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A TALE OF TWO CARBON PRICING SCHEMES FOR AVIATION: THE INTERPLAY BETWEEN THE EU/UK ETS AND CORSIA

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As part of a sweeping package of regulatory reforms under the Green Deal, the EU is in the process of revamping its cap-and-trade scheme or emissions trading scheme (ETS)—including gradually phasing out the so-called free allowances currently granted to the aviation sector. This means aircraft operators on flights covered by the ETS will have to purchase allowances covering their total emissions—or risk substantial fines. In parallel, the EU is also proposing new sustainable aviation fuel (SAF) requirements for aircraft leaving an EU airport. The UK—which has its own ETS—has tabled similar proposals.

At the same time, substantive obligations under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) are also coming into effect. CORSIA requires aircraft operators on certain international flights to offset any increase in their emissions above a baseline level by purchasing carbon credits. CORSIA also allows operators to reduce their CORSIA offsetting requirements by using eligible SAF.

These are important developments that seek to internalize the environmental costs of aircraft emissions. A cap-and-trade scheme, on the one hand, and a mandatory offsetting scheme, on the other, are two quite different ways of imposing a carbon price and, in this case, they will apply simultaneously to the same industry (and even to the same individual operators and the same emissions). Each is complex on its own and the interaction between the two even more so.

The importance of these developments is unlikely to be limited to the aviation sector. The ETS/CORSIA combination may provide a blueprint for how the emissions of other industries—such as maritime—may be regulated in the future.

This article unpacks the details of both schemes, explaining how they will operate in tandem and setting out key takeaways.

The ETS in a nutshell

The ETS is a key component of the EU's efforts to implement its obligations under the Paris Agreement (whereas CORSIA sits outside the Paris framework). The ETS is a cap-and-trade system, which sets an annual cap on the amount of greenhouse gases that companies in covered sectors may emit. To ensure emission reductions, the cap is gradually reduced over time. Within the cap, companies either receive emission allowances for free or buy them. Free allowances are especially provided to sectors considered at risk of carbon leakage (i.e. the risk of EU consumption shifting to goods produced in third countries with less stringent emissions regulation). Unused allowances can be sold or used the following year. If a company fails to secure allowances covering its total emissions, it will be subject to substantial fines.

The ETS operates in the European Economic Area (EEA), which includes the 27 EU Member states plus Iceland, Lichtenstein, and Norway. In 2020, Switzerland linked its ETS to the EU's. Since Brexit, the UK operates its own ETS, which it has not linked to the EU's, though the EU and UK agreed to apply the EU ETS to flights from the EEA to the UK.

In sum, right now the ETS covers emissions generated on intra-EEA flights and flights to Switzerland and the UK. Flights from Switzerland and the UK to the EU are covered by those countries' respective schemes (although the Swiss ETS is linked to the EU's).

In July 2021, as part of its Fit-for-55 package, the EU Commission proposed to strengthen the ETS by phasing out free allowances for the aviation sector (among others) by the end of 2026. This means aircraft operators will gradually have to purchase allowances for emissions generated on routes covered by the ETS. Right now, these are intra-EEA routes, and routes to Switzerland and the UK. However, as explained further below, international routes may also soon be covered under the amended ETS.

CORSIA in a nutshell

CORSIA was agreed in 2016, under the framework of the International Civil Aviation Organization (ICAO)—a UN agency to which virtually all countries are party. CORSIA seeks to address emissions generated by international aviation—which are otherwise not covered under the Paris Agreement. In short, under CORSIA, ICAO member states must require their aircraft operators to offset any growth in their CO_2 emissions, compared to a baseline year, by purchasing carbon credits generated by emissions-reducing projects in other sectors. In practice, things are somewhat more complicated.

What is the scope of offsetting obligations?

CORSIA is set to be rolled out across several stages: a pilot phase (2021–2023), a first phase (2024–2026), and a second phase (2027).

The pilot and first phase are voluntary, meaning only a subset of ICAO member states participate (112 states from 1 January 2023). CORSIA takes a route-based approach, so during the pilot and first phase, the obligations apply to all operators generating emissions on flights between volunteering states—regardless of whether the operator itself is registered in a volunteering state. Emissions generated by any operator on flights to or from a non-volunteering state are not covered during the pilot and first phase. As a result, all operators are treated the same, regardless of country of registration. This means that non-volunteering states must, nonetheless, require their aircraft operators to offset their emissions on covered flights.

The second phase is in principle mandatory for all ICAO member states, so the obligations will effectively extend to emissions generated on any international flight (albeit with some exceptions for States with low levels of aviation activity, least developed countries, small island developing states, and landlocked developing countries).

Phases of CORSIA

Phase	When?	What emissions must be offset?	Who is subject?
Pilot	2021–2023	Emissions generated on international flights between volunteering states	All operators
First	2024–2026		
Second	2027–2035	Emissions generated on international flights between ICAO member states	All operators

How are offsetting obligations calculated?

Calculating an individual operator's offsetting requirements for a given year is a complex technical exercise. CORSIA sets out a formula: the operator's annual emissions (on covered flights only) multiplied by a growth factor, which represents the percentage increase in emissions in the year of assessment compared to the baseline year (also on covered flights only). This gives the formula as *operator's total annual emissions × growth factor = annual offsetting requirements*. All calculations are based on data reported by ICAO member states, under harmonised monitoring and reporting obligations.

The baseline year—against which emissions growth to be offset is calculated—was originally proposed as an average of 2019 and 2020 values. However, industry expressed concern that 2020 should not be included in the baseline, since passenger flight emissions were unusually low due to the COVID-19 pandemic—inflating emissions growth since 2020 and thus significantly increasing offsetting obligations. ICAO agreed to exclude 2020 emissions from the baseline calculations. The baseline will be discussed further (and potentially revised) at the 41st ICAO Assembly in September 2022.

Calculation of the growth factor is designed to take into account both sectoral emissions growth writ large and an individual operator's own emissions growth. However, the two variables are weighted differently across the three phases. Until 2030 (three years into the second phase), only sectoral emissions growth will be included in the formula. After 2030, the weighting of the individual emissions growth factor variable will be gradually increased, until it reaches minimum 70 per cent in 2035. Thus, over time, offsetting obligations become more closely linked to each individual operator's own emissions and, hence, efforts to reduce its own emissions—sharpening an operator's incentive to find emissions reductions in its own operations.

An operator can also reduce its offsetting requirements by using eligible SAF—discussed further below.

How are emissions offset?

Operators must offset growth in their emissions by purchasing carbon credits—generated by emissions-reducing projects in other sectors (like replacing cook stoves with solar cookers, or forestry projects). One carbon credit typically represents a tonne of CO_2 emissions removed or avoided from the atmosphere. The operator must purchase—and cancel—an amount of carbon credits equivalent to its offsetting obligations. Credits are available for purchase on the international carbon market, which is likely to grow significantly in the coming years.

Many types of carbon credits are available on the market, but not all are eligible to satisfy CORSIA offsetting obligations. CORSIA imposes relatively strict eligibility requirements, to ensure the integrity of credits used and avoid justifiable concerns about greenwashing. Core requirements include the following:

- **No double counting**—The credit cannot be counted against another emissions reduction obligation. Importantly, this includes the host country's own emissions-reducing obligations under international law. So, if a project is to generate a CORSIA-eligible carbon credit, the host country must commit to not counting those emissions reductions towards its own Nationally Determined Contribution under the Paris Agreement. This commitment is typically referred to as a corresponding adjustment.
- **Additionality**—This means the credit represents emissions reductions that would not otherwise have occurred in the absence of the projected income stream from the sale of the credits generated by the project. A credit is not additional if, for example, the emissions reductions were legally required under the regulatory regime of the host country where the project took place, or if they would have occurred anyway in a business-as-usual scenario.

Some of the implications of CORSIA for the carbon credit market are discussed below, including in relation to new rules agreed at COP26 on the international regulation of carbon credits under Article 6 of the Paris Agreement.

What about sustainable aviation fuel?

SAF is considered a key plank of the aviation industry's long-term emissions reduction strategy. SAF includes a broad range of products, and involves emissions reductions in the upstream production process, namely where SAF production emits less than conventional fuel production. SAF features under both the EU (and UK) regulatory regime and CORSIA. The uptake of SAF is incentivized in two ways.

First, under both CORSIA and ETS, use of SAF can reduce an operator's offsetting obligations (CORSIA) or obligations to surrender allowances (ETS). Under CORSIA, the emissions reductions corresponding to the amount of SAF used will be deducted from the operator's total offsetting requirements. SAF used on domestic flights (which are otherwise outside CORSIA) can also be claimed to reduce offsetting obligations on international flights.

Under the ETS, use of SAF is deducted from an operator's total emissions, i.e. operators do not need to surrender allowances when reporting the use of SAF. However, the SAF eligibility criteria under the ETS are stricter than under CORSIA. In fact, CORSIA accepts a broader spectrum of fuels eligible for claiming emissions reductions, including fuels which are lower-carbon but still fossil-based, whereas the EU does not (on grounds that fossil-based fuels do not have long-term sustainability potential). On the other hand, the method of accounting SAF under CORSIA is stricter than under the ETS. While under the ETS the total amount of SAF used is rated as zero when calculating total emissions, under CORSIA an amount proportional to the emissions benefits from the SAF production process is reduced from the offsetting requirements.

Second, in parallel to the ETS, the EU has proposed a SAF blending mandate on all commercial flights leaving the EU, regardless of their destination. The mandate thus has a broader scope of application than the ETS, which only covers intra-EEU/Switzerland/UK flights. The mandate applies to fuel suppliers, who must ensure that all aviation fuel supplied to aircraft

operators contains a minimum SAF share (2 per cent in 2025, with incremental increases to 63 per cent in 2050). To incentivize uptake of SAF with the highest decarbonization potential, the EU also proposes to require, from 2030, a gradual increase in the share of synthetic SAF relative to biofuel-based SAF. The UK has also proposed an SAF blending mandate (10 per cent by 2030), with details under further consultation.

So, how does this all fit together?

The interaction between the EU ETS and CORSIA creates a somewhat complex web of obligations, and the potential scope of coverage continues to shift as the proposal works its way through the EU legislative process.

The EU ETS was originally planned to apply to all international flights to and from the EEA, which obviously would have meant significant CORSIA overlap. However, the EU modified the application of the ETS to cover only intra-EEA flights ('partial scope'), in part to support the development of CORSIA. The modification was temporary—unless legislators decide otherwise, the ETS is set to revert back to 'full scope' application in 2024. Most recently, the EU Parliament adopted its own amended text confirming a 2024 return to 'full scope'.

In any event, even under the 'partial scope' option which currently applies, there is still some degree of overlap between the EU ETS and CORSIA, and many operators will be subject to both regimes simultaneously. For some operators—e.g. those flying both intra-EEA routes and routes from the EEA to another CORSIA-volunteering country—the two regimes will apply separately to different routes. In other words, emissions generated on intra-EEA routes must be paid for with an allowance under the EU ETS, whereas those generated on EEA–third country routes must be offset under CORSIA (to the extent they exceed the baseline year's emissions).

For some operators, the two regimes may also apply to the same emissions, generated on the same routes. For example, some routes subject to the EU ETS are also international (Paris to London or Oslo, Brussels to Geneva), so are in principle also subject to CORSIA. The same is true for all UK flights to EEA countries and Switzerland—they are in principle subject to both the UK ETS and CORSIA.

Evidently, there will be considerably more overlap if the ETS returns to 'full scope' in 2024 (i.e., if it applies to all international flights to and from the EEA). There remains some uncertainty as to how application of the two regimes to the same route will work. The EU has been considering various policy options, with some difference in the Commission and Parliament's respective positions. For example, among the Commission's preferred approaches was to maintain the ETS its current partial scope (intra-EEA flights only), and to exempt the international flights also covered by the ETS from CORSIA. By contrast, as noted above, the Parliament has proposed returning the EU ETS to full scope, and adopting a hybrid mix on routes covered by both schemes (i.e., requiring ETS allowances for emissions up to the CORSIA baseline and requiring CORSIA offsets beyond the baseline).

The UK is considering its own set of policy options—its current preferred approach is described as a supply-adjusted hybrid mix. Put as simply as possible, this option would (like the EU's hybrid proposal above) require ETS allowances for emissions up to the CORSIA baseline and CORSIA offsets thereafter. However, without adjustment, this approach could reduce demand for ETS allowances (since a portion of what would otherwise have to be paid for under the ETS could instead be offset under CORSIA). So, an adjustment would also be made to reduce the overall ETS cap by an amount equivalent to any emissions offset under CORSIA.

Assuming the EU's and UK's respective preferred options are adopted, the web of route-specific obligations would look something like that shown in the figure below. The obligations on each route would apply to all operators, regardless of their country of registration.

How do the two systems compare in practice?

Together, the ETS and CORSIA present an interesting case study. The two represent different (and much debated) ways of pricing carbon to incentivize reducing emissions—a cap-and-trade system on the one hand, versus mandatory offsetting through carbon credits on the other.

There are two key factors that will affect the respective stringency of the regimes, which could change over time. These are (1) the amount of emissions for which a price must be paid, and (2) the per-unit cost of emissions. The total cost of emissions under each regime will depend on how these factors interact.

On the amount of emissions, under CORSIA, operators are only required to offset emissions above the baseline—above which they can, in principle, emit, provided they pay by purchasing credits. Under the ETS, operators must secure allowances to cover all their emissions; and (compared to carbon credits) there are a limited number of allowances available on the ETS market, which creates a ceiling on the total number of emissions permitted. The amount of emissions subject to a payment will also depend, under both regimes, on the use of (eligible) SAF. In practice, the degree to which SAF is actually available to reduce emissions liability in the near term depends on SAF supply—the resulting demand for SAF is likely to outstrip supply for some time.

On the price of emissions, again, a number of factors could be influential—and price will be subject to change, depending on market and regulatory dynamics. Under CORSIA, price will depend on the carbon credit market, which right now is largely unregulated and fragmented; in 2022, the per-unit carbon price for a CORSIA-eligible credit has ranged between around US$1.20 and US$22. Under the ETS, price will depend on the level of the EU cap—the higher the cap, the greater the number of available allowances, the lower the price per allowance. Currently, the per-unit carbon price under the ETS is approximately US$94 (it has fluctuated in 2022 between US$66 and US$100).

What next?

Developments in this space are moving at pace. Some key areas to watch out for are discussed below.

First, the recent agreement on the so-called Paris rulebook—which seeks to establish a framework for the international regulation of carbon credits—will shortly also be added to the mix. The quality requirements for carbon credits developed in the Paris rulebook were, to some extent, inspired by CORSIA's eligibility requirements. Both regimes, for example, prohibit double counting and require additionality. At the same time, the adoption of the Paris rulebook may prompt further changes to the CORSIA requirements. More generally, the adoption of the Paris rulebook may prompt increased demand across the board for high-quality carbon credits—both in compliance markets (i.e. where offsetting is legally required) or voluntary markets (i.e. to support voluntary net-zero pledges). This may make CORSIA-eligible carbon credits more expensive over time.

The Paris rulebook could also impact the ETS. Previously, the ETS permitted compliance through offsetting, then shifted position, citing concerns over the integrity of credits available on the market. Since the Paris rulebook aims at improving the integrity of carbon credits, the EU may shift again, and permit offsetting—provided it is done through Paris-consistent credits. If so, this would also increase demand for (and therefore the price of) high-quality carbon credits.

Second, the ETS/CORSIA combination may provide a blueprint for other areas, especially where tackling emissions has an international dimension. Top of the list is shipping: the EU has already proposed to expand the ETS to cover maritime emissions generated during berth at EU ports, from voyages within the EU, and even from the EU to third countries (counting half of those international emissions). The EU's plans to apply ETS not only to domestic shipping but also to international shipping may encourage states within the International Maritime Organization to follow ICAO in adopting a CORSIA-like offsetting framework for emissions resulting from international shipping.