



„Design of an Offset System as Global MBM Scheme for international Aviation in the Light of the Paris Agreement“



Editorial information

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Abstract

With the Paris Agreement for the first time in history, both developed and developing countries have agreed on a multilateral approach that aims at cutting GHG emissions below 2 °C compared to pre-industrial levels. The Paris Agreement does however not address GHG emissions from the international maritime and aviation sectors, which are treated separately under IMO (maritime) and ICAO (aviation). The 39th Assembly of ICAO in October 2016 adopted its resolution on a Global Market Based Measure (GMBM), creating the „CORSIA“ (Carbon Offset and Reduction Scheme for International Aviation) as a high-level framework, plus giving direction to the technical building blocks that must still be developed and adopted. Numerous technical questions are to be debated and solved before CORSIA starts. A linked process will in particular be relevant for technical design parameters in the context of the environmental integrity, and thus the eligibility of certificates. An un-coordinated development of both processes on the other hand could lead to fragmentation and inefficiencies in international climate policy, and ultimately potentially preventing the CORSIA from linking to the UN offset systems. This report discusses the robust design approach for ensuring environmental integrity of offsets under ICAO's Global MBM scheme for international aviation in the light of the Paris Agreement.

Kurzbeschreibung

Das im Dezember 2015 auf der COP 21 beschlossene Paris Abkommen stellt einen Meilenstein in der internationalen Klimapolitik dar und wird global als Erfolg bewertet. Es definiert für den Zeitraum ab 2020 das langfristige Ziel, den Anstieg der globalen Erwärmung auf deutlich unter 2 °C gegenüber dem vorindustriellen Niveau zu halten. Von den Regelungen zur Treibhausgasreduktion unter der UNFCCC nach 2020 ausgenommen sind der internationale Seeverkehr und die internationale Luftfahrt; historisch werden diese grenzüberschreitenden Sektoren unter den Vereinten Nationen nicht von der UNFCCC, sondern von der IMO (Seeverkehr) und ICAO (Luftfahrt) erfasst (festgelegt unter anderem im Kyoto Protokoll, Artikel 2.2). Die 39. ICAO Vollversammlung konnte im Oktober 2016 einen Beschluss zur Einführung einer GMBM fassen; die verabschiedete Resolution schafft und definiert die weitere notwendige Ausgestaltung des „CORSIA“ (Carbon Offset and Reduction Scheme for International Aviation). Die in den kommenden Jahren beginnende technische Ausgestaltung von marktbasierten Instrumenten der internationalen Klimapolitik, sowohl unter UNFCCC als auch ICAO, wird dabei eine Fülle von technischen Herausforderungen mit sich bringen. Eine unabgestimmte Entwicklung der Mechanismen unter ICAO und UNFCCC hätte Fragmentierung und Ineffizienzen im Klimaschutz zur Folge. Ein übergreifender, integrativer und ganzheitlicher Ansatz in der Ansprache dieser Situation hingegen kann dazu beitragen, einen internationalen und sektorübergreifenden Beitrag zum Klimaschutz effektiver zu gestalten. Dieser Bericht diskutiert die zukünftige robuste Ausgestaltung des ICAO Kompensationsmechanismus CORSIA im Lichte des Paris Abkommens.

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List of Abbreviations

CAEP	Committee on Aviation Environmental Protection
CATE	Centre for Aviation, Transport and the Environment
CDM	Clean Development Mechanism
COP	Conference of parties
CORSIA	Carbon Offset and Reduction Scheme for International Aviation
CPA	Paris Agreement
CSR	Corporate social responsibility
DTU	Technical University of Denmark
EAG	Environmental Advisory Group
ETS	Emissions Trading System
EUC	Emissions Unit Criteria
FCMC	Forest Carbon, Markets and Communities
FVA	Framework for various Approaches
GHG	Greenhouse gas
GLADs	Global Aviation Dialogues
GMBM	Global Market Based Measure
GMTF	Global MBM technical Task Force
GS	Gold Standard
ICAO	International Civil Aviation Organization
IEA	International Energy Agency
IGES	Institute for Global Environmental Strategies
IMO	International Maritime Organization
INDCs	Intended Nationally Determined Contributions
IPAG	Interim Programme Assessment Group
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally Transferable Mitigation Outcomes
ITMOs	Internationally Transferred Mitigation Outcomes
JI	Joint Implementation
MBM	Market Based Measure
MRV	Monitoring, reporting and verification
NDCs	National Determined Contributions
NMM	New Market Mechanism
PA	Paris Agreement
REDD+	Reducing emissions from deforestation and forest degradation
RTK's	Revenue-ton-kilometers
SARPs	Standards and recommended practices
SBSTA	Subsidiary Body for Scientific and Technological Advice
SDM	Sustainable Development Mechanism

TAB	Technical Advisory Body
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	US Agency for International Development
VCS	Verified Carbon Standard

Summary

With the Paris Agreement for the first time in history, both developed and developing countries have agreed on a multilateral approach that aims at cutting GHG emissions below 2 °C compared to pre-industrial levels. The Paris Agreement does however not address GHG emissions from the international maritime and aviation sectors, which are treated separately under the International Maritime Organisation (IMO) and the International Civil Aviation Organisation (ICAO), respectively. This report aims at discussing the robust design approach for ensuring environmental integrity of offsets under ICAO's Global MBM scheme for international aviation in the light of the Paris Agreement.

Offsetting GHG emissions of international aviation with CORSIA

While the international aviation sector is a relevant emitter of GHG and accounts for approximately 1.3 percent of the global CO₂ emissions, with a predicted annual growth of 5 percent on average, international decision-making on addressing the climate impacts from international aviation has proven to be challenging. In 2013, the International Civil Aviation Organization (ICAO) set itself a goal of achieving carbon neutral growth from 2020. A study by ICAO's Committee on Aviation Environmental Protection (CAEP) suggested CO₂ emissions from all international aviation would increase beyond 2020 levels to between 443 M t CO₂ and 596 M t CO₂ in 2035. Extrapolating the data points from the CAEP study to produce annual linear results, cumulative CO₂ emissions from all international aviation would be between 3,480 and 4,540 M t CO₂ by 2035.

After three more years of negotiations, the 39th Assembly of ICAO in October 2016 adopted its resolution on a Global Market Based Measure (GMBM). With this resolution, ICAO creates the CORSIA as a high-level framework, plus it gives direction to the technical building blocks that must still be developed and adopted. The CORSIA scheme uses the average emissions for international aviation covered by the scheme across 2019 and 2020 as a baseline, to which the offset requirement is applied. There are three phases to the scheme, starting in 2021 with a voluntary pilot phase. From 2024 (Phase 1) it is still voluntary, with countries able to opt in, and even opt out again up until 2027. From 2027 until 2035 (Phase 2) CORSIA is mandatory for those countries above a certain threshold defined in terms of their share of international aviation. By mid-October 2016, 66 countries representing more than 85 percent of international aviation activity (measured in RTK) had declared their intention to join from the start.

The coverage of the scheme is route-based, meaning that if the countries of both landing and take-off are in the scheme, the route is covered. With the beginning of the scheme, each year, airlines must measure and report to the national authorities all their CO₂ emissions of international flights, regardless whether the routes are covered by the scheme or not. Those reports need to be verified by third parties. At the end of each phase, airlines operating flights on covered routes are to surrender eligible emission units to cover the offset requirement placed on them.

The Paris Agreement Article 6 on market based instruments

The Paris Agreement marks a milestone in international climate policy achieved under another UN Body, the United Nations Framework Convention on Climate Change (UNFCCC) - for the first time in history, both developed and developing countries have agreed on a multilateral approach that aims at cutting GHG emissions to limit global average temperature levels to well below 2 °C, compared to pre-industrial levels. Less than one year after adoption of the Paris Agreement, the conditions for becoming effective (at least 55 Parties, representing 55 percent of global GHG emissions, ratifying it) were met; on 4 November 2016 the Paris Agreement thus entered into force.

Under its Article 6, the Paris Agreement specifies relevant approaches for the use of market based measures for GHG mitigation after 2020. Two options are established: firstly, a voluntary framework addressing the international trade of GHG emissions via so called Internationally Transferable Mitigation Outcomes (ITMO) (Article 6.2f on "cooperative approaches"). This way GHG mitigation arising from various approaches initiated "bottom up" by the Parties can be accounted towards national GHG mitigation targets of any country. Secondly, a centrally organized mechanism for generating and transferring GHG emission reductions (Article 6.4f). The scientific and technical body under the UNFCCC's Conference of the Parties (SBSTA) is tasked to develop technical details, rules and accounting provisions of those mechanisms over the next years.

As the Paris Agreement was negotiated under the UNFCCC, however, it does not address GHG emissions from the international maritime and aviation sectors, with those being handled respectively under IMO and ICAO.

The relevance of integrating the discussion on offsetting under UNFCCC and ICAO

A key element for CORSIA that has not yet been decided are eligible programmes and project types to be used for compliance with the scheme. Eligibility will be determined through criteria that are subject to ongoing discussions. The ICAO decision creating CORSIA left those criteria partly open, though it does specify that the UNFCCC mechanisms and programmes for offsets should be considered, specifying that they “[take] into account relevant developments in the UNFCCC and Article 6 of the Paris Agreement”.

The Article 6 framework is expected to establish the international standard under which the use of market based mitigation instruments will operate from 2020. Hence, at this point a link exists between the ICAO and the UNFCCC; in this respect, and in order to ensure mutual compatibility in future, it is imperative now to closely link the further development of CORSIA under ICAO with the Article 6 evolution under UNFCCC. Elaborating the technical design and governance approach of the CORSIA implies a reflection of, and an inter-linkage with, the process of spelling out the Article 6 mechanisms under the UNFCCC.

A linked process will in particular be relevant for technical design parameters in the context of the environmental integrity, and thus the eligibility of certificates. An un-coordinated development of both processes on the other hand could lead to fragmentation and inefficiencies in international climate policy, and ultimately potentially preventing the CORSIA from linking to the UN offset systems.

Identifying global best practice in offsetting

Offsetting GHG emissions at a global level has been practiced since more than a decade, including experiences under multilateral schemes (the UNFCCC’s Clean Development Mechanism, CDM), or the REDD+ mechanism, as well as in so called voluntary markets outside the UN system. Here, the CDM is the most relevant GHG offsetting scheme in terms of GHG emission reduction volumes and geographical coverage. The CDM was established as a project based mechanism of the Kyoto Protocol for helping Annex I Parties to comply with their mitigation commitments as per Annex B of the Protocol. As the Kyoto Protocol will end after 2020, the CDM will lose its function unless the UNFCCC agrees on provisions for prolonging CDM activities and potentially accommodating it under the Paris Agreement.

Voluntary markets comprise a diversity of standards for offsetting GHG, which vary in terms of scope, volume and quality. Credits generated under those standards have been used mainly by corporate stakeholders for offsetting GHG emissions. Interestingly in the context of CORSIA, the aviation sector has already gained vast experiences regarding compensation of GHG emissions by airlines through their voluntary passenger offset schemes. Airlines have been offering voluntary offset schemes to passengers for many years. Although there are no rules on how these are arranged, the convention is for the passenger to be informed of the opportunity to use an online calculator to determine how much CO₂ is associated with their airline ticket, then to pay for an offset from a project to reduce or avoid CO₂ emissions. These offsets are typically sourced from offset retailers and in many cases the passenger can choose the project they would like to support, such as wind energy in USA or avoided deforestation in Kenya. The offset is retired on behalf of the passenger. The voluntary offset schemes have tended towards projects that are regulated by recognised offset schemes. Of the 24 schemes that provide information on the projects from which the offsets are sourced, the majority of projects are registered under the Clean Development Mechanism (43 percent) or one of the recognised voluntary standards, such as the Verified Carbon Standard (27 percent) and Gold Standard (12 percent), though there is some overlap as some airlines offer projects from more than one standard, plus the Gold Standard offers a quality certificate attached to CDM projects as well as its own project standard. The project types on offer reveal an airline preference for forestry-related projects as the largest grouping (33 percent), followed by wind power (17 percent) and solar PV (14 percent).

Here, experience shows that the majority of airlines opt for recognised international standards, and for renewable energy and forestry projects. This is likely to reflect the airlines’ understanding of passenger preference.

Supply and demand for offset credits

ICAO's Committee on Aviation Environmental Protection presented a demand forecast in January 2016 that draws directly on other studies. The demand assumes 100 percent participation of international aviation in the scheme, as it was completed before the adoption of the CORSIA. CAEP puts the total demand for offsets from the CORSIA in the range of 142 M t CO₂ to 174 M t CO₂ in 2025 and 443 M t CO₂ to 596 M t CO₂ in 2035. Extrapolating the data points from the CAEP study to produce annual linear results, cumulative CO₂ emissions from all international aviation in period 2020 to 2035 would be between 3,480 and 4,540 M t CO₂ by 2035.

With respect to offset supply, the availability of supply of suitable offsets in the interim period before (and if) the Article 6 mechanisms begin delivering will determine whether the CORSIA scheme can function as demand from airlines increases, through "early action" up to the pilot phase and beyond. The CAEP used in its calculation supply forecasts from external organizations, and puts supply of CERs at 150 M t CO₂e annually by 2020, based on World Bank estimates (World-Bank, 2014). The accumulative supply is projected to be in the range of 2,390 M t CO₂ and 4,170 M t CO₂ by 2020, before CORSIA even starts. Besides the CDM, there is the likelihood of new supply sources that could, potentially, be eligible for CORSIA, certainly by 2035, including the Article 6 mechanisms.

Ensuring environmental integrity in international offsetting

While the policy framework is in place and a direction and timetable for the detailed technical aspects are set out, there are key questions of policy and principle as well as technical aspects that are still left open, particularly in the monitoring, reporting and verification (MRV) rules, the setting up of the online emissions registries and in the criteria that determine which offsets can be used for compliance. The design of such technical aspects will determine the quality of the projects and programmes, which in turn will determine the environmental effectiveness of the scheme as a whole. Also, the avoidance of double counting is of core relevance, i.e. ensuring that certified GHG emission reductions foreseen for offsetting under CORSIA have been, or will only be used, counted and claimed once (i.e. under the CORSIA), and not used in other schemes or put towards other targets as well.

The pathway towards CORSIA implementation

The detailed rules for CORSIA will take the form of standards and recommended practices (SARPs) and related guidance. The resolution text gives significant weight to encouraging states to work together to accelerate the process, including capacity building and collaboration on registries (see paragraph 20h), but the fact remains that the tasks are considerable and the timeline - in particular for MRV where rules need to be adopted by the ICAO Council and implemented through states by January 2019 - is extremely challenging by any measure.

Core technical questions to be debated and solved before CORSIA starts include the eligibility of offset credits from programmes or mechanisms. In particular, the legal character of the "emission unit criteria" is to be decided, i.e. whether they are standards, recommended practices or guidance. Moreover, for the operationalisation of the eligibility assessment, the principles on which the already agreed criteria are based, *inter alia* additionality, permanence or avoidance of double counting, needs descriptive elaboration.

The ICAO Council must at the same time take account of developments under Article 6 of the Paris Agreement and must meet its own timetable without prejudicing the outcomes of the UNFCCC developments. This requires a robust system that is also flexible enough to reflect those developments and ensure the two systems are compatible, in terms of policy decisions and also technical aspects, to ensure aviation has access to a wide market of offsets and to avoid double-counting.

The following aspects summarize relevant conclusions from the assessment in order to ensure a robust and integrated process of designing the CORSIA:

- Avoid „un-tuned“ development of the CORSIA and Article 6 over the next years, i.e. ICAO working groups and UNFCCC technical bodies should mutually reflect each other's work and ideally interact during the process of developing the individual mechanisms designs, specifically on the setting of emissions unit criteria not least for early action by airlines under ICAO on the one hand, and the rules, procedures and modalities under the Paris Agreement, on the other hand.

- ▶ Build on lessons that can be drawn from Kyoto Mechanisms (CDM/JI) for ensuring integrity of the scheme; this is also relevant for the efficiency of getting CORSIA operational – particularly operators are not in favour of re-inventing the wheel but building upon existing systems such as the CDM.
- ▶ Account for environmental integrity of credits through specific quality requirements and in particular by ensuring the avoidance of double counting of GHG emission reductions.
- ▶ Select good quality credits: there is no scarcity of credits, hence, environmental integrity of offsetting should be established based on the acknowledgement that there is ample supply of credits; in order to derive a minimum carbon price certain options for ensuring scarcity of credits need to be discussed (such as quality and vintage limitations).
- ▶ Reflect the tight timetable: dedicated capacity building initiatives can support countries and operators in preparing the CORSIA implementation accordingly.

Zusammenfassung

Das im Dezember 2015 auf der COP 21 beschlossene Paris Abkommen stellt einen Meilenstein in der internationalen Klimapolitik dar und wird global als Erfolg bewertet. Es definiert für den Zeitraum ab 2020 das langfristige Ziel, den Anstieg der globalen Erwärmung auf deutlich unter 2 °C gegenüber dem vorindustriellen Niveau zu halten. Hierbei haben sich erstmals sowohl Industrie- als auch Entwicklungsländer zur gemeinschaftlichen Reduktion von Treibhausgas (THG) Emissionen geeinigt. Weniger als ein Jahr nach der Beschlussfassung zum Paris Abkommen wurden die Bedingungen zum Inkrafttreten (Ratifikation durch wenigstens 55 Vertragsstaaten, die mindestens 55 Prozent der globalen THG Emissionen repräsentieren) bereits erfüllt; das Paris Abkommen trat somit zum 4. November 2016 in Kraft.

Von den Regelungen zur Treibhausgasreduktion unter der UNFCCC nach 2020 ausgenommen sind der internationale Seeverkehr und die internationale Luftfahrt; historisch werden diese grenzüberschreitenden Sektoren unter den Vereinten Nationen nicht von der UNFCCC, sondern von der IMO (Seeverkehr) und ICAO (Luftfahrt) erfasst (festgelegt unter anderem im Kyoto Protokoll, Artikel 2.2).

Nach langjährigen Konsultationen unter der ICAO konnte im Jahr 2013 die 38. ICAO Versammlung in Resolution A 38-18 verabschieden, welche den ICAO Rat neben weiteren Maßnahmen zur Entwicklung eines marktbasierten Instrumentes zur Minderung der Klimawirkungen des internationalen Luftverkehrs auffordert. Übergeordnetes Ziel ist die mittelfristige Begrenzung der THG-Emissionen des Sektors auf dem Niveau von 2020, als ein klimaneutrales Wachstum nach 2020 („carbon neutral growth from 2020, CNG2020“). Die 39. ICAO Vollversammlung konnte im Oktober 2016 einen Beschluss zur Einführung eines GMBM fassen; die verabschiedete Resolution schafft und definiert die weitere notwendige Ausgestaltung des „CORSIA“ (Carbon Offset and Reduction Scheme for International Aviation).

Dieser Bericht hat zum Ziel, die zukünftige robuste Ausgestaltung des ICAO Kompensationsmechanismus CORSIA im Lichte des Paris Abkommens zu diskutieren.

Kompensationsmaßnahmen im internationalen Luftverkehr

Der internationale Luftverkehr ist ein relevanter Emittent von Treibhausgasen; etwa 1,3 Prozent der globalen CO₂ Emissionen können der internationalen Luftfahrt zugerechnet werden, bei einem erwarteten Wachstum von 5 Prozent jährlich. CORSIA legt die durchschnittlichen THG-Emissionen der Jahre 2019 und 2020 der unter das System fallenden Routen / Betreiber als Referenzszenario für die spätere Kompensation zugrunde. Kompensiert werden sollen die wachstumsbedingten Emissionen bei internationalen Flügen; sie werden prozentual gleichmäßig auf alle Fluggesellschaften aufgeteilt. Die Abdeckung ist routenbasiert; Strecken zwischen Teilnehmerstaaten des CORSIA werden erfasst. Jedes Jahr müssen Betreiber, welche internationale Flüge auf diesen Strecken durchführen ihre CO₂-Emissionen messen, verifizieren lassen, und den nationalen Behörden übermitteln. Am Ende einer Phase (d.h. alle drei Jahre) müssen Betreiber förderfähige Offsets einreichen, um den an sie gestellten Kompensationsanspruch zu decken. Gegliedert ist CORSIA in drei Phasen, beginnend im Jahr 2021 mit einer freiwilligen „Pilotphase“. Von 2024 bis 2026 (Phase 1) ist die Teilnahme weiterhin freiwillig; Länder können weiterhin ein- und später sogar wieder austreten.

Ab 2027 bis 2035 (Phase 2) ist CORSIA für diejenigen Länder obligatorisch, deren Revenue-Tonnenkilometer (RTK) im Jahr 2018 einen Anteil von mehr als 0,5 Prozent der gesamten RTK unter dem CORSIA aufweisen oder – wenn 90 Prozent der gesamten RTK durch die bereits genannten Staaten noch nicht abgedeckt sein sollten – auch diejenigen, die zwar unterhalb von 0,5 Prozent liegen, aber noch gebraucht werden, um insgesamt 90 Prozent der RTK abzudecken (ausgenommen LDCs, SIDS und LLDCs). Ausnahmen bilden neu gegründete Airlines und Gesellschaften mit geringer Tonnage.

Die Pilotphase und die Phase 1 unterscheiden sich in erster Linie in der Berechnung des Kompensationsbedarfes. Während der Pilotphase von 2021 können Staaten zwischen der Anwendung des Kompensationsbedarfs auf die THG-Emissionen des jeweiligen Jahres (2021, 2022 und 2023) oder die THG-Emissionen des Betreibers im Jahr 2020 wählen. In Phase 1 von 2024 an wird dagegen ein Sektorwachstumsfaktor eingeführt. Bis zum Ende der ersten Verpflichtungsperiode der zweiten Phase im Jahr 2029 basiert die Berechnung auf dem Wachstum der erfassten THG-Emissionen zwischen dem jeweiligen Jahr und dem Referenzjahr (Durchschnitt von 2019-2020), um entsprechend den Sektorwachstumsfaktor abzuleiten und auf die Betreiber anzuwenden. Wenn zum Beispiel die Gesamtemissionen von CORSIA im Jahr 2024 um 5 Prozent über dem Referenzwert liegen, müssen die Luftfahrtunternehmen 5 Prozent ihrer von CORSIA abgedeckten Emissionen ausgleichen. Erst ab 2029 wird die Berechnung dann (gleitend, bis zu 20 Prozent 2030-2032, bis zu 70 Prozent 2033-2035) auf die individuellen THG-Emissionen der Fluggesellschaften umgestellt. Bis Mitte Oktober 2016 haben 66 Länder, welche mehr als 85 Prozent der internationalen Luftverkehrstätigkeit repräsentieren, ihre Absicht zur Teilnahme von Beginn des CORSIA erklärt.

Der Artikel 6 des Paris Abkommens zu marktbasierten Mechanismen

Im Kontext der internationalen Klimapolitik und der Nutzung von Marktmechanismen nach 2020 ist zudem die Beschlussfassung der COP 21 und des Paris Abkommens, insbesondere in Artikel 6, relevant. Es werden zwei Möglichkeiten für die internationale Nutzung von marktbasierten Klimaschutzinstrumenten aufgezeigt: Unter Artikel 6.4 wird ein von der UNFCCC überwachter Mechanismus definiert (von Beobachtern auch als „Mechanismus für nachhaltige Entwicklung“ /Sustainable Development Mechanism - SDM) bezeichnet. Artikel 6.2 dagegen adressiert so genannte „kooperative Ansätze“ (Cooperative Approaches - CA) welche die direkte Kooperation von Staaten unter einem übergeordneten regulativen Rahmen ermöglichen. Die Vertragsstaaten werden ihre Verhandlungen hierzu in den kommenden Jahren, beginnend mit dem Treffen der UNFCCC Nebenorgane im Mai 2017 in Bonn, weiterführen.

Eine integrierte Debatte zu Kompensationsmechanismen unter UNFCCC und ICAO

Die Mechanismen unter Artikel 6 werden sehr wahrscheinlich den Maßstab für marktbasierte Mechanismen im multilateralen Rahmen nach 2020 setzen. An diesem Punkt existiert nun eine Schnittstelle zwischen dem Paris Abkommen und dem ICAO Prozess und der Ausgestaltung des GMBM / CORSIA: Die Erarbeitung der technischen Designparameter und des GMBM Governance Ansatzes, insbesondere die Zulässigkeit von Zertifikaten, gebietet eine Reflektion und Verzahnung mit dem Prozess zur Ausgestaltung der Artikel 6 Mechanismen des Paris Abkommens.

Eine Verknüpfung zwischen der Ausgestaltung von Artikel 6 des Paris Abkommens unter der UNFCCC und dem CORSIA-Beschluss erscheint somit insbesondere für die technischen Parameter im Zusammenhang mit der ökologischen Integrität und in diesem Zuge der Anerkennung von Zertifikaten relevant. Dagegen birgt eine unkoordinierte Entwicklung der beiden Prozesse die Gefahr von Fragmentierung und Ineffizienzen in der internationalen Klimapolitik, sowie letztendlich das Nichtzustandekommen einer Verknüpfung zwischen CORSIA und dem UNFCCC Regime.

Globale Erfolgsmaßstäbe für Kompensation erkennen

Seit mehr als einer Dekade werden im globalen Maßstab THG-Kompensationsmechanismen eingesetzt, unter anderem der CDM im Rahmen der UNFCCC oder REDD+, sowie weitere freiwillige Mechanismen außerhalb des UNFCCC Systems. Der CDM ist hier der relevanteste Standard hinsichtlich geographischer Verbreitung und hinsichtlich der erfassten Menge an THG-Reduktionen. Sofern die UNFCCC Vertragsstaaten sich nicht auf eine Verlängerung des Mandates für den CDM einigen können, wird er allerdings nach 2020 mit dem Auslaufen des Kyoto Protokolls an Relevanz verlieren. Für den Zeitraum bis 2020 spielt der so genannte freiwillige Markt eine zentrale Rolle, da hier freie und flexible Ansätze und Standards zur Ausgestaltung von Kompensationsaktivitäten und Projekten bestehen.

Viele Fluggesellschaften nutzen diese Möglichkeit im Rahmen ihrer Kompensationssysteme. Dabei entscheiden sich viele Fluggesellschaften für etablierte international Standards wie den CDM, den Goldstandard oder den VCS, und für Projekte aus den Bereichen Erneuerbare Energien und Forstwirtschaft.

Angebot und Nachfrage nach Zertifikaten

ICAO's Umweltausschuss CAEP hat Anfang 2016 erste Nachfrageszenarien für den Bedarf an Zertifikaten durch den Sektor vorgelegt. Hierbei geht man von einer 100-prozentigen Teilnahme des Sektors an CORSIA aus. Der identifizierte Bedarf korrespondiert mit den zusätzlichen Wachstumsannahmen nach 2020 und bewegt sich in den Bereichen zwischen 142 M t CO₂ bis 174 M t CO₂ für das Jahr 2025 und 443 M t CO₂ bis 596 M t CO₂ für das Jahr 2035. Würden diese Werte der CAEP extrapoliert, erhielte man für den Zeitraum 2020 bis 2035 kumulierte CO₂ Emissionen der gesamten internationalen Zivilluftfahrt von zwischen 3.480 und 4.540 M t CO₂. Hinsichtlich des potenziell verfügbaren Angebots an Zertifikaten zur THG-Kompensation legt CAEP externe Daten an und geht für den CDM von einem Angebot von bis zu 150 M t CO₂ jährlich aus. Kumuliert ergibt sich eine Projektion in der Größenordnung 2.390 und 4.170 M t CO₂ bis 2020. Neben dem CDM werden bis zum Jahr 2035 zudem weitere operative Standards mit weiterem Angebot an Zertifikaten erwartet, unter anderem aus dem Artikel 6.

Ökologische Integrität und Kompensationsmechanismen

In der technischen Ausgestaltung des CORSIA sind naturgemäß noch viele Fragen offen. Das Regelwerk wird sich aus so genannten Standards und Praktiken (standards and recommended practices (SARPs)) sowie Empfehlungen (related guidance) zusammensetzen. Hierbei ist die verfügbare Zeit kritisch - mit Hinblick auf das MRV etwa sind bis Januar 2019 Rahmenbedingungen und Anforderungen zu entwickeln (Rechtsstatus von Standards und empfohlenen Handlungen), durch den ICAO Rat anzunehmen sowie von den Mitgliedsstaaten zu ratifizieren. Bislang gibt es hier nur grobe Prinzipien (permanent, measurable, additional, verifiable etc). Hinsichtlich der Zulässigkeit von Zertifikaten (Emissions Unit Criteria) ist der rechtliche Status der Kriterien zu definieren, also ob diese Standards, Praktiken oder Empfehlungen entsprechen. Die den Kriterien zugrundeliegenden Prinzipien sind zudem zu definieren. Grundsätzlich könnten hier komplette Standards wie der CDM oder der VCS zugelassen werden. Die ICAO Resolution sieht bereits vor, dass Kompensationen welche durch unter der UNFCCC etablierte Mechanismen generiert werden, für die Nutzung unter CORSIA zulässig sein werden (wenn diese mit den weiteren Beschlüssen des ICAO Rates übereinstimmen). Im Bezug auf die ökologische Integrität des CORSIA ist neben den Qualitätskriterien für die Anerkennung der Emissionsreduktionseinheiten das Vermeiden von Doppelzählungen essentiell. Das heißt, dass zertifizierte Emissionsreduktionseinheiten, die unter CORSIA zur Kompensation von Emissionen eingesetzt werden, nur einmalig genutzt, gezählt und in Anspruch genommen (nämlich unter CORSIA) und nicht in anderen Systemen oder gegen andere Ziele gegengerechnet werden.

Der Pfad zur Umsetzung von CORSIA

Die in den kommenden Jahren beginnende technische Ausgestaltung von marktbasierten Instrumenten der internationalen Klimapolitik, sowohl unter UNFCCC als auch ICAO, wird dabei eine Fülle von technischen Herausforderungen mit sich bringen. Eine unabgestimmte Entwicklung der Mechanismen unter ICAO und UNFCCC hätte Fragmentierung und Ineffizienzen im Klimaschutz zur Folge. Ein übergreifender, integrativer und ganzheitlicher Ansatz in der Ansprache dieser Situation hingegen kann dazu beitragen, einen internationalen und sektorübergreifenden Beitrag zum Klimaschutz effektiver zu gestalten. Insbesondere der ICAO Rat ist nun gefordert, neben der Ausgestaltung des CORSIA auch die Entwicklungen der Mechanismen unter Artikel 6 des Paris Abkommens zu berücksichtigen.

Die folgenden Punkte fassen relevante Erkenntnisse der Betrachtung zusammen, um ein robustes und integriertes Gestaltungskonzept für den CORSIA zu gewährleisten:

- ▶ Vermeidung der „unabgestimmten“ Entwicklung des CORSIA und des Artikels 6 in den nächsten Jahren: ICAO-Arbeitsgruppen und UNFCCC-Fachgremien sollten in der Entwicklung der individuellen Mechanismen interagieren.
- ▶ Erkenntnisse aus den Kyoto-Mechanismen (CDM / JI) nutzen: Der große Erfahrungsschatz aus mehr als einer Dekade Praxis mit Kompensationsmechanismen unter der UNFCCC sollte – auch vor dem Hintergrund des engen Zeithorizonts - in jedweder Dimension bei der weiteren Ausgestaltung des CORSIA berücksichtigt werden.

- ▶ Qualität der Zertifikate gewährleisten: Es ist auf starke Vorgaben und Regularien für die Zulässigkeit von Zertifikaten unter CORSIA zu achten, insbesondere im Kontext der Doppelzählung. Vor dem Hintergrund der ausreichenden Verfügbarkeit von Zertifikaten alleine aus dem CDM sollten stringente Einschränkungen bezüglich zulässiger Projekttypen in Betracht gezogen werden; dies kann neben ökologischer Integrität auch Effekte auf ein Mindestniveau des Kohlenstoffpreises haben.
- ▶ Kapazitätsaufbau: Verschiedene Initiativen zum Kapazitätsaufbau können an CORSIA teilnehmende Staaten und Betreiber bei der Vorbereitung auf das System unterstützen.

1 Background

The Paris Agreement marks a milestone in international climate policy. For the first time in history, both developed and developing countries have agreed on a multilateral approach that aims at cutting GHG emissions below 2 °C compared to pre-industrial levels. Less than one year after adoption of the Paris Agreement, the conditions for becoming effective (at least 55 Parties, representing 55 percent of global GHG emissions, ratifying it) were met; by 4 November 2016 the Paris Agreement thus enters into force.

As the Paris Agreement was negotiated under the UNFCCC, it does however not address GHG emissions from the international maritime and aviation sectors, which are treated separately under IMO (maritime) and ICAO (aviation). While the international aviation sector is a relevant emitter of GHG and accounts for 1.3 percent of the global CO₂ emissions, with a predicted annual growth of 5 percent on average, international decision-making on addressing the climate impacts from international aviation has proven to be challenging. After years of negotiations, in 2013 the 38th General Assembly of ICAO tasked Parties with developing a Global Market Based Measure (GMBM) for addressing the sectors GHG emissions, with the overall goal of achieving a carbon neutral growth from 2020 onwards.

Over the past three years a broad consultation process on the design of such a measure resulted in a common ground draft resolution text for consideration at ICAO's 39th Assembly. The 39th Assembly of ICAO in October 2016 adopted its resolution creating the Carbon Offset and Reduction Scheme for International Aviation (CORSIA). It has been through a design process lasting several years and the resolution creates the high-level framework of the scheme. Plus, it gives direction to the technical building blocks that must still be developed and adopted.

Looking towards implementation, while the CORSIA framework is agreed, there is still a great deal of work to be done on technical aspects before it can be implemented, particularly in the monitoring, reporting and verification rules, the setting up of the online emissions registries and in the criteria that determine which offsets can be used for compliance.

Here, in the context of international climate policy and the use of market based measures post-2020, the Paris Agreement specifies relevant approaches under its Article 6. Two options are established, a framework addressing the international trade of GHG emissions (via so called Internationally Transferable Mitigation Outcomes, ITMO) and by this allowing GHG reductions arising from various domestic approaches to be accounted towards national GHG mitigation targets of any country (Article 6.2f on cooperative approaches), as well as a centrally organized mechanism for generating and exchanging mitigation outcomes (Article 6.4). The scientific and technical body under the UNFCCC's Conference of the Parties (SBSTA) is tasked to develop technical details of those mechanisms over the next years.

At this point a link exists between the ICAO process and the Paris Agreement. Elaborating the technical design and governance approach of the CORSIA implies a reflection of and an interlinkage with the process of spelling out the Article 6 mechanisms under the UNFCCC. For instance, eligibility criteria for offsets use under CORSIA are left partly open, though they are to consider the UNFCCC mechanisms and programmes for offsets, both the existing ones and those yet to be developed under Article 6. While the rules applied to the airlines directly have been set, the rules on which offsets can be used are yet to be fixed. They will determine the environmental effectiveness of the scheme as a whole.

In light of this, this report aims at discussing the robust design approach for ensuring environmental integrity of offsets under a Global MBM scheme for international aviation in the light of the Paris Agreement. It commences by providing an overview on the development of ICAO's CORSIA mechanism (chapter 2), by reflecting the general ratio for introducing offsetting as an instrument for aviation (2.1), describing the political challenge of developing the CORSIA (2.2), and elaborating on the CORSIA design, including outstanding technical and policy questions (2.3). Options for offset use are debated for the time before 2020 (chapter 3), and after 2020 (chapter 4). For the so called "early action phase" before 2020 existing offsetting approaches for the aviation sector can provide interesting insights on airline behavior. The role of early action under the CORSIA is summarized in 3.1, while the status of voluntary offset schemes for passengers that are applied by airlines will be regarded in 3.2. In addition, it is discussed whether the CDM and / or other offset programmes could serve as sources for certificates for serving aviation demand; recent studies on credit supply from the CDM and demand from the international aviation sector are evaluated in this context (3.4). For the post-2020 period the assessment reflects the mechanisms under Article 6 of the Paris Agreement (4.1), and discusses how to ensure robust and integrated offsetting between ICAO and UNFCCC (4.2). The study concludes with considerations on ensuring a robust and integrated process of designing the CORSIA.

2 Current developments in design and implementation of an ICAO GMBM

Why Parties under ICAO have agreed to identify a backstop option beyond technical measures, how this option evolved in the multilateral policy arena, and what the adopted design for a market-based measure offers, and which challenges still need to be faced, will be discussed in the following sections of this chapter.

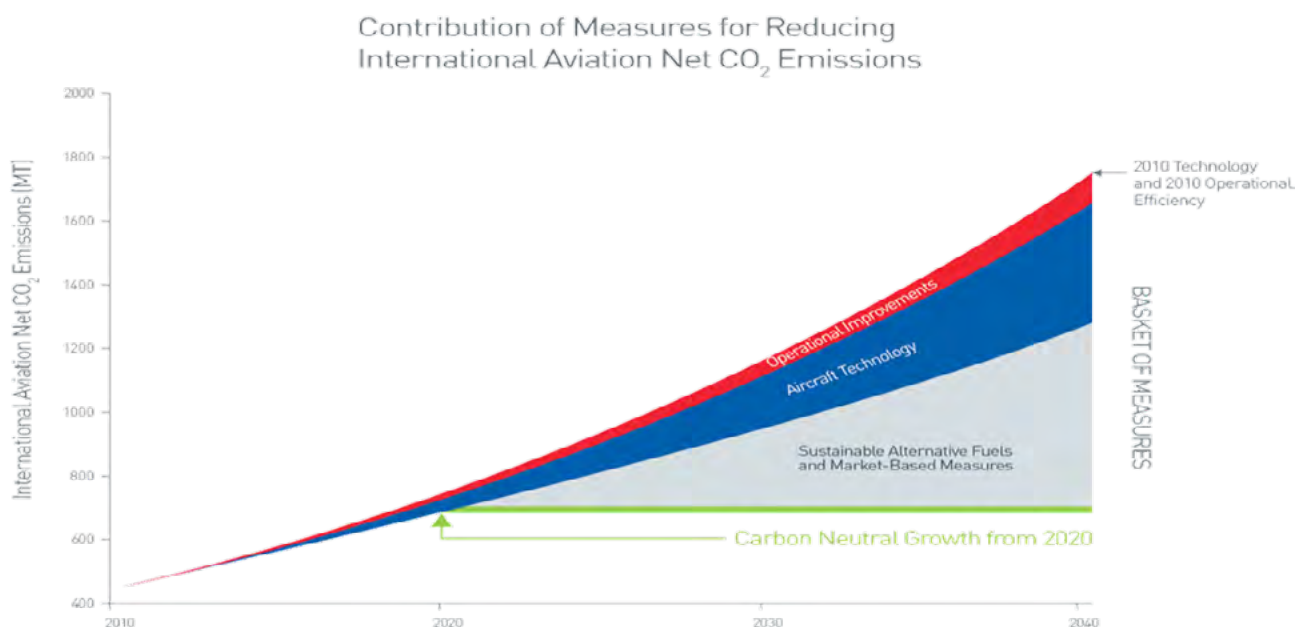
2.1 Why aviation and offsetting – backstop after technology and biofuels

Emissions from civil aviation represent 2 percent of global CO₂ emissions, with international aviation accounting for 1.3 percent, not taking account of other factors which may imply a higher impact, such as the effect of emitting CO₂ at high altitudes (IPCC, 1999). However, emissions from the sector hitherto do not face any specific controls at international level and ICAO predicts 5 percent yearly sector growth.

At its 37th session in 2010, the ICAO Assembly adopted a resolution setting out a three-stage aspirational goal to limit GHG emissions from international civil aviation, which it confirmed at its 38th Assembly in 2013: a 2 percent efficiency improvement year on year; no net growth (carbon-neutral growth) in GHG emissions from 2020; a 50 percent cut in GHG emissions by 2050. It is worth noting that in the event that the 2 percent efficiency improvement target is met, a net growth in GHG emissions in the sector is very likely.

ICAO identified a basket of measures that would reduce its future impact on the climate and achieve its targets. Firstly, to continue to improve efficiency using operational improvements, such as improved air traffic management, use of electricity on the ground and pilot technique. The second set of measures refers to technology improvements. Finally, the third is the increasing use of sustainable fuels instead of fossil-based fuels, such as jet fuel derived from energy crops. However, these three groups of measures are not expected to halt the growth in emissions at the level required to meet ICAO's goals.

Therefore, at its 38th session in 2013, the ICAO Assembly decided to develop a market-based measure that would enable aviation to cut its emissions to the levels required, at least until the other three set of measures have reached sufficient scale and deployment. Figure 1 below illustrates this role of a market-based approach compared to other opportunities to address GHG emissions.



Source: ICAO. (2016)

Figure 1: The role of a market-based measure within the ‘basket of measures’

2.2 The path to designing the CORSIA

Previous work conducted by the ICAO Committee on Aviation Environmental Protection and already considered by the Assembly had identified market-based measures as preferable to fiscal measures, and a global application as preferable to a patchwork or national or regional measures. It was at its 38th Assembly in 2013 that the ICAO member states decided, in resolution A38-18, it would proceed with designing a global market-based measure (GMBM) capable of being implemented from 2020 to help achieve the aspirational goal of carbon-neutral growth. The resolution already at that stage provided for de minimis thresholds based on states’ contribution to the sector’s total greenhouse gas emissions.

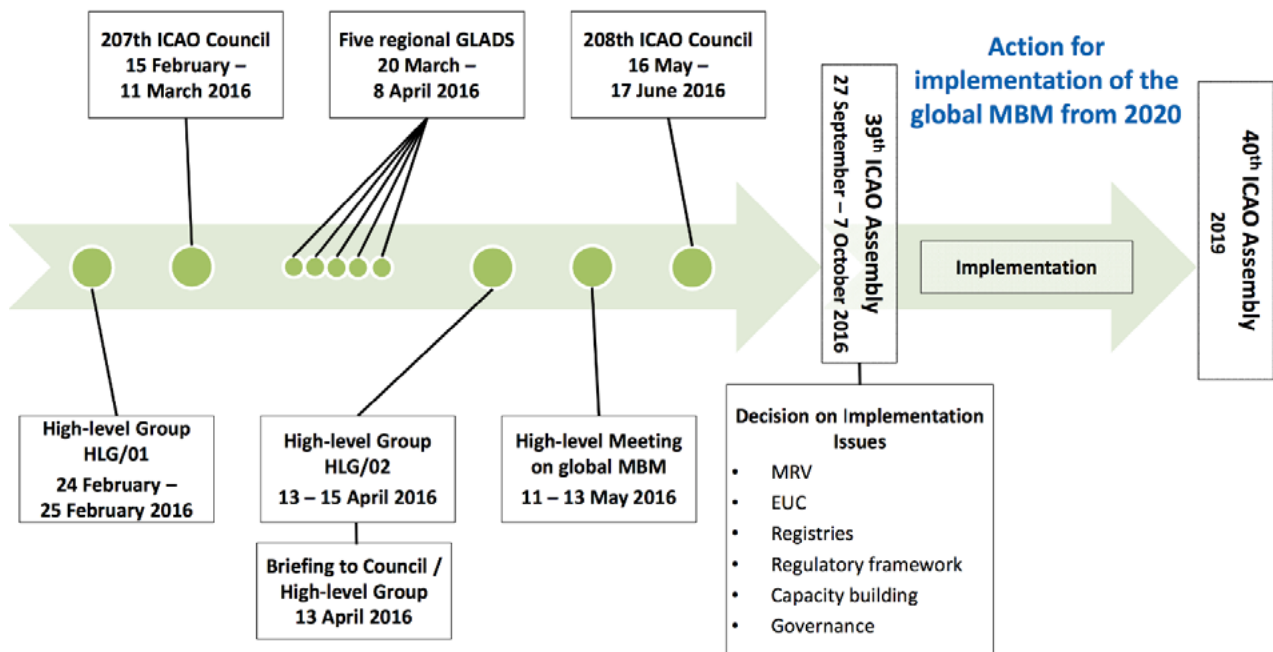
The resolution called on ICAO to work on technical aspects, environmental and economic impacts and modalities of future options for a global market-based measure. It specified that there should be widespread consultation with government officials as well as other organisations. The resolution also required ICAO to identify major issues and problems and address them in its design elements, including a means to take into account “special circumstances and respective capabilities” of states, which corresponds to the principle of common but differentiated responsibilities in the UNFCCC, while also protecting against market distortion. All of this should be prepared and reported to the 39th session of the Assembly in 2016.

ICAO assigned the tasks to two groups. The Environmental Advisory Group (EAG), convening a group of state officials, would consider policy and design options. The CAEP would develop technical aspects and conduct analysis on the impacts of the scheme, including developing monitoring, reporting and verification protocols. Finally, the resolution included in annex a list of principles the new market-based measure would adhere to, including facilitating “appropriate access to all carbon markets”.

The EAG conducted its work from March 2014 to December 2015, during which time it developed an offsetting scheme as a “straw man” proposal. In December 2015, a wider group of Parties was established, known as the High-Level Group on a Global Market-Based Measure, to take the work forward. It was in December 2015 that the President of the ICAO Council issued a draft proposal text for the Assembly and work began on amending the text to gain widespread support from ICAO states.

Meanwhile, the CAEP had established a working group, the Global MBM technical Task Force (GMTF), dedicated to working on technical aspects for the scheme, with two main work streams: Monitoring, reporting and verification (MRV); and emissions unit criteria which will determine what offset credits are eligible for use as compliance instruments under the scheme.

To ensure adequate consultation, ICAO held two rounds of global aviation dialogues (GLADs), in 2015 and 2016 - one session per continent. There were two meetings of a High-Level Group, involving a wider circle of ICAO Parties as well as industry observers, on the MBM in February and April 2016. In May 2016, a High-level meeting on the global MBM convened.



Source: ICAO. (2016)

Figure 2: ICAO decision making process on GMBM 2016-2019

In addition, the ICAO Council at its 209th Session decided that in relation to the governance and process of the Council in the course of the preparation of the CORSIA implementation, to establish an ad hoc Council Group, composed of Representatives of the Council to serve as an advisory body to the Council.

Finally, in August 2016, a Friends of the President Informal Group Meeting on a Global Market-based Measure Scheme for International Aviation was convened, at which key design elements were agreed and its moniker was set as the Carbon Offset and Reduction Scheme for International Aviation. The proposal was passed up for adoption by the 39th Assembly session in October 2016 and it was adopted on 8th October.

2.3 The path to designing the CORSIA

Subsequently, the CORSIA is summarized in its main design elements, while open technical and political aspects and procedural challenges on the further development under ICAO are addressed.

2.3.1 CORSIA design

According to the Assembly Resolution the average level of emissions in 2019 and 2020, represents the baseline for carbon neutral growth from 2020, against which emissions from 2021 are compared. Any increase in CO₂ emissions covered by the scheme compared to the baseline represents the sector's offsetting requirements for that year. It is important to note that there is no redistribution of emissions for imperfect coverage and so the scheme will not ensure a strict definition of carbon-neutral growth for the whole sector; rather just for the emissions of those flights covered by the scheme.

The scheme starts in phases:

- ▶ Pilot phase (2021-2023 inclusive) and first phase (2024-2026 inclusive) apply to States that have volunteered to participate in the scheme;
- ▶ The second phase (from 2027 through 2035) is mandatory for all states with an individual share of international aviation activities in 2018, measured in revenue-tonne-kilometres (RTKs), above 0.5 percent of the total RTKs, or whose cumulative share in the list of states, when ranked from highest to lowest amount of RTKs reaches 90 percent of total RTKs, taking exemptions into account. Least developed countries, small island developing states and landlocked developing countries are exempted from mandatory participation unless they opt in voluntarily.

While the voluntary phases imply lesser coverage, in fact, already by 12th October 2016 66 states representing more than 85 percent of international aviation activity, intend to voluntarily participate in the global MBM scheme from the outset¹. States that volunteer should notify ICAO by June 30 and can then start from the beginning of the following year. Once the state volunteers to join, the provisions of the scheme are mandatory for airline operators on the routes covered by the scheme.

As well as state-based exemptions, there are de minimis thresholds also for small emitters to avoid disproportionate administrative burden. Aircrafts with a maximum take-off mass of 5,700kg or those aircraft operators emitting less than 10,000 t CO₂ per year from international flights are exempted as well as humanitarian, medical or fire-fighting flights CORSIA apply to new aircraft operators only after three years of operation, provided that they are not exempt.

The first two phases are both voluntary for states, however they are distinguished by the way that the offsetting requirement is calculated. During the pilot phase, states can calculate the yearly offset requirement of the aircraft operators according to the following options: a) by comparing each year's emissions with the baseline (average of 2019-2020), b) by comparing the baseline with the emissions in 2020 and applying the same value for each year.

During the first phase until the end of 2029 the calculation is based on the sector growth rate of covered emissions between a given year and the baseline. This rate is then equally applied to the emissions of aircraft operators to calculate the offsetting requirements. For example, if the total emissions covered by CORSIA in 2024 are 5 percent higher than the baseline, the aircraft operators must offset 5 percent of their emissions covered by CORSIA.

From 2030 onwards, the calculation is based on a growth factor that now includes both the individual airline's growth and a sectoral growth rate. Thus, from 2030 to 2032, at least 20 percent of the growth factor will be calculated based on the airline's individual emissions growth, raising this proportion up to at least 70 percent from 2033 (the exact figures will be decided by 2028).

From the start, the growth factor is calculated each year. The coverage of the scheme is route-based. Where both take-off and landing airports are in states covered by the scheme, the route is included and all airlines flying those routes are treated equally. If either or both airports are in exempted states (that have not opted in voluntarily), the route is excluded from the scheme.

Regardless of whether or not they are covered by the offset scheme, all states with aircraft operators undertaking international flights are requested to report on emissions to ICAO.

2.3.2 Outstanding Technical Elements

The ICAO resolution sets the framework for the technical building blocks, but the detailed work must still be done. The CAEP is charged with developing the detailed rules and modalities, with a view to them being ready for adoption by 2018 by the ICAO Council. The three building blocks are monitoring, reporting and verification (MRV) which apply to the airlines, emissions unit criteria which will determine what emission units are eligible for compliance, and the registry system.

1 See URL: <http://www.icao.int/environmental-protection/Pages/market-based-measures.aspx> (FCCC, 2015s Approaches, FVA) (AOSstives can support countries and operators in preparing for emission reductions. quality

The detailed rules will take the form of standards and recommended practices (SARPs) and related guidance. According to the Chicago Convention on International Civil Aviation, the uniform application of standards is considered necessary for the safety or regularity of the industry, whereas recommended practices are “desirable”. States either comply with SARPs or shall submit reports on how they deviate from them. While SARPs are not legally binding, the term “related guidance” has less force still.

The Resolution already states an annual compliance cycle for monitoring, reporting and verification. The deadline for surrendering offsets to meet the requirement is at the end of each phase, i.e. every three years. The offsets are to be procured from outside the international aviation sector, to avoid double-counting, and one emission unit is to represent one metric tonne of CO₂. Offsetting of CO₂ emissions could be through surrendering of emission units (offset credits and allowances) from then deemed eligible crediting mechanisms and emissions trading, schemes.

The SARPs and related guidance on MRV are to be applicable from 1 January 2019 by states, a necessary deadline as that is the start of the baseline period. To be clear, the states must be ready to implement the MRV rules on 1 January 2019, so the SARPs and related guidance should really be adopted by the Council well in advance, and a capacity-building programme is envisaged for states to help them prepare.²

Regarding the eligibility of offset credits from programmes or mechanisms, the resolution notes that the criteria should be developed, specifying that they “[take] into account relevant developments in the UNFCCC and Article 6 of the Paris Agreement”. The resolution also states that units generated from mechanisms established under the UNFCCC and the Paris Agreement are eligible for use in CORSIA, provided that they align with decisions by the Council, including on avoiding double counting and on eligible vintage and timeframe.

The ICAO resolution also requests the Council to promote the use of offset credits from activities in developing countries and also encourages states to develop their own domestic activities in the aviation sector. It also requests the Council help develop aviation-sector activities under the UNFCCC, as long as double-counting is avoided.

Once the SARPs and guidance are adopted for the emissions unit criteria, the Council is to establish a standing technical advisory body on the emissions unit criteria to make recommendations to the Council for decision, which should periodically be reviewed to promote compatibility with the future decisions of the Paris Agreement. While the link to the Paris Agreement is again established here, it is worth noting that eligibility will not necessarily be restricted to UNFCCC mechanisms and programmes; it is possible at this stage that offsets and allowances from other schemes, such as the voluntary sector, become eligible. It is clear that ICAO does not envisage creating a new offsetting standard itself.

The ICAO Council is also to develop, with the technical contribution of CAEP, policies and related guidance material to support the establishment of registries under the scheme for adoption by 2018, i.e. they should already be adopted by the Council during 2017. States will then set up their own registries, either individually or in groups, or join other registries. Many states have no more than one or a few airlines registered to them that will fall into the scheme, so it is practical for registries to group them together. The Council must also establish an overarching central registry under the auspices of ICAO, which is to be operationalised by the beginning of 2021.

2.3.3 Outstanding Policy Questions on CORSIA

While the policy framework is already in place and a direction and timetable for the detailed technical aspects are set out, there are key questions of policy that are still left open.

The primary question is securing the environmental integrity of the emission units used in the GMBM through the emissions unit criteria. Offsetting has been used already in the UNFCCC-based realm as well as through regional, national and sub-national emissions trading schemes. The CORSIA policy framework has set the level of ambition and the scope of the scheme in terms of the proportion of emissions from international aviation that it covers.

² For instance, the World Bank is introducing a Partnership on capacity building for the aviation sector, with particular focus on registries (World Bank 2016).

However, the whole scheme's environmental effectiveness rests on the quality of the mechanisms and programmes used for offsetting. This is particularly true given the legal character of the emissions unit criteria, i.e. whether they are standards, recommended practices or guidance and whether they apply effectively the principles on which the emissions unit criteria are based.

In its preparatory work leading up to the adoption of the CORSIA, the Committee on Aviation Environmental Protection's working group focussing on the technical aspects of the scheme identified two lists of criteria for emissions unit eligibility, one for programmes and the other for the credits themselves.

Table 1: Emissions Unit Criteria for programmes

Clear, publicly disclosed methodologies and protocols	Governance
Considerations of the scope of activities	Transparency and public participation provisions
Credit issuance and retirement procedures	Safeguarding systems to address environmental and social risks
Identification and tracking of units	Sustainable development criteria
Legal nature and transfer of units	Avoidance of double counting, issuance and claiming
Validation and verification procedures	

Table 2: Emissions Unit Criteria for offset credits

Additional to business-as-usual	Represent permanent emissions reductions
Based on realistic and credible baseline	Mitigate against potential increase in emissions elsewhere
Quantified, monitored, reported and verified	Only counted once
Have clear & transparent chain of custody	Do no net harm

The fact that there are two separate lists raises the possibility for entire programmes to be approved, for example the Clean Development Mechanism, but it also leaves open the possibility of applying eligibility criteria to project types within those programs, so that for example while the Clean Development Mechanism is approved, not all project types thereunder are necessarily eligible.

While these are high-level principles, they correspond quite closely to the principles on which existing offsetting standards in the voluntary sector and UN-based mechanisms are based. They provide useful guidance, though it is in their application in detail that the environmental integrity of the CORSIA will be secured.

When it comes to the MRV framework and registry modalities and protocols, the challenge is to meet the deadlines in setting up what will be a complex system. The MRV processes and registry system under the UN took many years to develop. The ICAO Council has the advantage of being able to apply lessons learned. For the MRV a useful reference point will be the existing emissions trading schemes that cover aviation, the largest being the EU ETS. Nevertheless, it must now do so while taking account of developments under Article 6 of the Paris Agreement (along with other related provisions, particularly Article 4 on 'mitigation') and must meet its own timetable without prejudicing the outcomes of the UNFCCC developments. It requires a robust system that is also flexible enough to reflect those developments and ensure the two systems are compatible, in terms of policy decisions and also technical aspects, in order to ensure aviation has access to a wide market of offsets and to ensure against the risk of double counting.

Indeed, in terms of registry software it may be a case of selecting from existing programs. However, amongst other issues, there must be a level of institutional and practical preparedness among the ICAO states in the scheme; training of the different stakeholders from national regulators through airlines to third-party verifiers and relevant bodies to accredit those verifiers; implementing IT systems in the form of registries that are able to interact so that international transfers of credits can be monitored to avoid double counting and demonstrate a chain of ownership.

The ICAO resolution gives significant weight to encouraging states to work together to accelerate the process, but the fact remains that the tasks are considerable and the timeline - by 2018 for the registry, by 2019 for emissions unit criteria and MRV to be adopted and for states to implement them - is extremely challenging by any measure.

3 Offset options for aviation 2016-2020 (“Early Action”)

The issue of whether airlines can start procurement of emission units before they enter the CORSIA scheme, and whether the CDM and voluntary market carbon offset standards qualify in this regard is discussed in this chapter. In addition, recent studies on supply and demand in relation to offsetting use in the international aviation sector are reflected.

3.1 Early Action under the CORSIA

The term “early action” or “early mover” came up during the preparation of the CORSIA with two different meanings. In the first place, some countries were pushing for recognition for those airlines that have invested in high efficiency fleets. As their aircraft are more efficient than average, they contribute less to global emissions relatively; but the offset requirement they face will be based on a sectoral calculation and the same applying to a less efficient airline, the argument being that they will be penalised for their efficient fleets.

The second context would be a decision by an airline to start procuring emission units between now and when they join the scheme, whether at the start of the pilot phase in 2021 or later. In February 2016, the CAEP’s EUC working group recommended to the CAEP in their report (CAEP, 2016.) that airlines should be encouraged to purchase emissions units before 2020, with the goal of already offsetting emissions, and in order to send a market certainty for the future availability of eligible emissions units. The EUC working group also recommended that, until the technical advisory body is operational, CAEP constitutes a group which will propose a list of programs/project types under the umbrella of the GMTF, for the purpose of forming an early decision on programs/project types eligibility. At its 10th meeting (February 2016) CAEP agreed to constitute an Interim Programme Assessment Group (IPAG) to undertake assessment of programs/potentially project types in this regard. Emissions units from those programs/project types on the list would be eligible for compliance for when the scheme starts, though time bound. For example, an airline could start purchasing emission units immediately the list is published, and use them for compliance up to the end of the first phase (2023). As well as giving the advantages set out by the EUC working group, some airlines may find it useful to test their procurement programmes ahead of the first compliance phase and also mitigate future price risk by purchasing emission units over time.

These commercial advantages are not mentioned in the working group’s reports and, therefore, may be rejected by airlines. Nevertheless, it is possible that CAEP will continue to work towards publishing a list of eligible programmes early, in order to open the way for early action by airlines. Even if the eligibility of those emission units on the list is time-bound, it is clear they will have a significant impact on decisions on the permanent emissions unit criteria for after 2020. Because of the timing, they are likely to pre-empt progress on the part of the UNFCCC and the Paris Agreement’s Article 6 mechanisms.

The imminent work on early action are likely to draw from existing mechanisms and programs, including those under the UNFCCC, which suggests for the time being, the Clean Development Mechanism. As it is not limited to the UNFCCC, it could also potentially include voluntary market standards for carbon reduction projects. The use of CDM and voluntary market carbon offset standards by airlines in their (existing) voluntary offset schemes is discussed below.

3.2 Status of voluntary offsets schemes for passengers, as operated by Airlines

Airlines have been offering voluntary offset schemes to passengers for many years. Although there are no rules on how these are arranged, the convention is for the passenger to be informed of the opportunity to use an online calculator to determine how much CO₂ is associated with their airline ticket, then to pay for an offset from a project to reduce or avoid CO₂ emissions. These offsets are typically sourced from offset retailers and in many cases the passenger can choose the project they would like to support, such as wind energy in USA or avoided deforestation in Kenya. The offset is retired on behalf of the passenger.

Currently approximately 45 international airlines offer voluntary offsetting (Arvanitakis, 2015). As airlines choose to run these schemes on a voluntary basis, there is no set of rules to which they must adhere. While there are common characteristics, the variation in the passenger experience, and in the information made available to the public, is striking.

Taking the example of the passenger experience, typically the voluntary offset schemes are offered online. The opportunity to offset is presented in some cases as an add-on to the ticket price as part of the booking process; in other cases, it is offered after entering credit card details or after confirmation of purchase of the ticket. Several schemes are offered on the airline's corporate website as opposed to the ticket sales site. There is also great variation in the CO₂ calculation, with airlines using their own calculator or outsourcing calculation to one of various online CO₂ calculators available. The calculation itself can be based on historical average data or estimates of CO₂ emissions from the airline's entire network, or the particular flight. In the case of the latter, the calculation can relate to the passenger and luggage only, or to include freight on the flight. Some calculators differentiate between first and business class tickets and economy class tickets. Furthermore, the calculators use different values and assumptions, to include the predicted effect of emitting at altitude for example; or assumptions on distance between the city-pair (great circle distance) or actual distances recorded by the airline on that route. The result is that two passengers on the same route would get different values for the quantity of CO₂ to be offset, according to the calculator used by the airline. Once a quantity of CO₂ is established, the passenger may have access to information on a choice of projects from which to offset. The price they pay may vary according to the project. In many cases the passenger can opt to determine how much they want to pay; for example, they may find their CO₂ emissions for a particular flight is 1 t CO₂, but they can choose to offset only half of that amount. In many cases, it is possible to "pay" for the offset using airmiles. In some cases, no specific calculation is made; instead the airline offers a flat fee or any amount defined by the passenger as a "contribution" to compensate for the climate impact of flying. When it comes to choice of project type; some airlines assign the fee to offset to a single emissions reduction project or to a small portfolio of projects evenly. Other airlines allow the passenger to select a project from several on offer. The passenger may see the projects' profiles on the airline's offsetting page, or on the offset retailer's website.

While these aspects mentioned so far are not subject to any rules or standards, hence the great variation, the voluntary offset schemes have tended towards projects that are regulated by recognised offset schemes. Of 36 schemes considered in an assessment by Arvanitakis (2015), a third give no information before the offset purchase of the standard under which the projects are registered. Of the remaining 24 schemes, the majority of projects are registered under the Clean Development Mechanism (43 percent) or one of the recognised voluntary standards, such as the Verified Carbon Standard (27 percent) and Gold Standard (12 percent), though there is some overlap as some airlines offer projects from more than one standard, plus the Gold Standard offers a quality certificate attached to CDM projects as well as its own project standard.

A survey of the project types on offer reveals a preference for forestry-related projects as the largest grouping (33 percent), followed by wind power (17 percent) and solar PV (14 percent). Reporting by airlines varies drastically and in most cases is uninformative, with the result that comparison from one airline to another on the rate of offset uptake by passengers is impossible. Most airlines report on the existence of their voluntary offset scheme through their environmental and social governance (ESG) or corporate social responsibility (CSR) reports, though only a few provide a figure for uptake. The uptake is sometimes expressed in absolute numbers, either of volume of CO₂ or number of passengers that opted to offset, or in percentage terms. In the case of the latter it can be as a proportion of ticket sales or as a proportion of CO₂, which may be the CO₂ associated with flights only, or scope 1 emissions (direct company emissions including ground operations) or scope 2 emissions (including indirect emissions, e.g. associated with electricity consumption in ground operations).

Despite these disparities, the uptake tends to be low by any standard. The average across the schemes is below 1 percent of passengers (and a smaller figure for airline's scope 1 emissions, as far as can be determined). The one exception is where the airline adds an offset fee to the cost of the ticket automatically, so the passenger must actively de-select that option if they choose not to offset. In that case, a flat fee is requested and no specific volume figure is given. The fee is matched by the airline, and invested in several projects with environmental and social benefits. Uptake in that particular case is around 30 percent of passenger tickets.

The move towards an ICAO regulated scheme, even in the voluntary stages, provides for a global standard for monitoring and reporting on CO₂ emissions based on fuel-burn measurement, as opposed to the mix of standards and calculations used now. Specifically, the GMBM introduces a transparent methodology and its application is verified by third parties, so for the first time the measurement of CO₂ emissions from flying routes included in the GMBM will be known and will be comparable from one airline to the next. The GMBM also provides for a set of rules on the minimum to be offset as well as the project standards / types that are eligible.

In summary, compared to the current status of voluntary offsetting schemes run by airlines with no standardisation or regulation, the GMBM introduces a high level of transparency on the side of CO₂ monitoring and reporting.

3.3 Potential use of the CDM and other Offset Programmes

The Resolution includes a specific reference to the UNFCCC process in the context of the future work on the emissions unit criteria. The most important aspect of that work is the Paris Agreement's Article 6, which allows for Internationally Transferred Mitigation Outcomes (ITMOs). It is possible therefore that the mechanisms defined under Article 6 may be considered eligible under CORSIA, once the UNFCCC completes work on those mechanisms. However, currently the only mechanism that generates internationally recognized emissions units is the CDM.

The CDM was created as a flexibility mechanism under the Kyoto Protocol, which is unlikely to be renewed and is in effect supplanted by the Paris Agreement. As a result, there is a question mark over the long-term survival of the CDM. At the UN climate summit in Paris in 2015, the Parties gave a mandate to the CDM executive board to consider linkages between the existing market mechanism and the future market mechanisms envisaged under Article 6. This means that it is possible in the coming years that a decision will be taken to revise the CDM and adopt it into the new regime post-2020.

Under the CDM, emission reduction and development projects in developing countries earn a saleable credit for each ton of greenhouse gas they reduce or avoid. The mechanism has registered more than 7,900 projects and programmes in 107 countries. (UNEP DTU URL, 2016) However, a lack of demand for the credits that the CDM produces has left a surplus of the emissions units, known as Certified Emission Reductions (CERs). Moreover, live CDM projects that are registered under the CDM are still earning more CERs. These CERs could be deemed eligible for use under ICAO's new scheme.

The ICAO scheme may go on to allow for CERs, a decision which entails also deciding on whether there should be a start and/or vintage date, for example CERs from projects registered before a particular date, or CERs created before a particular date, are not eligible under CORSIA. The start date could correspond to the ICAO Assembly 38 in 2013, when the decision to develop a market-based measure for aviation was taken. Or it could be Assembly 39 in 2016, when CORSIA was adopted, which would restrict supply further. Another possible date is 2020, when the scheme is due to start, which would be more restrictive still and allow only future CERs. Whenever the date is, such a decision by the ICAO Council may spur investment in new CDM projects and prompt existing ones to renew their crediting periods, potentially increasing supply further.

As well as potentially setting a start date, IPAG or the Technical Advisory Body (TAB, once formed) may recommend certain project / activity types for exclusion from the use in the CORSIA. However, the EUC working group recommends that IPAG or TAB assess the eligibility at programme or project /activity type level, as developing the expertise to rule at project level would require too much resource. These rules will become clear as the CORSIA's technical building blocks are agreed. In the meantime, there is the prospect of early action. CERs are currently available and airlines will take early action in the form of offsetting their emissions voluntarily, already ahead of the start of the scheme, may elect to procure CERs during the next five years.

In essence the CDM offers the credit supply, existing and working technical systems, an elaborated MRV system, unrestricted access and flexibility. It can be used for non-compliance purposes (NDC, MRV of climate finance, green bonds etc), and if pre-2020 early action is allowed in ICAO, the CDM can offer a prompt and sufficient volume of CERs for post-2020 obligations of airline companies under CORSIA. CORSIA's pre-2020 early action through voluntary cancellations of CERs can also contribute to “Enhanced action prior to 2020” that is encouraged by the Paris Agreement” (para. 106 of 1/CP.21).

3.4 Review of studies on Supply and Demand.

Though emission units from eligible crediting mechanisms and emission trading schemes could be used for offsetting, in this section supply and demand refers to offset credits only. The results of several existing studies projecting supply of offset credits and demand for such offsets from international aviation are reviewed. Projections by nature are based on various assumptions that may or may not bear out in future. Therefore, they are intended to give range of results that are reasonably likely, not precise forecasts with a high degree of confidence.

The availability of supply of suitable offsets in this interim period, before (and if) the Article 6 mechanisms begin delivering, is critical to the ability of airlines to comply with the CORSIA scheme. Demand from airlines is anticipated to increase, from the pilot phase in 2021 and possibly sooner through “early action”. Unless available supply runs apace with that demand, airlines may face punitive costs, or the CORSIA must be amended as a result of higher costs or through the periodic reviews of the scheme.

As mentioned in this section, demand from aviation is expected to spur new and existing offset projects to generate carbon credits. For example, the current market price for CERs do not incentivise existing CDM projects to request for CER issuance, nor to renew their crediting periods when the current one expires. Anticipated demand from aviation may be sufficient to overcome these obstacles. In short, the implementation of the CORSIA may result in increased supply from existing programs.

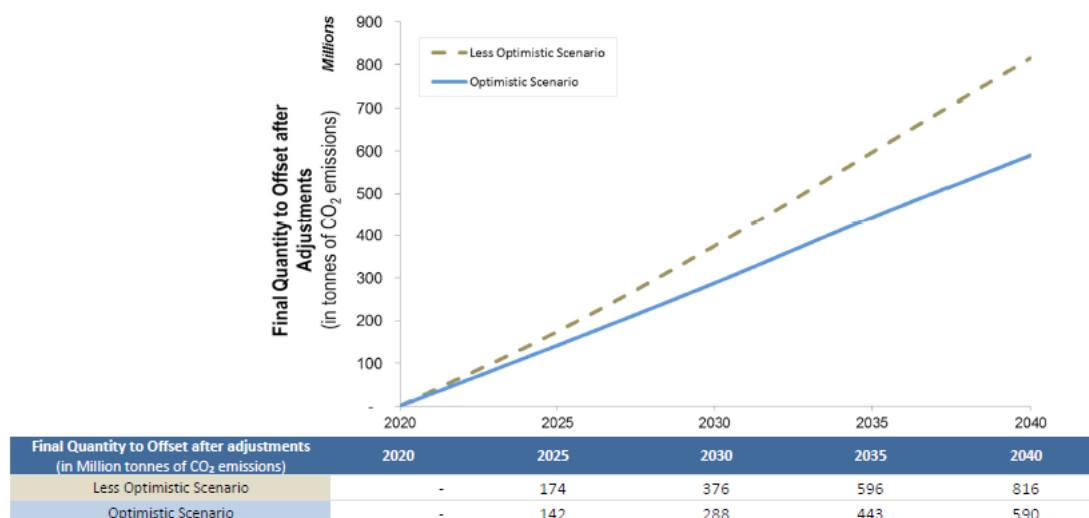
The Article 6 mechanisms are intended to bring about significant supply of tradable emissions credits (among other goals), however there will be a lead-time before supply reaches significant levels, with rules and modalities to be decided; investments in the activities themselves and the reductions to be made. Therefore, early action implies procurement of credits from existing supply in the meantime. That said, in the long term, supply of tradable credits should increase under the UNFCCC system through the Article 6 mechanisms and other developments, such as the REDD+ programme for deforestation activities. If they are deemed eligible for the ICAO scheme, the total supply will increase at scale.

In the meantime, the ICAO decision on CORSIA provides for a review of the scheme every three years starting in 2022, including to examine the impact of the scheme on the aviation market, and on airlines’ costs, as well as other aspects. Given that new supply of credits under the Article 6 mechanisms are not expected to emerge before that first review date, it is reasonable to expect procurement of credits by airlines to be channelled to existing supply.

As the CORSIA scheme was being developed, the CAEP considered this issue and produced an analysis of expected or forecast supply of offset credits, and demand for those credits from the aviation sector, intended to contribute to the understanding of the fundamental question: Will there be enough supply to meet demand from airlines?

3.4.1 CAEP demand forecast

CAEP presented a demand forecast in January 2016 that draws directly on the “impacts and trends” report (Fleming, 2013) from the 38th ICAO Assembly in 2013, which in turn is based on 2010 fuel burn data. The demand assumes 100 percent participation of international aviation in the scheme, as it was completed before the adoption of the CORSIA. The results suggest total growth in emissions from 2020 that would need to be offset, after adjusting for technical, operational, and infrastructure efficiencies and set out “optimistic” and “less optimistic” scenarios. Figure 3 shows such a projection of demand after various adjustments from 2020 to 2040.



Source: CAEP (2016). Report on supply, demand and price of emissions units.

Figure 3: Offset demand forecast, CAEP analysis

3.4.2 CAEP analysis of projected supply

The CAEP used in its calculation supply forecasts from external organizations, and puts supply of CERs at 150 M t CO₂e annually by 2020, based on World Bank estimates (World-Bank, 2014).

In the case of credits generated from Reducing Emissions from Deforestation and forest Degradation (REDD+), the CAEP report cites a study (Linacre, R., Ross, & Durschinger, 2015) by US Agency for International Development (USAID) and Forest Carbon, Markets and Communities (FCMC). The USAID report's time horizon is 2015-2025, for which it estimates supply empirically by calculating the volume of REDD+ credits due to be generated by projects already registered with the Verified Carbon Standard (VCS) REDD+ projects, plus the potential supply from additional REDD+ projects and jurisdictional REDD+ programmes currently under development. Table 3 displays the supply of credits from existing programmes to 2020.

Table 3: CAEP analysis: Supply of credits from existing programmes to 2020

	Demand for 2014-2020 (M t CO ₂ e)	Full potential for issuance for 2014-2020 (M t CO ₂ e)	Assumed net available supply to 2020
CERs and ERUs	EU ETS: 400-500	3,500-5,400	2,380-4,170
	National procurement: < 700		
	NZETS: 20-30		
	Total < 1,120-1,230		
REDD+ (without backdating)	Not applicable	Annually 2015-2020: 71 Total: 426	426

However, it is possible that in the end only jurisdictional REDD+ projects and programmes are deemed eligible for CORSIA, which would imply a different supply projection for REDD+ credits after 2020. To provide a conservative alternative to the estimate used by CAEP, the World Bank's Forest Carbon Partnership Facility (FCPF), presented at the ICAO in October 2016, suggests that the total emissions reductions available to market over a 6-year period would reach 335 M t CO₂³ (average 55.83 M t CO₂ per annum). As the World Bank has yet to sign emissions reduction purchase agreements with any of the projects in its portfolio, it is fair to assume the average volume of 55.83 M t CO₂/year is applicable after 2021.

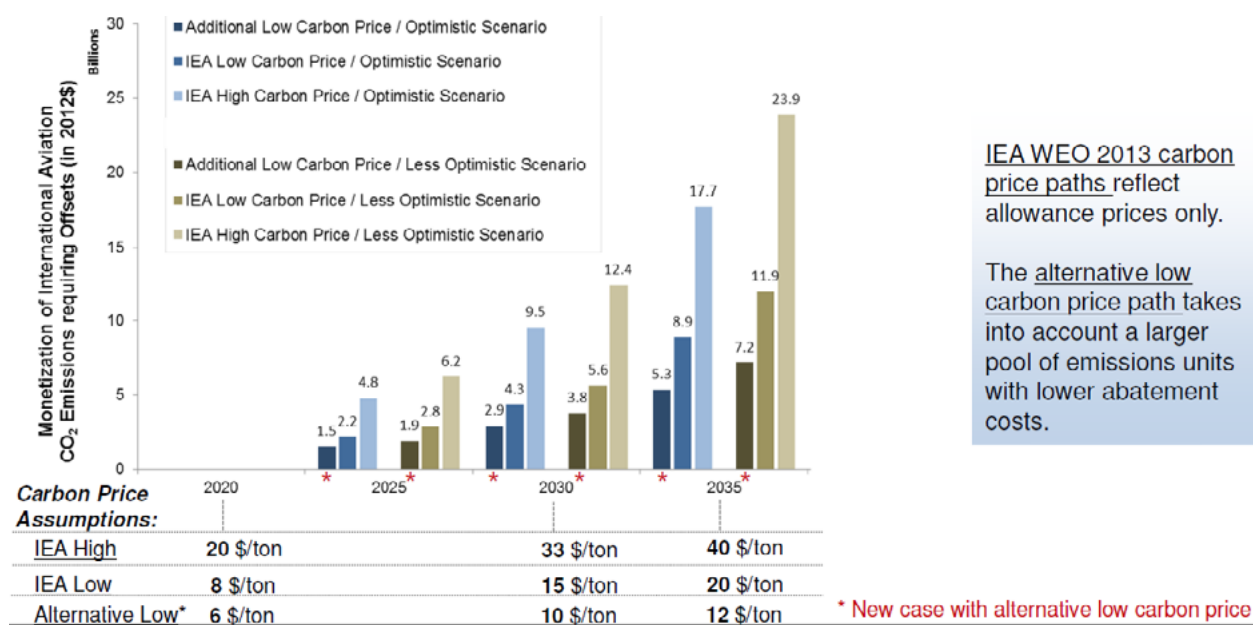
Taking the average outcome of 335 M t CO₂, almost half would be set aside (not sold into the market) for uncertainty and reversal buffers; a means of responding to the issues that the emissions reductions calculations contain an element of uncertainty and the permanence of the REDD+ projects cannot be guaranteed. This would mean that just 30 M t CO₂ would be available per year from 2021. This figure should be read with caution; it is derived from a series of assumptions applied to an average outcome of a range of modelling runs.

3.4.3 Cost to airlines

The comparison that CAEP conducts clearly demonstrates that it expects supply to amply meet demand. The value of carbon at this stage is hard to forecast, not least since there are different price drivers in the various markets and the long-term cost of credits generated under Article 6 is highly uncertain. The current market for CERs reflects the demand and supply balance, with the current oversupply of CERs leading to a price collapse. The current value is little higher than transaction cost, with spot market close price on 1 September 2016 at €0.41 (\$0.46). The close price has been consistently below €1.00 since November 2012 and without a substantial shift in the supply-demand balance, the market price is forecast to gradually drop to close to zero in the medium term⁴.

CAEP also considers the cost to aviation, based on the assumption that aviation will be a price-taker, i.e. that it will pay the market price for credits and that price will be dependent on factors beyond CORSIA, such as the prevailing price in the EU emissions trading scheme. CAEP does not offer a cost projection, but uses the IEA price scenarios cited in the figure below, to which it adds its own "alternative low" scenario.

The cost analysis presented by CAEP takes as its pricing point two price pathways set out by the International Energy Agency (IEA) (IEA, 2013, p. 51). The price paths are based on carbon allowance prices, being the carbon credits traded within emissions trading schemes such as in the EU, which tend to be higher than offset markets. To this, CAEP added an "alternative low" scenario; its cost estimates are summarised below.



Source: EAG15, Jan 2016: Results of Technical Analyses by CAEP

Figure 4: International Energy Agency (IEA) price scenarios

3 This figure is an average of the results of 1,000 simulations in a Monte Carlo modelling exercise of the facility's projects, with the lowest outcome being 160 M t CO₂ and the highest 642 M t CO₂.

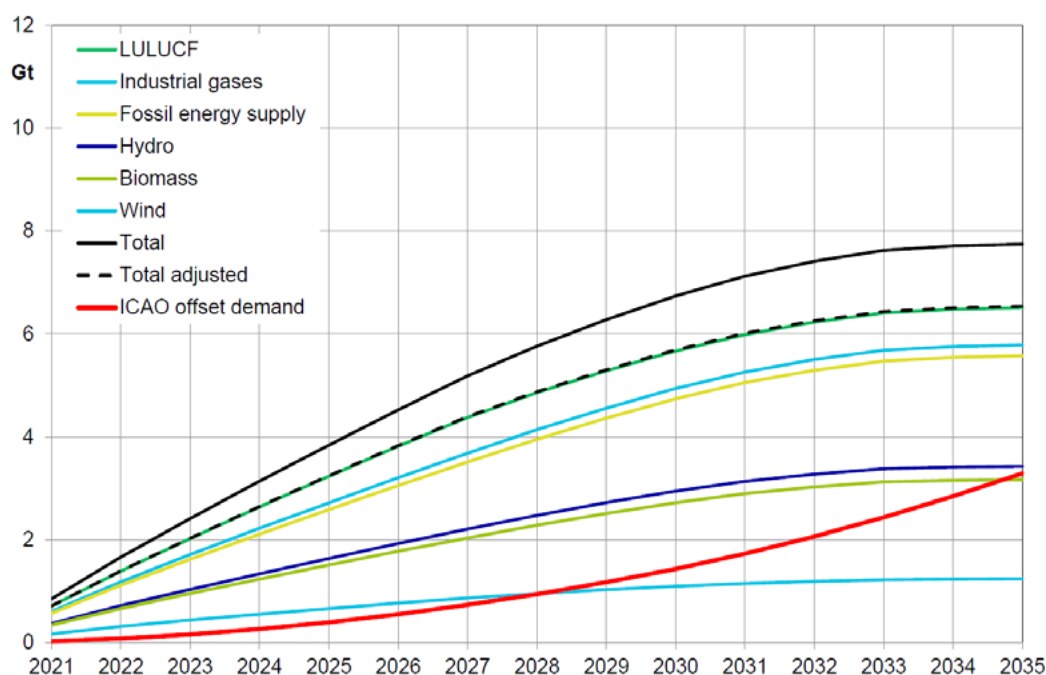
4 Thomson Reuters CER price forecast is for CERs to gradually return to zero in the absence of a shift in the market fundamentals. www.thomsonreuters.com

3.4.4 Alternative analyses

In October 2015, the Oeko Institut published an analysis of the market balance for offsets that the aviation sector could use in theory for compliance with CORSIA (Cames, 2015).

This analysis uses the existing CDM project pipeline data provided and regularly updated by UNEP DTU and IGES. Both data sets use the data from the project documents themselves and add assumptions and calculations. The Oeko report merges the two into a single supply forecast, then discounted to reflect actual performance of CDM projects. Actual issuance of CERs is about 15 percent below that estimated in the project documents. Other assumptions are made on a project-type basis.

For its demand forecast, the Oeko report draws on an earlier report (Lee & Lim, 2013) by the Centre for Aviation, Transport and the Environment (CATE) from 2013, which in turn uses a range of previous forecasts for international emissions from aviation. As the analysis pre-dates the final version of the CORSIA, it does not reflect the exact rules of the scheme; for example, the demand figure does not reflect exclusion of various routes. The result of the Oeko Institut analysis is presented below.



Source: Cames, 2015

Figure 5: Oeko Institut - Accumulated offset demand and supply, 2021-2035

Assuming that only CERs generated after the start of CORSIA are eligible, the Oeko Institut finds that the CDM supply would be ample to accommodate the demand from aviation. Wind power projects alone would be sufficient to 2028 and the total supply would double aviation demand by 2035. In a scenario where CERs are eligible from 2016 onwards, the supply increase to almost four times more than demand.

Taking one last example, Thomson Reuters Point Carbon published a report (Melum, Kolos, & Arvanitakis, 2016) using its own forecast for CDM supply, with a set of restrictive assumptions including that no new projects enter the pipeline and a proportion of existing projects die off. It produces the most conservative of the supply estimates considered here. Like with the CAEP analysis, it assumes that other sources of demand for CERs are satisfied first, then matches the remaining supply to aviation demand. For demand, it assumes that 80 percent of international aviation emissions are subject to the offset requirement, reflecting the phased start of CORSIA. It found that “there is sufficient CER supply from existing projects. Even with a conservative supply forecast (...) existing projects will likely deliver more than enough credits to meet ICAO demand. The annual emissions growth in the aviation sector would have to reach an unlikely 7 percent in order to soak up all CERs in our base case supply estimate”.

It goes on to conclude that eligibility of CERs under the CORSIA's future Emissions Unit Criteria, both at project type and vintage (e.g. CERs generated after 2016 only), is an important determinant of the level of supply that is forecast.

In summary, this comparison of studies on supply and demand from the CDM found no analyses suggesting that demand from aviation would overtake supply of CERs and cause concern for ability of the market created by CORSIA to function, nor for the additional cost for airlines. It should be noted that none of these estimates consider new supply from, for example, the voluntary offset market, nor from new programmes and mechanisms under the UNFCCC.

4 Offset options for aviation after 2020: Integrating the Paris Agreement mechanisms with ICAO

The Paris Agreement entails provisions for the use of market based measures for the period after 2020, which are detailed under Article 6. In reflection of ICAO's decision for establishing the CORSIA, the subsequent paragraphs introduce the approaches under Article 6, and discuss the way forward for an integrated offsetting approach between UNFCCC and ICAO.

4.1 Article 6. of the Paris Agreement

Overview

The negotiations on a successor treaty for the Kyoto Protocol for the post-2020 era involved a comprehensive debate on the “if and how” of using market based instruments under the UNFCCC. Hereby the discussion focussed on a centrally governed market mechanism (the New Market Mechanism, NMM) and a bottom-up framework of various domestic approaches (Framework for various Approaches, FVA). In late 2015, Parties under the UNFCCC agreed on a multilateral approach for addressing anthropogenic climate change, by adopting the Paris Agreement (UNFCCC, 2015x). The Paris Agreement requires specific GHG emission reductions from all Parties, developed as well as developing countries. These emission reductions are referred to as nationally determined contributions (NDCs). In order to be able to comply with the targets specified in the individual NDCs, the Paris Agreement inter alia allows the use of market based measures, for which provisions are detailed under Article 6. Here, both of the options debated under the UNFCCC over the past years regarding a centrally governed mechanism and a bottom-up framework are considered.

Article 6.2 specifies the bottom-up scenario, by providing a multilateral framework for allowing Parties an exchange of domestic GHG emission reductions (so called internationally transferred mitigation outcomes, ITMOs), and for accounting such emission reductions towards their domestic mitigation targets (NDCs). The nature of instruments to be applied under Article 6.2 is not further specified. In general, a multitude of options is possible here, for instance Cap & Trade based Emissions Trading Schemes, Regional ETS, the Joint Crediting Mechanism, REDD+ or tradable energy efficiency certificates (e.g. Indian PAT scheme).

Article 6.2 specifies that the “cooperative approaches” shall promote sustainable development and ensure environmental integrity and transparency, including governance. They shall apply a robust accounting to ensure the avoidance of double counting of emission reductions, be voluntary and must be authorized by participating Parties. Further guidance (Dransfeld, et al., 2016) on how cooperative approaches are to be specified is to be elaborated by the Parties over the next years, and to be adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (COP).

Article 6.4 on the other hand establishes a centrally governed mechanism under the UNFCCC with the aim to contribute to the mitigation of GHG emissions and support sustainable development (hence, by many observers also referred to as the “Sustainable Development Mechanism, SDM”). Activities under the Article 6.4 mechanism are open to public and private sector stakeholders; they shall result in quantified GHG emission reductions, which can eventually be used by Parties to meet their NDC targets. An important feature is the aim to deliver an overall mitigation in global emissions, i.e. a “net mitigation effect”. This underscores the relevance of robust accounting provisions that avoid double counting and ensure additionality. Participation is of voluntary nature, while the mechanism and any activities shall be centrally supervised by a body designated by the UN.

The fact that the COP Decision (Art 37, d) (UNFCCC, 2015) recommends the additionality of measures under Article 6.4 indicates that the mechanism will be of baseline-and-credit nature. Further rules, modalities and procedures for the Article 6.4 mechanism are to be elaborated by technical UNFCCC bodies over the next years.

State of negotiations

After COP 21 in Paris agreed on including provisions for market based measures into a post-2020 climate regime, Parties are now tasked with spelling out the articles. Pressing issues will inter alia comprise the following aspects:

- ▶ The definition of tradable units in the context of transferred mitigation outcomes (ITMOs) is of particular relevance;
- ▶ The development of accounting rules for the cooperative approaches under 6.2 must reflect the evolving rules, modalities and procedures of Article 6.4 for ensuring consistency across mechanisms and instruments. This is relevant for ensuring environmental integrity of the Article 6 mechanisms;
- ▶ The design and nature of individual NDCs must be reflected when further designing the Article 6 framework;
- ▶ The aspects of how to derive net mitigation effects;
- ▶ The reflection of provisions for transparency (Article 13) in order to derive an overarching consistency regarding the accounting of mitigation contributions.
- ▶ Institutional framework for both Article's 6.2 and 6.4;
- ▶ The support of mitigation action under Article 6 measures must be clearly defined regarding their role in the context of international climate finance. In case an actor from country B (or country B itself) acquires certificates under Article 6.4, or finances mitigation activities under Article 6.2, it must be clarified, whether this would also count as climate finance according to Article 9 of the Paris Agreement (also relevant with respect to cancellation of certificates with no accounting of climate finance and mitigation effects towards NDCs);
- ▶ The financing of the Article 6.4 administration through a so called "share of proceeds".

At the first UNFCCC meeting after Paris, taking place in Bonn in May 2016, Parties started exchanging views on both the guidance for cooperative approaches (UNFCCC 2016 a, b) as well as the rules, modalities and procedures for the mechanism established in 6.4. (UNFCCC 2016 c, d). The technical advisory body SBSTA invited both Parties and observers to submit their views on key issues related to Article 6 (UNFCCC, 2016a, c). By 12 October 2016 12 submissions on Article 6.2 and 13 submissions on Article 6.4 were provided by Parties⁵. The focus of those submissions is on the process for developing Article 6. 2 guidance, the process of developing Article 6.4 modalities & procedures, linking to experiences made under the Kyoto mechanisms CDM & JI, as well as accounting aspects, in particular avoidance of double counting.

The UNFCCC COP22 held in Marrakech in November 2016 debated the process of elaborating Article 6; it invited more specific submissions of Parties on the further elaboration, and suggested to hold a dedicated dialogue through a roundtable in 2017. An important challenge regarding the evolution of the Article 6 mechanisms will be the integration of the CDM under Article 6.

4.2 Ensuring robust and integrated offsetting between ICAO and UNFCCC

Based on the above considerations, the Article 6 framework is expected to establish the international standard for how a multilateral use of market based mitigation measures will look in the 2020s. Hence, at this point a link exists between the ICAO and the UNFCCC; in this respect, and in order to ensure mutual compatibility in future, it is imperative now to closely link the further development of CORSIA under ICAO with the Article 6 evolution under UNFCCC, in an integrated manner, while ensuring environmental integrity and providing required capacity building measures.

⁵ See the UNFCCC submission Portal, <http://www4.unfccc.int/submissions/SitePages/sessions.aspx?showOnlyCurrentCalls=1&populateData=1&expected-submissionfrom=Parties&focalBodies=SBSTA>.

Integrated development of CORSIA and Article 6

While elaborating the technical design and governance approach of the CORSIA, the ICAO Council must at the same time take account of developments under Article 6 of the Paris Agreement and must meet its own timetable without prejudicing the outcomes of the UNFCCC developments. This requires a robust system that is also flexible enough to reflect those developments and ensure the two systems are compatible, in terms of policy decisions and also technical aspects, to ensure aviation has access to a wide market of offsets and to avoid double-counting. There are key questions of policy and principle as well as technical aspects that are still left open, particularly in the MRV rules, the setting up of the online emissions registries and in the criteria that determine eligible programmes and project types to be used for compliance with the scheme. Eligibility of programmes and project types will be determined through criteria some of which are still subject of ongoing discussions and have not yet been approved by ICAO. Nonetheless, the ICAO resolution states that mechanisms and programmes under the UNFCCC decision for creating CORSIA left those criteria partly open, though it does specify that the UNFCCC mechanisms and programmes for offsets under the UNFCCC should be considered, specifying that they “[take] into account relevant developments in the UNFCCC and Article 6 of the Paris Agreement”. In particular, the legal character of the “emission unit criteria” is to be decided, i.e. whether they are standards, recommended practices or guidance.

Without predicting the results of the CDM eligibility assessment by the IPAG, an important challenge with regards to the suitability of using the CDM in the context of CORSIA is the unclear post-2020 future of the CDM. Although the Kyoto Protocol does technically not end after 2020, there is no guarantee for CDM to be operational after 2020. While the transition of CDM-elements to Article 6 mechanisms has been proposed and discussed at COP22, aircraft operators would only have clarity once the UNFCCC has debated the CDM transition and once ICAO has discussed eligibility for the post-2020 period. While both processes might take some years, airlines will regard this to be a pressing issue to be resolved better sooner than later.

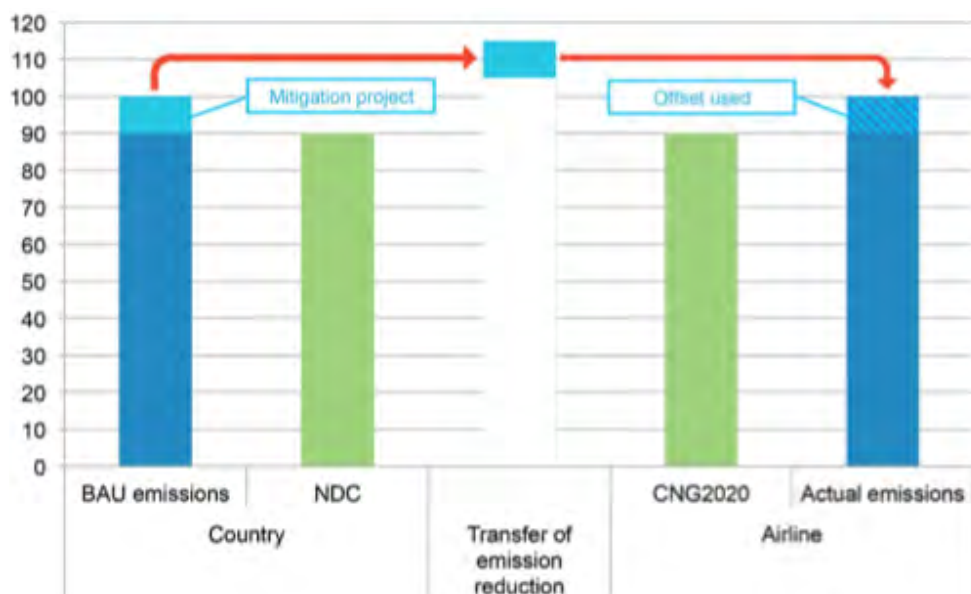
Ensuring environmental integrity of offsets

The design of such technical aspects will determine the quality of the projects and programmes, which in turn will determine the environmental effectiveness of the scheme as a whole. An un-coordinated development of both processes on the other hand could lead to fragmentation and inefficiencies in international climate policy, and ultimately potentially preventing the CORSIA from linking to the UN offset systems.

A linked process will furthermore be relevant for technical design parameters in the context of the environmental integrity, and thus the eligibility of certificates. The principles on which the above mentioned criteria are based need to be agreed, for instance comprising additionality to business-as-usual, representing permanent emissions reductions, or the reflection of a Miranda Wilson integration truly intact realistic and credible baseline, etc.

Of particular relevance is the avoidance of double counting. Under the UNFCCC, the double counting of GHG emission reductions can significantly undermine the environmental integrity of the entire multilateral system (Kollmuss et al., 2014). In Article 6.5 the Paris Agreement refers to the specific aspect of double counting of emissions: Accordingly, emission reductions resulting from the mechanism under Article 6.4 shall not be used to demonstrate achievement of the host Party’s NDC if used by another Party to demonstrate achievement of its NDC. Key issues and options to ensure robust accounting of international transfers from market mechanisms under Article 6 in this regard are currently being elaborated (Broekhoff et al., 2016). As the Paris Agreement only addresses double counting between NDCs, one would need rules under the UNFCCC in order to avoid double counting between NDCs and CORSIA, i.e. ensuring that certified GHG emission reductions foreseen for offsetting under CORSIA have been, or will only be used, counted and claimed once (i.e. under the CORSIA), and not used in other schemes or put towards other targets (NDCs) as well (Cames and Schneider, 2016). Countries would need to adjust their NDC in case of sold offsets. Such “corresponding adjustments” would also be required for offsets transferred to other sectors. Against this background, conditions that increase the suitability of credits for CORSIA could comprise the projects being new, having a high likelihood of additionality, having sustainable development co-benefits, originating from countries that agree to avoid double counting (country attestations from Parties), and originating from countries with multi-year emission trajectories (Cames and Schneider, 2016). Figure 6 illustrates the transfer of GHG emission reductions from a country with BAU emissions and an NDC target below BAU, to the Airline with a CNG 2020 goal and emissions above this goal (to be offsetted through offset credits from the country) under the CORSIA scheme.

Here the challenge is to not double claim the GHG reductions on both sides, i.e. the for both country and the airline; as per the idea of CORSIA, only the airline can apply the GHG reductions, while it must be ensured that the same reduction is not counted towards the NDC target.



Source: Cames and Schneider, 2016

Figure 6: Transfer of emission reductions between countries and CORSIA

This furthermore relates to the challenge of most countries putting forward economy wide targets, and with this running the risk of countries and airlines counting towards the same target (Shishlov and Cochran, 2016).

Capacity Building Support

The ICAO resolution gives significant weight to encouraging states to work together to accelerate the process, but the fact remains that the tasks are considerable and the timeline - in particular for MRV where rules need to be adopted by the ICAO Council and implemented through states by January 2019 - is extremely challenging by any measure. Against the outstanding technical elements in the context of establishing CORSIA until 2020, specific issues involve capacity building measures in the CORSIA member countries, including support for the elaboration of NDCs or detailed programmes, the consideration of offsetting funds for airlines, consistency across ITMOs, understanding the important role for private companies in the voluntary market for private compensation of flights, as well as understanding the important role of global players on carbon markets. In this context, specific capacity building programmes are being put forward. IETA and IATA for instance are joining forces to conduct carbon offsetting workshops for the aviation sector (IETA, 2016). The World Bank is currently preparing the launch of a capacity building programme with the ICAO Parties to provide technical and financial assistance to developing countries for a successful and ambitious implementation of CORSIA. The initiative will build upon experiences made with the Partnership for Market Readiness (PMR), and will comprise activities such as knowledge sharing and advisory with ICAO, elaboration of outreach and background materials, dialogues, workshops and seminars, as well as financial assistance for infrastructure development (World Bank, 2016a). Another World Bank led initiative is the Carbon Pricing Leadership Coalition, which is working with governments for progressing carbon pricing. In the context of aviation, it can become relevant for mobilizing support for carbon pricing, showcasing leadership and facilitating discussions on further actions by working with key aviation partners.

5 Conclusions

The above analysis introduces the approaches taken and foreseen for the use of offsetting in international aviation. Hereby the process and design of the recently established ICAO mechanism “CORSIA” is discussed, as well as the outstanding technical and political elements required for making the mechanism operational. Core questions to be debated and solved before CORSIA starts include monitoring, reporting and verification (MRV) rules, the setting up of the online emissions registries and in the criteria that determine which offsets can be used for compliance. In particular, the legal character of the “emission unit criteria” is to be decided, i.e. whether they are standards, recommended practices or guidance.

Moreover, the principles on which the criteria are based need to be agreed, for instance comprising additionality to business-as-usual, representing permanent emissions reductions, reflection of a realistic and credible baseline, mitigation against potential increase in emissions elsewhere, a robust MRV approach, the avoidance of double counting, a clear and transparent chain of custody, or provisions for not doing net harm. The avoidance of double counting is of particular relevance, i.e. ensuring that certified GHG emission reductions foreseen for offsetting under CORSIA have been, or will only be used, counted and claimed once (i.e. under the CORSIA), and not used in other schemes or put towards other targets as well. As the Paris Agreement only addresses double counting between NDCs, one would need rules under the UNFCCC in order to avoid double counting between NDCs and CORSIA. Here, countries would need to adjust their NDC in case of sold offsets. Such “corresponding adjustments” would also be required for offsets transferred to other sectors. Against this background, conditions that increase the suitability of credits for CORSIA could comprise the projects being new, having a high likelihood of additionality, having sustainable development co-benefits, originating from countries that agree to avoid double counting (country attestations from Parties), and originating from countries with multi-year emission trajectories.

The design of such technical design aspects will determine the quality of the projects and programmes, which in turn will determine the environmental effectiveness and integrity of the scheme as a whole.

For the period before CORSIA comes into effect, i.e. until 2021 the use of offset schemes for so called “early action” is regarded, providing interesting lessons. Looking at trends in the existing voluntary offset schemes utilized by airlines, aircraft operators have a preference for forestry, renewable energy and cookstoves projects. Those are self-policing in terms of standards (Gold Standard, GS CDM, VCS), and also have geographical preferences, i.e. airlines registered in developing countries go for “home projects”. Applying this logic to the GMBM, aircraft operators sensitive to the brand implications of the scheme may be self-policing by selecting recognised standards.

The paper furthermore considers the development of market based approaches for use by Parties under the UNFCCC for the period post-2020, i.e. in the context of the Paris Agreement. Under its Article 6 the Paris Agreement specifies relevant approaches for the use of market based measures for GHG mitigation after 2020. Two options are established, a framework addressing the international trade of GHG emissions (via so called Internationally Transferable Mitigation Outcomes, ITMO) and by this allowing GHG mitigation arising from various approaches initiated “bottom up” by the Parties, and to be accounted towards national GHG mitigation targets of any country (Article 6.2f on cooperative approaches), as well as a centrally organized mechanism for generating and transferring GHG emission reductions (Article 6.4f). The scientific and technical body under the UNFCCC’s Conference of the Parties (SBSTA) is tasked to develop technical details, rules and accounting provisions of those mechanisms over the next years.

Challenges arise in ensuring a tuned process of further elaborating the concepts under ICAO and UNFCCC, in order to ensure environmental integrity of the ICAO offset eligibility system and accounting, consider the respective implications for the Article 6 of the Paris Agreement under the UNFCCC, and vice versa. In light of this, the ICAO Council is thus tasked to at the same time take account of developments under Article 6 of the Paris Agreement and must meet its own timetable without prejudicing the outcomes of the UNFCCC developments. This requires a robust system that is also flexible enough to reflect those developments and ensure the two systems are compatible, in terms of policy decisions and also technical aspects, to ensure aviation has access to a wide market offsets.

The following aspects summarize relevant conclusions from the assessment in order to ensure a robust and integrated process of designing the CORSIA:

- ▶ Avoid „un-tuned“ development of the CORSIA and Article 6 over the next years, i.e. ICAO working groups and UNFCCC technical bodies should mutually reflect each other's work and ideally interact during the process of developing the individual mechanisms designs, specifically on the setting of emissions unit criteria not least for early action by airlines under ICAO on the one hand, and the rules, procedures and modalities under the Paris Agreement, on the other hand.
- ▶ Build on lessons that can be drawn from Kyoto Mechanisms (CDM/JI) for ensuring integrity of the scheme; this is also relevant for the efficiency of getting CORSIA operational – particularly operators are not in favour of re-inventing the wheel but building upon existing systems such as the CDM.
- ▶ Account for environmental integrity of credits through specific quality requirements and in particular by ensuring the avoidance of double counting of GHG emission reductions.
- ▶ Select good quality credits: there is no scarcity of credits, hence, environmental integrity of offsetting should be established based on the acknowledgement that there is ample supply of credits; in order to derive a minimum carbon price certain options for ensuring scarcity of credits need to be discussed (such as quality and vintage limitations).
- ▶ Reflect the tight timetable: The detailed rules for CORSIA will take the form of standards and recommended practices (SARPs) and related guidance. The ICAO resolution gives significant weight to encouraging states to work together to accelerate the process, but the fact remains that the tasks are considerable and the timeline - in particular for MRV where rules need to be adopted by the ICAO Council and implemented through states by January 2019 - is extremely challenging by any measure. Here dedicated capacity building initiatives can support countries and operators in preparing the CORSIA implementation accordingly.

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