included:** CORSIA addresses only the emissions of international flights. This means that the domestic flights of the countries are still not addressed by mitigation measures. Flights within the Europe-an Economic Area are covered by the EU ETS, both national flights and flights between the countries of the European Economic Area. An appropriate linking

of the EU ETS and CORSIA should ensure that mitigation measures address all aviation emissions.

7. **Changing the baseline in the wake of the Covid-19 pandemic:** It was originally envisaged that average emissions in 2019 and 2020 would be used as the base-line for CORSIA so that emissions growth above these levels would have to be offset by airlines from 2021 onwards. In response to the collapse in air travel in the wake of the Covid-19 pan-demic, ICAO decided in late June 2020 that only the emission levels of 2019 would be used as the baseline for CORSIA (ICAO 2020). Since emissions are expected to remain below 2019 levels for a few years after 2020, there will be no emissions growth to offset during the pilot phase of CORSIA. As a consequence, this means a 25% to 75% reduction in the mitigation effect of CORSIA, de-pending on how quickly air travel returns to pre-pandemic levels (Öko-Institut 2020a).

The project “Flying high or staying grounded? The relation between aviation and climate protection“ has been financed through donations. All information is available on the website www.fliegen-und-klima.de/en_index.html.

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4 References and links to further information

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