



NDC ASPECTS

Policy Brief

Article 6 and CORSIA after Glasgow:
Ready for take-off?

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Key messages

- Aviation is one of the most challenging sectors to decarbonise. Although the Paris Agreement in principle covers emissions from all sectors, including those of aviation, most Parties to the Paris Agreement have not included emissions from international flights in their Nationally Determined Contributions (NDCs). However, these emissions are explicitly addressed by the International Civil Aviation Organization (ICAO).
- In 2016, ICAO adopted a market-based mechanism – the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) – to address the sector’s growth in emissions. In the meantime, Parties to the Paris Agreement in 2021 agreed on a detailed rulebook for market mechanisms under Article 6 of the Agreement, which creates linkages with CORSIA.
- We identify four types of interactions between CORSIA and Article 6 rules: (1) allowing Parties with single-year targets to use the averaging accounting approach creates a loophole that may undermine the environmental integrity of both CORSIA and Article 6; (2) the quality criteria for CORSIA offsets may be strengthened by following Article 6 rules; (3) the level of CORSIA’s ambition will affect the supply side of carbon credits, including those provided under Article 6; and (4) like CORSIA, the operation of Article 6 may rely on private certification standards’ registries.
- To ensure that CORSIA provides a meaningful contribution to climate change mitigation in the sector, we suggest that ICAO Member States should: (1) adopt a long-term climate target for the sector in line with the Paris Agreement, (2) revise its quality criteria for offset programmes, (3) address non-CO₂ effects, and (4) carry out an assessment of the impacts on the functioning of the Article 6 mechanisms each time a decision is made.
- Parties to the UN Framework Convention on Climate Change could also take specific action, including refining guidance on averaging, establishing a buffer pool to offset an increase in emissions, and considering a requirement for Parties to transition towards multi-year emission targets.

1. Introduction

Aviation is the most carbon-intensive mode of transport, with carbon dioxide (CO₂) emissions having grown rapidly in recent decades (IEA, 2020). Since 2000, CO₂ emissions from commercial flights have increased by 50% (IEA, 2020). These emissions are projected to continue rising, with commercial aircraft emissions predicted to triple by 2050 (Overton, 2022). As a result of this projected emissions growth, the aviation industry could potentially consume 27% of the global carbon budget for 1.5 °C by 2050 (Pidcock and Yeo, 2016). While the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement do not explicitly refer to international aviation emissions, they do not exclude them either. The Paris Agreement commits Parties to submit economy-wide absolute emission reduction targets as part of their Nationally Determined Contributions (NDCs). However, most Parties have so far not included emissions from international flights in their NDCs (Murphy, 2020).



Instead, these emissions are directly addressed outside the UNFCCC process by a separate United Nations (UN) agency, the International Civil Aviation Organization (ICAO). The primacy of ICAO to address international aviation emissions was more or less confirmed by the omission of the sector in the Paris Agreement (Martinez Romera, 2016). As a specialised UN agency designed to address matters concerning international aviation, ICAO arguably represents the ‘appropriate forum’ to regulate emissions arising from the sector (ICAO, 2016: 1). In 2010, ICAO established the sector-wide goal of carbon-neutral growth from 2020 onwards (ICAO, 2010). In 2016, ICAO then adopted a market-based mechanism – the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) – to address the sector’s large and rapidly rising emissions (ICAO, 2016). As the name suggests, CORSIA is a global offsetting scheme intended to complement other efforts to realise the sector-wide objective of carbon-neutral growth from 2020 (ICAO, 2010; ICAO, 2016). Under the scheme, aircraft operators are required to offset any increase in their CO₂ emissions.

While states were developing rules for a market-based mechanism for international aviation emissions, they were also negotiating rules to operationalise the Paris Agreement’s market mechanisms introduced in its Article 6. Although the majority of the ‘Paris rulebook’ was adopted in Katowice in 2018, negotiations on Article 6 were highly contentious, spilling over to the Glasgow Climate Conference (COP26) in 2021. At Glasgow, detailed guidance regarding Article 6 was finally agreed. Although originally envisioned to assist Parties in the implementation and achievement of their NDCs, the Article 6 rulebook creates linkages to CORSIA and the voluntary carbon market. Accordingly, this policy paper seeks to explore these linkages by analysing the interplay between the rules adopted under the Article 6 rulebook and CORSIA.

The paper proceeds in four steps. First, it presents an overview of CORSIA by outlining its offsetting requirements, eligibility criteria and implementation phases, as well as highlighting criticisms of the scheme (Section 2). Second, it provides an overview of the Article 6 rulebook (Section 3). In particular, this section explores the role of emissions accounting through the application of ‘corresponding adjustments’ to counter double claiming as one form of double counting. Third, it analyses the interactions between CORSIA and the Article 6 rules (Section 4). Specifically, this section discusses four key interactions and their associated challenges: (1) the use of single-year targets and the average accounting approach; (2) quality criteria for offsets; (3) the level of ambition in ICAO decision-making; and (4) the use of registries. For each of these issues, the paper offers suggestions on how to address these challenges. Lastly, the paper identifies opportunities for Paris Agreement Parties and ICAO Member States to manage the interplay on CORSIA and Article 6 (Section 5), before offering some conclusions (Section 6).

2. An overview of CORSIA

2.1 CORSIA explained

CORSIA is touted as the world’s first sector-wide scheme to pursue emissions reductions (ICAO, 2019a: 216). It aims to complement other in-sector efforts to stabilise emissions from international aviation, such as technological solutions and sustainable fuels (ICAO, 2016). Following the adoption of CORSIA in 2016, the ICAO Council – the organisation’s governing body – approved its associated Standards and Recommended Practices (SARPS) – i.e., the detailed rules – in 2018 (ICAO, 2018).

CORSIA requires airlines and other aircraft operators to offset any growth in CO₂ emissions from international flights above 2020 levels (ICAO, 2019b). Accordingly, operators must compensate for any increase in their emissions by purchasing offsets as so-called emissions units from other sectors. Under CORSIA, operators can only purchase carbon offsets from 'emissions unit programmes' (EUPs) that have been approved by the ICAO Council (ICAO, 2019b). In addition, operators can minimise their offsetting obligations by using CORSIA eligible fuels, which includes sustainable aviation fuels (SAFs, renewable or waste-derived), as well as lower-carbon aviation fuels (LAFs, fossil-based) (ICAO, 2018).

The ICAO Council's decision on what EUPs to approve is informed by a recommendation by an expert group known as the Technical Advisory Body (TAB). The TAB was established by the Council in March 2019 and is composed of 19 expert members. In addition to establishing the TAB, the ICAO Council also approved the 'terms of reference', setting out the mission and tasks of the TAB (ICAO, 2019c). The key role of the TAB is to assess and recommend what programmes should be eligible for use under CORSIA. When conducting an assessment, the TAB considers whether the EUPs adhere to the CORSIA emissions unit eligibility criteria (EUCs) (ICAO, 2019d).

In terms of implementation, CORSIA is divided into three phases: a pilot phase from 2021 to 2023; a first phase from 2024 to 2026; and a second phase from 2027 to 2035 (ICAO, 2019b). The pilot phase and first phase are both voluntary, i.e., only ICAO Member States that have agreed to partake in these phases will be subjected to offsetting requirements. The second phase is mandatory and requires all Member States to participate from 2027 unless they are exempt. These exemptions include least developed countries, small island developing states, landlocked developing countries and states with less than 0.5% of air traffic (ICAO, 2019b). Member States that are exempt may opt to volunteer in the second phase.

The industry body International Air Transport Association (IATA) estimates that in the period 2021–2035, CORSIA will mitigate around 2.5 billion tonnes of CO₂ (IATA, 2019). At the same time, the scheme has been subjected to criticism since its adoption. One common criticism concerns the lifespan of CORSIA and hence, its ability to achieve sizeable emission reductions and meaningful in-sector decarbonisation. While the objective of the scheme is to help realise the sector-wide goal of carbon-neutral growth from 2020, CORSIA is only in place until 2035. Accordingly, the International Coalition for Sustainable Aviation (ICSA) – a network of NGOs accredited as an official observer by ICAO – anticipates that CORSIA will only 'modestly reduce' the overall climate impact of international aviation (ICSA, 2018: 4). In addition, the scheme merely targets *growth* in emissions. Airline operators are only required to offset emissions above 2020 levels. There is no requirement to mitigate emissions beyond this. This is a severe limitation of the mechanism that could significantly hinder the ability of CORSIA to have a meaningful impact on the sector.

As part of its 41st Assembly in late 2022, however, ICAO is set to consider the adoption of a long-term climate target for international aviation. This will be crucial if the objectives of the Paris Agreement are to be achieved. It will be vitally important that CORSIA's current objective is revisited to ensure alignment with a long-term climate goal. Schneider and Wissner (2022) have offered some recommendations to this end, such as an ambitious goal of net-zero emissions by 2035 that includes the possibility for offsetting.

Another criticism stems from the rules concerning CORSIA eligible fuels. These rules require that any alternative fuel used to lower offsetting obligations deliver a minimum emission reduction of 10% compared to the baseline life emissions of conventional jet fuel (ICAO, 2021a). This falls far short of the deep and fast reductions needed to meet the Paris Agreement goals. In addition, there is the inclusion of LAFs under CORSIA eligible fuels. Unlike SAFs,

which are derived from sustainable resources, LAFs are fossil-based. While less carbon-intensive than conventional jet fuel, if airlines can reduce their offsetting obligations through fossil-based fuels, the ability of CORSIA to deliver meaningful decarbonisation remains questionable.

2.2 Eligibility criteria and eligible offsetting programmes

As outlined earlier, the ICAO Council is responsible for determining which offsetting programmes and emissions units are eligible under the scheme. The Council adopted the CORSIA emissions unit eligibility criteria (EUCs) in 2019, which outline the requirements that programmes and their offset credits must fulfil to be considered eligible (ICAO, 2019d). The criteria are twofold, consisting of both 'programme design elements' and 'carbon offset integrity assessment criteria' (ICAO, 2019d). These criteria may only be amended by the ICAO Council, informed by recommendations developed by the Committee on Aviation Environmental Protection (CAEP). The CAEP, in fulfilling its role as a technical committee, is required to assist the ICAO Council in the formulation of new policies and the adoption of new SARPs. When conducting a periodic review of the EUC SARPs, the Council will also, as appropriate, promote compatibility with any future relevant decisions under Article 6 of the Paris Agreement (ICAO, 2016).

The carbon offsetting programmes and emissions units that meet the CORSIA EUCs are contained within the 'CORSIA eligible emissions units' document (ICAO, 2022a). As mentioned earlier, these are also determined by the Council upon recommendation of the TAB. In 2020, the Council completed its first decision on what EUPs to approve. As part of this decision, the Council also chose to limit vintage eligibility to units generated *pre-2020* to avoid double claiming (i.e., the claiming of one unit of emission reduction by more than one actor), as there was not yet an outcome regarding Article 6. The approved programmes from this decision include the:

- (1) American Carbon Registry (ACR);
- (2) Architecture for REDD+ Transactions (ART);
- (3) China GHG Voluntary Emissions Reduction Program (CCER);
- (4) Clean Development Mechanism (CDM);
- (5) Climate Action Reserve (CAR);
- (6) Global Carbon Council (GCC);
- (7) The Gold Standard; and
- (8) Verified Carbon Standard (VCS).

Following this initial decision, the ICAO Council has since approved two programmes to generate new credits (i.e., *post-2020* vintages) between 2021 and 2023: the ACR and ART. These programmes were approved in 2021 and can be used in the first compliance cycle of CORSIA. While the other programmes have received approval, only the ACR and ART can generate post-2020 credits. This is because they have procedures in place that avoid double claiming (ICAO, 2022a).

Some of the decisions made by the ICAO Council have been criticised. This includes the approval of the CCER. Critics have argued that this decision represents a political compromise to ensure China's involvement in CORSIA during the voluntary phases, 'rather than being based on the programme's robustness and merits' (Hitterski, 2020). The ICAO Council has also approved all CDM projects as eligible, despite the EU's decision to prohibit certain projects where environmental integrity has been considered questionable (e.g., large hydroelectric projects) (Hitterski, 2020).

2.3 Periodic review process

In accordance with Assembly Resolution A40-19, the Council is tasked with conducting a periodic review of the implementation of CORSIA – with the technical contribution of the CAEP – every three years starting in 2022 (ICAO, 2019b). These triannual reviews will provide the Council with the opportunity to improve the overall operation of the scheme and, where necessary, recommend adjustments to the next phase or compliance cycle of CORSIA (ICAO, 2019b). Specifically, Assembly Resolution A40-19 provides that the periodic review will involve, among others:

- (a) assessment of: progress towards achieving the ICAO’s global aspirational goal; the scheme’s market and cost impact on States and aeroplane operators and on international aviation; and the functioning of the scheme’s design elements;
- (b) consideration of the scheme’s improvement that would support the purpose of the Paris Agreement, in particular its long-term temperature goals; and update the scheme’s design elements to improve implementation, increase effectiveness, and minimize market distortion, taking into account the consequential impact of changing the scheme’s design elements, e.g., to [measurement, reporting and verification] requirements; and
- (c) a special review by the end of 2032 on termination of the scheme, its extension or any other improvements of the scheme beyond 2035, including consideration of the contribution made by aircraft technologies, operational improvements and sustainable aviation fuels towards achieving the ICAO’s environmental objectives (ICAO, 2019b: para. 17).

Any recommendations made by the ICAO Council on the CORSIA review will be put forward to the 41st Session of the ICAO Assembly, which is held in September 2022 and is anticipated to complete the first periodic review of the scheme (ICAO, 2022b).

3. The Paris Agreement’s Article 6 and the rulebook agreed in Glasgow

3.1 Voluntary cooperation under Articles 6.2 and 6.4

With the adoption of the Paris Agreement in 2015 and its Article 6, Parties established three possible avenues to voluntarily cooperate in the implementation of their NDCs:

- Article 6.2 allows for bilateral or multilateral ‘cooperative approaches’ to be established between Parties;
- Article 6.4 introduces a market-based mechanism that is overseen by the UNFCCC; and
- Article 6.8 allows for non-market approaches.

Article 6.2 and Article 6.4 are market-based approaches. Article 6.2 enables Parties to transfer and use emission reductions and removals as so-called internationally transferred mitigation outcomes (ITMOs). Article 6.4 creates tradable units in the form of Article 6.4 emission reductions (A6.4ERs). Both Article 6.2 and 6.4 therefore enable ITMOs or A6.4ERs respectively to be transferred from the transferring Party to the acquiring Party. Both ITMOs generated under Article 6.2 and A6.4ERs from the mechanism can be used by the acquiring Party for NDC

attainment. Since no such transfers are envisaged under Article 6.8, this type of voluntary cooperation will not be further discussed here.

The use of market-based mechanisms has proven to be controversial in the UNFCCC context. Their introduction and operationalisation proved particularly cumbersome under the Paris Agreement. At COP21 in Paris, the need to ensure a balance between proponents and opponents of market-based approaches made Article 6 the last Article to be agreed on (Howard, 2017). Therefore, it is not surprising that it took Parties almost six years to establish the rules for operationalising Article 6. The Article 6 rulebook adopted in Glasgow consists of a set of three decisions, two of which guide the operationalisation of the market-based instruments. First, Parties adopted guidance on cooperative approaches (Guidance), which can be considered a reporting and accounting framework for Article 6 (UNFCCC, 2021a). Second, for the operationalisation of the Article 6.4 mechanism, Parties adopted the rules, modalities and procedures (RMPs), which provide detailed provisions on the functioning and governance of the mechanism (UNFCCC, 2021b).

Article 6.2 can be considered an open framework that provides Parties willing to participate in cooperative approaches considerable leeway in their design and implementation. However, to make use of Article 6.2, Parties must meet some participation requirements such as having technical and institutional arrangements in place. They are also required to meet specific reporting and accounting provisions. Given the decentralised nature of Article 6.2, the reporting and transparency requirements established by the guidance are key: Parties are required to submit an initial report, annual information that is centrally recorded, as well as regular information that is included as an annex to Parties' biennial transparency reports submitted pursuant to Article 13 of the Paris Agreement. For example, under Article 6.2, Parties are required, inter alia, to provide information on their emissions balance, the transfer and use of ITMOs, and how double counting has been avoided through 'corresponding adjustments' (see Section 3.3). More generally, the accounting and reporting infrastructure of Article 6.2 is interlinked with the broader enhanced transparency framework of Article 13. Parties have also established an Article 6 review process that will be integrated into the technical expert review under Article 13 (UNFCCC, 2021a).

Building on the Article 6.2 reporting and accounting framework, Article 6.4 establishes a crediting mechanism, with detailed provisions for the implementation of creditable mitigation activities. Despite important differences, its basic structure largely resembles the functioning of the Kyoto Protocol's Clean Development Mechanism (CDM): mitigation activities must be approved by the host Party and be developed according to a methodology approved by the Supervisory Body, the entity overseeing the mechanism. Following a successful validation by a Designated Operation Entity (DOE), the activity is then registered by the Supervisory Body and its implementation is monitored by the activity participants. After successful implementation of the activity, another DOE verifies and certifies the mitigation impact achieved and submits a request for issuance to the Supervisory Body, which will then issue A6.4ERs (UNFCCC, 2021b).

3.2 The expanded scope of Article 6 and the authorisation of ITMOs and A6.4ERs

As outlined above, Article 6 was originally conceived as a tool to assist Parties in the implementation of their NDCs. With the adoption of the Article 6 rulebook, however, the scope of application was broadened. Both the Guidance and the RMPs take into account 'other international mitigation purposes' as well as 'other purposes'. Although there is no legal definition of these terms, there is wide agreement among observers that the first term ('other international mitigation purposes') refers to obligations deriving from international mitigation outside the UNFCCC, namely CORSIA. The second ('other purposes') is commonly understood as referring to the voluntary carbon market

(see e.g. Marcu, 2021). While the latter is decentralised and not subject to international regulation, the Guidance provided by the Article 6 rulebook will likely have a significant impact on the voluntary carbon market.

The application of Article 6 is thus no longer confined to NDC attainment. ITMOs and A6.4ERs may also be used outside the Paris Agreement and UNFCCC context. The Article 6 rulebook requires host Parties to decide on how ITMOs (and A6.4ERs) are to be used, by providing an authorisation for one of the three uses: (1) NDC achievement; (2) other international mitigation purposes (e.g., CORSIA); and (3) other purposes (voluntary carbon markets). The authorisation is a key step in the entire process, as it provides the host Party with the authority to define how ITMOs (and A6.4ERs) can be used. Since the authorisation of ITMOs and A6.4ERs requires host Parties to account for these mitigation outcomes, the decision on authorisation can have important repercussions on the host Party's climate policy, as will be shown in the following.

3.3 Avoidance of double claiming through corresponding adjustments

All ITMOs and authorised A6.4ERs must be robustly accounted for through 'corresponding adjustments' (CAs). The application of CAs has been proposed as a means to avoid emission reductions being claimed by more than one actor. Such double claiming is one form of double counting and is particularly problematic if emission reductions are transferred among Parties. While not an entirely new phenomenon, double claiming has not been a major concern in the past. Under the Kyoto Protocol, the largest share of carbon credits was generated by CDM activities implemented in the so-called 'uncapped environment' – i.e., in countries that had no international mitigation targets. This now changes with the Paris Agreement, which requires all Parties to adopt NDCs and to submit national inventory reports, as well as information to track progress made towards NDC achievement.

Under these circumstances, a project that is implemented in Party A would automatically reduce the Party's emissions and contribute to the achievement of its NDC. If the project is implemented as a carbon market activity, the emission reductions generated could be transferred internationally and used for NDC attainment by another Party (Party B). Without CAs, the emission reductions of the project would be claimed twice: they would appear in the inventory of Party A, while at the same time being used by Party B when reporting on its progress towards its NDC. By applying CAs, such double claiming can be avoided. While the acquiring Party B subtracts the quantity of the emission reductions from its emissions balance, the host Party (Party A) adjusts its reported emissions upwards by adding the quantity of emission reductions exported back to its emissions balance. While originally conceived as a concept to avoid emission reductions being claimed more than once if used for NDC attainment, the Article 6 rulebook expands the application of CAs to cases that only involve one Party, such as the use of ITMOs for CORSIA.

The timing of CAs is a relevant parameter for host Parties, as it may impact their ability to achieve their NDC. For mitigation outcomes that are authorised for the use against NDC attainment, CAs must be implemented when these mitigation outcomes are first transferred. For mitigation outcomes authorised to be used for other international mitigation purposes, by contrast, there is no such first transfer. Parties can therefore decide what they consider to be the first transfer, which in turn will trigger the timing of CAs. The Guidance provides three options for defining what a 'first transfer' is: (1) the authorisation; (2) the issuance; or (3) the use or cancellation of the mitigation outcome. The RMPs also require Parties to apply these rules when using the Article 6.4 mechanism for other international mitigation purposes. It will hence be up to the host Party to define when CAs will be applied. There is an incentive for the host Party to apply CAs at the latest possible moment, as the information on how these CAs will impact NDC attainment are clearer. From an environmental integrity perspective, however, it would be preferable to ensure that CAs are applied at the earliest point in time to limit the risks that non-adjusted units are

unduly used.

3.4 Accounting rules under Article 6

The adoption of the Article 6 rulebook in Glasgow has largely been hailed as a success. The adoption of the comprehensive accounting rules in particular marked one of the most significant achievements of COP26. Parties were able to agree on rules that require CAs to be applied irrespective of whether the mitigation activity is within or outside the scope of the host Party's NDC (UNFCCC, 2021a, Annex, para. 14). This means that CAs will be applicable where the mitigation outcomes originate in sectors outside the host Party's NDC. This provision in particular addresses concerns related to the perverse incentives for Parties to limit the scope of their NDC in order to evade the application of CAs. In addition, the rules further state that the 'participation in cooperative approaches does not lead to a net increase in emissions across participating Parties within and between NDC implementation periods' (UNFCCC, 2021a, Annex, para. 7), thereby also prohibiting the carry-over of units from one NDC period to the next. This prevents Parties from generating large amounts of credits not backed by actual climate action that are subsequently carried forward to achieve future climate targets (Schneider, 2021).

However, the accounting framework contains a significant loophole. This loophole relates to the bottom-up structure of the Paris Agreement, which generates a large diversity of NDCs. One parameter that differs among Parties' NDCs is their target type. NDCs may be submitted as continuous multi-year targets or as single-year targets. Multi-year targets are defined over various years, for example over the period 2021–2030. Single-year targets, on the other hand, only specify an emissions target for one future year. The latter accounts for around 85% of current NDCs (Hattori and Takahashi, 2021), which generally specify a single emissions target for the year 2030 (Schneider, 2021).

Single-year targets present major challenges for countries engaging in carbon market mechanisms under Article 6 (Siemons and Schneider, 2022). While the Article 6 rules were intended to provide important safeguards against double counting, this loophole could considerably undermine climate mitigation efforts and thus hinder the overall effectiveness of the scheme (Schneider, 2021). Parties that have submitted their NDC as a single-year target can choose between two accounting approaches: Averaging and multi-year accounting. The application of the averaging approach can effectively lead to double claiming and an increase in aggregate emissions, as shown by Siemons and Schneider (2022). Under this approach, countries with a single-year emissions target will apply CAs in their specified target year as an *average* of all units transferred (or acquired) between a certain period (e.g., 2021–2030 or 2026–2030). The application of this approach is less problematic if the ITMO engagement remains constant over time and emissions in the target year are representative of the country's emissions trend. However, Siemons and Schneider (2022) show that averaging can lead to a situation in which aggregate emissions are considerably higher and environmental integrity is undermined, in particular if ITMO generation is not constant and there is an increase in ITMO engagement of the Parties involved. In such a situation, the CAs applied by Parties might not correspond with the amount of emission reductions transferred or used.

4. Interactions between CORSIA and Article 6 rules

4.1 Accounting for single-year targets and averaging

As discussed in Section 3.4, the UNFCCC accounting rules contain one crucial loophole that could generate risks for

environmental integrity. This is particularly problematic if carbon credits are used by airline operators to offset their emissions under the CORSIA scheme, as it leads to a combination of factors that increase the risk of double claiming. For CORSIA, Siemons and Schneider (2022) expect that demand for carbon credits will increase over time, leading to a rising generation of ITMOs authorised for this purpose. The application of the averaging approach for an increasing number of ITMOs authorised for use under CORSIA is especially problematic since CORSIA specifies a multi-year approach for buying airlines. This combination of accounting approaches, averaging on the seller’s side and multi-year accounting on the buyer’s side, together with an increasing generation of ITMOs over time, could lead to considerable double claiming. Schneider (2021) shows that this may lead to a situation in which around half of the emission reductions used for compliance under CORSIA would be double claimed (see Figure 1).

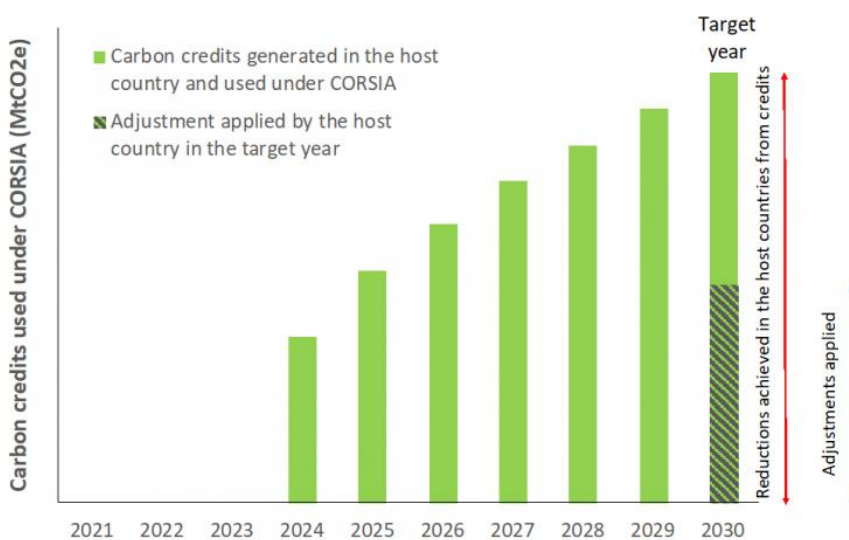


Figure 1: Double claiming potential under CORSIA due to averaging. Source: Schneider (2021).

As can be seen, the mismatch between single-year targets and the averaging accounting approach threatens to jeopardise the environmental integrity of Parties’ NDCs, as well as CORSIA. Where Parties’ employ single-year targets, it is thus crucial that adjustments are applied in a manner that reflects the actual use of credits over a period of time.

To ensure that the application of CAs is representative over time, it will be key that further guidance is issued on this at COP27 in Sharm El-Sheikh, Egypt. This guidance could take different forms: Parties could specify under what circumstances averaging can be applied, for instance by limiting the application of averaging to cases where the generation of ITMOs remains constant over time. This alone, however, will presumably not fully solve the issue, as the decrease or increase of ITMO generation over time is not the only aspect influencing the environmental impact of averaging. As highlighted by Siemons and Schneider (2022), the impact will also depend on the emission levels in the target year, which are only known *ex post*. One option to deal with this uncertainty would be the introduction of an ITMO buffer pool to balance out potential increases in global emissions. While holding back a sufficiently high amount of ITMOs may reduce the attractiveness of using Article 6 for the Parties involved, the introduction of a buffer pool could be seen as a pragmatic approach to accommodate the different positions in the Article 6 negotiations. Only Parties that apply the averaging approach would be required to transfer a certain share of their

ITMOs into this buffer pool. If a cooperative approach has been found to lead to an increase of global emissions, for instance following the review by the Article 6 technical expert review team, the respective amount of ITMOs would be cancelled to compensate for the climate impact incurred. Whether Parties will be open to the introduction of such an approach seems questionable, as it might increase their administrative burden. However, it would allow Parties to maintain the possibility of using the averaging approach, at least in theory, while limiting the potential adverse impacts that this approach is associated with. Ultimately, requiring Parties to transition towards multi-year targets seems the more promising way forward to ensure robust accounting.

4.2 Quality criteria for offsets

High-quality carbon credits that stimulate actual emission reductions are crucial to the overall success of CORSIA. As mentioned above, airlines may only purchase carbon credits from programmes that have received the approval of the ICAO Council (ICAO, 2019b). However, the scheme has been accused of allowing airlines to merely compensate for their emissions, opposed to actually delivering on required emissions reductions (Hodgson et al., 2021). Studies suggest that these carbon credits lack quality, bringing their effectiveness into question (Transport & Environment, 2021; Beard, 2017). A study by the NGO Transport & Environment in 2021 concluded that the initial six programmes approved in 2020 by the Council to certify offsets failed to meet all of the integrity assessment criteria (Transport & Environment, 2021). Three of the key programmes – CCER, the CDM, and the Gold Standard – failed to meet the criterion relating to additionality, meaning that the emission reductions generated by these programmes would have materialised even without existence of the carbon price incentive (Transport & Environment, 2021). There are also issues pertaining to the TAB's application of the criteria. This further calls into question whether and how environmental integrity is ensured. Rather than assessing the *actual performance* of the respective programmes against the criteria, the TAB has generally evaluated whether the programmes have necessary measures in place *to address the criteria*. In other words, the TAB does not consider whether these measures in themselves ensure carbon credit quality (Schneider and Wissner, 2022).

In this regard, the ICAO process may benefit from ongoing processes under the Article 6.4 mechanism. The RMPs adopted in Glasgow establish some fundamental requirements that methodologies under the Article 6.4 mechanism must meet in order to be approved by the Supervisory Body. Some of these requirements go well beyond existing approaches, for instance under the CDM. In terms of baseline setting, for instance, the rules require baseline methodologies to apply approaches based on performance, such as best available technologies to ensure that baselines are below 'business as usual' and 'align to the long-term temperature goal of the Paris Agreement' (UNFCCC, 2021b, Annex, paras. 36 and 33). By the same token, additionality must be demonstrated by 'taking into account all relevant national policies, including legislation, and representing mitigation that exceeds any mitigation that is required by law or regulation' (UNFCCC, 2021b, Annex, para. 38). While it remains to be seen how the Supervisory Body will put these rules into practice, voluntary certification standards are already considering how to align their rules with these requirements (Kreibich and Brandemann, 2022).

Instead of waiting for these more ambitious rules to spill over into certification schemes outside the UNFCCC, the ICAO Council could take on a more active role by phasing in the ambitious requirements of the Article 6.4 mechanism into its own assessment processes. In doing so, the overall quality of credits eligible under CORSIA could be increased. In addition, it is worth noting that there are several initiatives that independently assess and distinguish the quality of carbon credits. Examples include the Carbon Credit Quality Initiative, Calyx Global and the Integrity Council for the Voluntary Carbon Market. It is possible that these initiatives emerged in response to ICAO's

failure to identify high-quality carbon credits. Importantly, some have published their methodologies. To ensure the quality of credits under CORSIA, ICAO could therefore draw from these independent initiatives.

4.3 Level of ambition in ICAO decision-making

With the adoption of the Article 6 rulebook at COP26 in Glasgow, the links between CORSIA and Article 6 have been tightened. Policymakers at ICAO should be aware of this and consider that their policy decisions may have a wider impact on the supply side of the CORSIA market, namely the voluntary carbon market and Article 6.4; both linked to the Article 6.2 accounting and reporting framework. In the past, however, decision-making by ICAO has been characterised by a lack of ambition.

One example is the modification of CORSIA's baseline in light of the COVID-19 pandemic. The pandemic resulted in a dramatic decline of CO₂ emissions from international aviation. In response to this, the ICAO Council modified the baseline for the pilot phase (ICAO, 2020). Rather than using the average of 2019 and 2020 CO₂ emissions from international flights, the baseline was revised to 2019 emissions only. It is anticipated that this will increase the baseline by roughly 30%, translating into fewer offsetting obligations (Harper, 2020). According to Schneider and Graichen (2020), this adjustment could give rise to a complete elimination of all offsetting requirements during the pilot phase, resulting in a delay of the scheme's implementation by three to five years (Harper, 2020). The ICAO Assembly is yet to formally adopt this decision at the 41st Assembly Session in 2022, however. In March 2022, CAEP's analysis in support of CORSIA's periodic review was presented to the ICAO Council 225th Session. This analysis also shows that a 2019 baseline would significantly reduce offsetting requirements under the scheme (ICAO, 2022c).

Another example concerns the impact of non-CO₂ effects on the climate. Non-CO₂ effects from aviation, including the effects of nitrogen oxide, sulphate aerosols and contrails, for example, have a significant influence on climate change (Beard, 2017). CO₂ emissions only account for a small portion of overall aviation emissions. A scientific study published in 2021 concluded that the total climate impact of the aviation sector is actually three times greater than the impact of all CO₂ emissions alone (Lee et al., 2021). Accordingly, the regulation of non-CO₂ impacts will be crucial in realising the objectives of the Paris Agreement. However, CORSIA currently only targets CO₂ emissions from international flights. Hence, it only regulates around half of the global warming impact of international aviation (Beard, 2017). Schneider and Wissner (2022) put forward some practical recommendations to this end, including the establishment of a monitoring system for non-CO₂ effects, the adoption of policies to reduce non-CO₂ effects such as re-routing, and requiring that any residual non-CO₂ effects are offset after 2030.

To generate high-quality credits that can be used by airlines under CORSIA, planning security is key for activity proponents, governments and other stakeholders. This must be seen in the context of the new framework conditions brought about by the Paris Agreement. These require a much more active involvement of host Party governments when it comes to identifying mitigation activities that can generate credits authorised by host Parties. By increasing the ambition of CORSIA, the ICAO Council would send a clear message to the supply side that demand will continue to grow in the future. Host Parties would be reassured that developing an Article 6 strategy is worthwhile, while other stakeholders would be incentivised to engage in this process to generate the offset credits needed to meet future demands.

4.4 Registries

The linkages between Article 6 and CORSIA will also become stronger at the technical level. One area where the



UNFCCC negotiations are influenced by the CORSIA structure is the development of the infrastructure of Article 6, in particular the registries to be used under Article 6. The Article 6.2 Guidance requires participating Parties to have or have access to a registry that tracks units and ITMOs and that records authorisations, transfers and uses against NDCs among others (UNFCCC, 2021a, Annex, paras 29-31). While most Parties argue that only national and international registries should be allowed to meet this requirement, Canada, Singapore, and the United States also want to make registries from private certification standards eligible (Michaelowa, 2022), following the structure introduced by CORSIA.

However, the structure of private certification standards' registries is still very diverse and lacks consistency. Exclusively relying on these registries for international transfers is therefore not desirable. At the same time, private certification standards need to operate their own registries, for instance to show compliance with upcoming requirements from initiatives such as the Integrity Council for the Voluntary Carbon Market (IC-VCM, 2022). A possible way forward would be to link national and international registries with the registries from private certification standards. While the former would track units and record uses, the latter would basically function as databases for the purpose of transparency.

5. Managing the interplay between CORSIA and Article 6

As the previous section shows, while CORSIA was developed and adopted outside the UNFCCC, there are clear links to the international climate regime, in particular its new mechanisms developed under Article 6 of the Paris Agreement. The adoption of the Article 6 rulebook in Glasgow forms a new chapter in the longer-standing saga of interactions between the two international regimes. However, while it may be clear that ICAO is the primary international body dealing with aviation emissions, it is much less clear what happens in case of a conflict with the goals, principles, or rules of the international climate regime. This raises the question of how interplay between rule development under ICAO and the UNFCCC/Paris Agreement can and should be managed (see generally Martinez Romera, 2018).

In this regard, several ICAO Assembly Resolutions explicitly acknowledge cooperation with the UNFCCC. For example, Resolution A40-19 refers to 'welcoming' cooperation between ICAO and the UNFCCC with regard to the development of CDM methodologies concerning aviation (ICAO, 2019b: preamble). A further example is Resolution A40-18, which requests the ICAO Council to continue cooperating with relevant organisations, with specific mention of the Conference of the Parties to the UNFCCC (ICAO, 2019e: para. 2(c)). The Resolution also asks the Council to request ICAO Member States 'to regularly report CO₂ emissions from international aviation to the UNFCCC' (ICAO, 2019e: para. 15).

ICAO regularly submits inputs into the UNFCCC process, through formal submissions and statements to the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA). For instance, in a submission made to the SBSTA, ICAO set out the progress made by ICAO and its Member States since the previous Assembly in 2019, including on CORSIA (ICAO, 2021b). As well as reporting on CORSIA related milestones and future areas of work, the statement also acknowledged that ICAO would 'continue to monitor further developments related to Article 6 of the Paris Agreement, in particular, any implications for the implementation of CORSIA and its eligible emissions units' (ICAO, 2021b: 1).

The question is whether such reporting and monitoring on the part of ICAO is sufficient to address the concerns

raised in Section 4. While CORSIA and the Paris rulebook will continue to be elaborated through separate intergovernmental processes, it will be important that ICAO and the UNFCCC strengthen cooperation with a view to aligning their efforts and avoiding the creation of rules that may hamper the environmental integrity and broader functioning of each mechanism.

The CORSIA review process should play a role in this regard. The review process specifically involves consideration of the scheme's improvement to 'support the purpose of the Paris Agreement' (ICAO, 2019b: 6). To this end, ICAO should continue to pursue Paris-compatibility as part of its review process and in parallel with ongoing COP negotiations. The first opportunity to do so will be when the ICAO Council puts forward suggestions for updating Resolution A40-19 at the next ICAO Assembly in September 2022. The ways in which ICAO Member States could ensure compatibility with the Paris Agreement in general, and Article 6 in particular, would be to request the ICAO Council to carry out an assessment of the impacts on the functioning of the Article 6 mechanisms each time a decision is made. Moreover, to address the issue of the quality of offsets, the Council could be requested to align its guidance with that of the Article 6.4 Supervisory Body.

From the perspective of the Paris Agreement, the Glasgow Climate Conference delivered the bulk of the rulebook on Article 6. Still, at COP27, Parties will have to clarify some of the outstanding issues, in particular, related to the operationalisation of the Article 6.4 mechanism, such as national arrangements for the mechanism, processes for the transition of CDM activities to the Article 6.4 mechanism, and operation of the mechanism registry (UNFCCC, 2021b, para 7). With regard to Article 6.2, Parties will have to agree on reporting tables and outlines as well as on infrastructure needed for tracking and recording of ITMOs (UNFCCC, 2021b: paras 6 and 10). One aspect on the agenda that is of particular relevance to CORSIA is the elaboration of further guidance in relation to the avoidance of double claiming and the application of CAs to single-year targets, including through averaging (UNFCCC, 2021a, Annex, para 3).

6. Conclusions and recommendations

The adoption of the Article 6 rulebook marked a significant step forward for the continued evolution of carbon markets. The rules adopted under Article 6 of the Paris Agreement provide a strong framework for Parties to pursue voluntary cooperation and realise the emission reduction targets specified in their NDCs. While originally intended to support Parties in the implementation of their NDCs, however, the expanded scope of Article 6 has also created a direct linkage to CORSIA. This paper has sought to explore this linkage, in particular, by analysing four key interactions between the Article 6 rules and CORSIA: (1) the use of single-year targets and the averaging accounting approach; (2) quality criteria for offsets; (3) unpredictability in ICAO decision-making; and (4) the use of registries. To this end, the paper has offered some possible suggestions on how to address the challenges associated with these interactions.

While CORSIA and Article 6 are elaborated through separate regimes, the future development of these systems, and in particular the extent to which they align, has important implications for their overall effectiveness in achieving global emission reductions. The future interplay between ICAO and the UNFCCC will thus be crucial in unlocking the full potential of international emissions trading. This paper has shown, however, that the current regulations contain some severe loopholes that could significantly undermine the environmental integrity of CORSIA and Article 6. The first move is for ICAO Member States, which are to complete the first review of CORSIA

at the 41st ICAO Assembly in September 2022. This provides an important opportunity to consider CORSIA's alignment with the Paris Agreement and its implementing rules. More generally, ICAO Member States should consider the impacts of their decision-making on the Article 6 mechanisms.

In particular, ICAO Member States should adopt a long-term climate target for international aviation in line with the Paris Agreement. It will be vital that CORSIA's current objective is also revised to align with such a long-term goal. This would be particularly important in addressing the currently limited focus of CORSIA on emissions *growth* rather than actual emissions *reduction*. Additionally, ICAO should also revise its quality criteria for offsets if it is to ensure the overall effectiveness of the scheme. In particular, the ICAO Council should seek to enhance the quality of credits eligible under CORSIA by integrating the more ambitious requirements under the Article 6.4 mechanism. A further element for consideration by ICAO is the regulation of non-CO₂ effects from international aviation. Finally, ICAO should consider carrying out an assessment of the impacts on the functioning of the Article 6 mechanisms each time a decision is made.

While COP26 laid the foundation for the operationalisation of Article 6, some outstanding issues will have to be agreed on, including at this year's COP27 in November. Addressing the concerns related to double claiming in the context of averaging will be relevant for ensuring the integrity of both CORSIA and Parties' NDCs. In particular, the guidance on averaging should be further refined or a decision on the establishment of a buffer tool should be considered. In the long run, however, requiring all Parties to transition towards multi-year targets seems most promising. Agreeing on this from the start will presumably be challenging, if not impossible, given the bottom-up structure of the Paris Agreement. Therefore, restricting the application of averaging and introducing safeguards could ultimately prove to be more realistic. If this alternative path is chosen, ensuring environmental integrity should always be a priority. While potentially challenging, CORSIA should also consider accepting only units from host Parties with multi-year emission budgets. In addition to addressing the issues concerning double claiming and the averaging approach, the registry issue should also be resolved. One possible avenue forward would involve linking national and international registries with the registries from private certification standards.

Addressing these challenges and ultimately closing the loopholes identified in this paper will be crucial in ensuring the environmental integrity and wider functioning of CORSIA and Article 6. Accordingly, it will be vitally important that ICAO and the UNFCCC pursue strong cooperation to ensure that their efforts are aligned and can sufficiently address the concerns raised in this paper.

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NDC ASPECTS

POLICY BRIEF

Article 6 and CORSIA after
Glasgow: Ready for take-off?

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