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Regulating carbon emissions from international aviation through air services agreements: Lessons from aviation safety enforcement

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Abstract

This article addresses how air services agreements (ASAs) are starting to be used to regulate carbon emissions from international aviation. International aviation is regulated by a combination of multilateral aviation-specific conventions and bilateral ASAs. The Chicago Convention of 1944 and annexes that contain the Standards and Recommended Practices (SARPs) are the primary multilateral sources of international aviation law. These SARPs mainly cover the technical requirements of aviation safety with the notable exception of Annex 16: Environmental Protection. With the goal of reducing the climate impact of aviation-related carbon emissions, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) was adopted as SARPs. However, the legal status of SARPs remains controversial. Since they are not an integral part of the Chicago Convention, they do not have the same legal force as the convention itself. Although the International Civil Aviation Organization (ICAO) adopts and manages SARPs, it lacks a way to enforce compliance. Despite this limitation, however, bilateral ASAs give SARPs legal force. ASAs determine the level of aviation market access between states, and most ASAs permit the imposition of operational bans in case of non-compliance with SARPs on safety standards. From exclusively dealing with the exchange of commercial rights for international air transport, a new generation of ASAs has started to cover environmental protection. Based on a review of 620 publicly available ASAs, this article assesses how SARPs on aviation safety are effectively enforced by ASAs and anticipates how SARPs on carbon emissions will gradually follow suit.

Keywords: air services agreement; Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA); Chicago Convention of 1944; International Civil Aviation Organization (ICAO); Standards and Recommended Practices (SARPs)

1. Introduction

Because of the transboundary nature of aviation, states have recognized the need for the international harmonization of the norms relating to international aviation and undertook to comply with the rules of international law with regard to international aviation. On a global level,

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there are a dozen aviation-specific multilateral treaties,¹ some of which enjoy virtually universal ratifications. Indeed, the regulatory framework of international aviation consists of a combination of multilateral conventions and bilateral air services agreements (ASAs).² To be sure, there are technical regulations formulated by ICAO, such as SARPs (the focus of this article), Procedures for Air Navigation Services (PANS), Regional Supplementary Procedures (SUPPS), regional air navigation plans and related manuals, circulars, and guidance.³ All of them, however, are derived from the 1944 Convention on International Civil Aviation, a multilateral convention with 193 member states.⁴

The 1944 Convention on International Civil Aviation, commonly known as the Chicago Convention, is the primary source of international aviation law. Consisting of 96 articles, the Chicago Convention stipulates, among other matters, the legal regime of airspace and legal principles relating to aircraft and serves as the constituent instrument of the International Civil Aviation Organization (ICAO). ICAO was created and empowered by the Chicago Convention to develop principles for international air navigation and facilitate states' co-operation in the safe and orderly development of international air transportation.⁵ Since the adoption of the Chicago Convention in 1944, ICAO has adopted 19 annexes containing over 12,000 SARPs, many of which are evolving in concert with the latest developments and technological innovations.⁶ These annexes focus, for instance, on personnel licensing (Annex 1), operation of aircraft (Annex 6), airworthiness of aircraft (Annex 8), aircraft accident and incident investigation (Annex 13), and safety management (Annex 19).

Following ICAO's broad definition of 'aviation safety' as the 'state of freedom from unacceptable risk of injury to persons or damage to aircraft and property',⁷ SARPs are generally related to aviation safety. A notable exception is Annex 16 (environmental protection), which consists of four volumes; namely, Volume I: Aircraft Noise, Volume II: Aircraft Engine Emissions, Volume III: Aeroplane CO₂ Emissions and Volume IV: Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Volume III and Volume IV were

¹The full names of the key multilateral treaties are as follows: Convention on International Civil Aviation (1944 Chicago Convention); Convention on Offences and Certain Other Acts Committed on Board Aircraft (1963 Tokyo Convention); Convention for the Suppression of Unlawful Seizure of Aircraft (1970 Hague Convention); Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation (1971 Montreal Convention); Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation, Supplementary to the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation signed at Montreal on 23 September 1971 (1988 Montreal Protocol); Convention on the Marking of Plastic Explosives for the Purpose of Detection (1991 Montreal Convention); International Air Services Transit Agreement (1944 Transit Agreement); Convention for the Unification of Certain Rules Relating to International Carriage by Air (1929 Warsaw Convention); Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air signed at Warsaw on 12 October 1929 (1955 Hague Protocol); Convention for the Unification of Certain Rules for International Carriage by Air (1999 Montreal Convention); Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface (1952 Rome Convention); Protocol to Amend the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface signed at Rome on 7 October 1952 (1978 Montreal Protocol); Convention on International Interests in Mobile Equipment (2001 Cape Town Convention); Protocol to the Convention on International Interests in Mobile Equipment on Matters specific to Aircraft Equipment (2001 Cape Town Protocol).

²B. F. Havel and G. S. Sanchez, *The Principles and Practice of International Aviation Law* (2014), 5; Air services agreements are sometimes called air transport agreements or comprehensive air transport agreements. Since air services agreements are more commonly used than air transport agreements in the airline industry and ICAO often uses air services agreements (such as 'Template Air Services Agreements' and = 'World Air Services Agreements', the term 'air services agreements' ('ASAs') is collectively used in this article.

³J. Huang, *Aviation Safety through the Rule of Law: ICAO's Mechanisms and Practices* (2009), 44–5.

⁴Convention on International Civil Aviation Signed at Chicago on 7 December 1944, 15 UNTS 295 (Chicago Convention).

⁵*Ibid.*, Preamble and Art. 44.

⁶ICAO, 'How ICAO Develops Standards', available at www.icao.int/about-icao/AirNavigationCommission/Pages/how-icao-develops-standards.aspx.

⁷ICAO, Determination of a Definition of Aviation Safety, ICAO Doc. AN-WP/7699 (11 December 2001), Para. 2.2; With the broad definition, the concept of aviation safety includes aviation security. See Huang, *supra* note 3, at 7.

adopted in 2017 and 2018, respectively, with the goal of reducing the impact of aviation-related carbon emissions on the global climate. The development of Annex 16 will be examined in Section 2.

Bilateral ASAs regulate the international carriage of passengers, cargo, and mail by air and determine the level of aviation market access between states. Before an airline can operate international services to another country, its government must first conclude an ASA with the government of the destination country. One of the earliest ASAs is the one signed between the United States and the United Kingdom in 1946.⁸ This agreement, often referred to as the Bermuda I Agreement, became the prototype for many subsequent ASAs around the world.⁹ It is reported that a complex web of over 4,000 bilateral ASAs with variations in substance and style are in existence today.¹⁰ Although various global multilateral approaches have been contemplated over time, none of them have been successful.¹¹ It is important to note that regional approaches have also been adopted around the world, with the European Union (EU) being an exceptional example.¹² That said, bilateral ASAs are the principal instruments for regulating market access in international air transportation.

The relationship between the Chicago Convention and ASAs has not been clearly defined in academic literature. A common understanding is that the Chicago Convention and ASAs are two separate branches of international aviation law because ASAs decide the level of market access¹³ while the Chicago Convention does not deal with market access. However, that understanding does not provide a full picture of their relationship. The focus of this article is the relationship between SARPs under the Chicago Convention and ASAs. Based on a textual and contextual interpretation of SARP-related articles in the Chicago Convention and a review of 620 publicly available ASAs (from 1946 to 2022), it aims to clarify the interaction between SARP and ASAs through doctrinal and empirical analyses. Notably, a descriptive quantitative analysis was conducted to supplement the doctrinal analysis in this article. Rather than exploring the relationship between variables, this article provides a descriptive account of the increasing inclusion of safety provisions in ASAs since the 1970s and of environmental provisions in the new generation of ASAs since the 2000s.

This article will show how SARP on aviation safety are effectively enforced by ASAs and anticipate how SARP on carbon emissions will gradually follow suit. The article is organized as follows. As a background, Section 2 describes how carbon emissions from international aviation have been (un-)regulated. Section 3 discusses the unique legal status of SARP on a multilateral level. Based on a review of 620 publicly available ASAs, Section 4 presents the different levels of bilateral mechanisms for ensuring compliance with SARP on aviation safety. Section 5 introduces a number of new ASAs that have started to cover environmental protection. Section 6 suggests how carbon emissions from international aviation will be regulated by ASAs.

2. International measures to limit the carbon emissions of international aviation

This section introduces the various efforts implemented under the Chicago Convention to limit the climate impacts of international aviation. In doing so, it first sketches out those climate impacts. After briefly covering how the UN climate regime deals with greenhouse gas (GHG)

⁸1946 Agreement between the Government of the United States of America and the Government of the United Kingdom Relating to Air Services Between Their Respective Territories, US TIAS 1507 (Bermuda I).

⁹P. S. Dempsey, *Public International Air Law* (2008), 523.

¹⁰See Havel and Sanchez, *supra* note 2, at 72.

¹¹J.W. Lee, *Regional Liberalization in International Air Transport: Towards Northeast Asian Open Skies* (2016), 11–34.

¹²*Ibid.*, at 33–4.

¹³For a comparison between direct market access issues (such as traffic rights under the scope of ASAs) and indirect market access issues (such as slot allocation which is generally beyond the scope of ASAs), see *ibid.*, at 103–14.

emissions from the aviation sector, it discusses the development of Annex 16 (Environmental Protection) on climate issues under ICAO's purview.

2.1. The climate impacts of international aviation

Regulating the climate impacts of international aviation is of particular concern for efforts to mitigate global climate change. In 2018, international aviation produced 604 Mt CO₂ emissions, or close to South Korea's annual CO₂ emissions.¹⁴ A study conducted in 2018 by the Intergovernmental Panel on Climate Change (IPCC) reported that international aviation CO₂ emissions account for 65 per cent of aviation emissions and 2.4 per cent of global anthropogenic emissions.¹⁵ Furthermore, CO₂ from international aviation has increased steadily and rapidly during the past decades.¹⁶ The projected doubling of the global fleet in the next two decades means a further increase in CO₂ emissions from this sector.¹⁷

Beyond CO₂ emissions, aircraft also produce short-lived climate forces, such as sulphur dioxide and nitrous oxide (NO_x) emissions.¹⁸ Although CO₂ emissions are the largest contributor by far among GHG emissions,¹⁹ the climate forcing of these non-CO₂ emissions may be stronger than that of CO₂ in some estimates, and accounts for 66 per cent of the net forcing of aviation.²⁰ The evolution in scientific understanding of the climate forcing of non-CO₂ emissions will further reveal the climate impacts of aviation.²¹ From 2020 to 2022, the COVID-19 pandemic led to an abnormally low level of international air passenger traffic,²² corresponding to a sharp drop in CO₂ emissions in 2020, around 59 per cent compared to the level in 2019.²³ After this temporary decline, international air traffic recovered swiftly and almost reached the pre-pandemic level by 2023,²⁴ along with the rebound of international aviation emissions.²⁵ Due to a continued rise in CO₂ emissions from international aviation, there appears to be a need for greater global regulation.

¹⁴OECD, 'Air Transport CO₂ Emissions', 2020, available at stats.oecd.org/Index.aspx?DataSetCode=AIRTRANS_CO2. In 2022, South Korea's annual CO₂ emissions stood at 601 Mt, see H. Ritchie, P. Rosado, and M. Roser, 'CO₂ and Greenhouse Gas Emissions', *Our World in Data*, 2023, available at ourworldindata.org/CO2-and-greenhouse-gas-emissions.

¹⁵P. Jaramillo et al., 'Transport', in P. R. Shukla et al. (eds.), *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (2022), 1049 at 1086.

¹⁶*Ibid.*

¹⁷S. Gössling, 'Risks, Resilience, and Pathways to Sustainable Aviation: A COVID-19 Perspective', (2020) 89 *JATM* 101933, at 2.

¹⁸See Jaramillo et al., *supra* note 15, at 1086.

¹⁹United States Environmental Protection Agency, 'Overview of Greenhouse Gases', 16 January 2025, available at <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#overview>.

²⁰European Commission, Final Report: Updated Analysis of the Non-CO₂ Climate Impacts of Aviation and Potential Policy Measures Pursuant to the EU Emissions Trading System Directive Article 30 (4), COM (2020) 747 final, 7.

²¹See D. S. Lee et al., 'The Contribution of Global Aviation to Anthropogenic Climate Forcing for 2000 to 2018', (2021) 244 *Atmospheric Environment* 117834; A. Skowron et al., 'Greater Fuel Efficiency Is Potentially Preferable to Reducing NO_x Emissions for Aviation's Climate Impacts', (2021) *Nature Communications* 12; V. Grewe, S. Mattes, and K. Dahlmann, 'The Contribution of Aviation NO_x Emissions to Climate Change: Are We Ignoring Methodological Flaws?', (2019) 14 *Environmental Research Letters* 121003.

²²ICAO Air Transport Bureau, 'Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis' (2023), 5.

²³ICAO CAEP, 'Analyses in Support of the 2022 CORSIA Periodic Review: Focus on Covid19 impacts on CORSIA and its baseline' (2022), 6.

²⁴IATA, 'Global Air Travel Demand Continued Its Bounce Back in 2023', 2024, available at www.iata.org/en/pressroom/2024-releases/2024-01-31-02/.

²⁵H. Kim and J. Teter, 'Aviation', *IEA Tracking Clean Energy Progress 2023*, 2023, available at www.iea.org/energy-system/transport/aviation.

2.2. The UN climate regime on international aviation

Reducing international aviation emissions through the UN climate regime – including the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol, and the Paris Agreement – has proven contentious.²⁶ The UNFCCC lays the legal foundation for climate change governance²⁷ and develops two distinct obligations, procedural and substantial ones, for all parties. For the former, the UNFCCC requires its parties to develop and communicate ‘national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol’ with comparable methodologies agreed by the Conference of Parties (COP).²⁸ The COP 1 decided to follow the inventory guidelines adopted by the IPCC.²⁹ Accordingly, each party needs to report GHG emissions generated within its territory and, for mobile sources, emissions from the consumption of fuel sold by it, and all these emissions are included in a national total emissions.³⁰ As an exception, international aviation emissions should be reported separately and are not included in national totals.³¹

Beyond reporting obligations, parties to the UNFCCC take substantive obligations to formulate and implement ‘programs containing measures to mitigate climate change’.³² In contrast to relatively specific reporting obligations, the substantive obligation on climate change mitigation is open-ended. The UNFCCC does not restrict it to limiting and reducing emissions that the parties inventory and report.³³ In turn, the reporting obligations are not meant to reflect responsibility for controlling those emissions. As a result, whether to fulfil mitigation obligations through addressing international aviation emissions is left to the parties’ discretions.

Further, the reference to ICAO under the Kyoto Protocol incurs questions about the feasibility of regulating international aviation emissions under the UN climate regime. The Kyoto Protocol adopts quantified emissions limitation and reduction commitments for the developed country parties listed in Annex I of the UNFCCC, in the period from 2008 to 2020.³⁴ The accounting for quantified commitments follows the methods adopted by the IPCC,³⁵ which means the exclusion of international aviation and shipping emissions. To regulate these emissions, the Protocol requires Annex I parties to work through ICAO and the International Maritime Organization (IMO).³⁶ This arrangement does not necessarily mean excluding international aviation emissions from Parties’ general mitigation obligations under the UNFCCC. Still, the reason behind this arrangement, the failure to reach a consensus on distributing responsibility for these emissions,³⁷

²⁶See, generally, B. M. Romera and H. van Asselt, ‘The International Regulation of Aviation Emissions: Putting Differential Treatment into Practice’, (2015) 27 *Journal of Environmental Law* 259; A. P. Valdés, *Greenhouse Gas Emissions from International Aviation: Legal and Policy Challenges* (2019); B. M. Romera, *Regime Interaction and Climate Change: The Case of International Aviation and Maritime Transport* (2019) (‘Romera, Regime Interaction’); B. M. Romera, ‘The Paris Agreement and the Regulation of International Bunker Fuels’, (2016) 25 *RECIEL* 215 (‘Romera, Bunker Fuels’).

²⁷D. Bodansky, J. Brunnée, and L. Rajamani, *International Climate Change Law* (2017), 118.

²⁸1992 United Nations Framework Convention on Climate Change, 1771 UNTS 107, Arts. 4.1(a), 12.1(a) (UNFCCC).

²⁹Decision 4/CP.1, Methodological issues, UN Doc. FCCC/CP/1995/7/Add.1 (1995), Paras. 1(a), 1(b).

³⁰J. T. Houghton et al. (eds.) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (1996), Vol. 1, ‘Overview’, at 5; K. Rypdal et al., ‘Introduction to the 2006 Guidelines’, in S. Eggleston et al. (eds.), *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (2016), Vol. 1, Section 1.1 ‘National territory’.

³¹See Houghton et al., *ibid.*, ‘Overview’, 5; see Rypdal et al., *ibid.*, ‘Sectors and Categories’.

³²See UNFCCC, *supra* note 28, Art. 4.1 (a)–(b).

³³B. Mayer and Z. Q. Ding, ‘Climate Change Mitigation in the Aviation Sector: A Critical Overview of National and International Initiatives’, (2023) 12 *TEL* 14, at 20.

³⁴The first commitment period is from 2008 to 2012. See 1997 Kyoto Protocol to the United Nations Framework Convention on Climate Change, 2303 UNTS 162, Art. 3.1 (Kyoto Protocol). The second commitment period is from 2013 to 2020. See 2012 Doha Amendment to the Kyoto Protocol, UNFCCC Doc. FCCC/KP/CMP/2012/13/Add.1, Decision 1/CMP.8 (2012), Section C.

³⁵See Kyoto Protocol, *ibid.*, Art. 5.2.

³⁶*Ibid.*, Art. 2.2.

³⁷See UNFCCC SBSTA, Communications from Parties Included in Annex I to the Convention: Guidelines, Schedules and Process for Consideration, UN Doc. FCCC/SBSTA/1996/9/Add.2 (1996), Paras. 42–55. See Romera, Bunker Fuels, *supra* note

implies to some extent that parties are reluctant to regulate international aviation emissions to meet their general mitigation commitments.

The adoption of the Paris Agreement does not change the status of international aviation under the UN climate regime. It is important to note that, unlike the Kyoto Protocol, the Paris Agreement makes no reference to emissions from international aviation.³⁸ This omission has led to various interpretations. Truxal noted that this ‘can be interpreted as giving ICAO a “free hand”, or as a vote of confidence in ICAO, or as a failure of ICAO to “step up”’.³⁹ Indeed, a former ICAO Council President viewed this as ‘a vote of confidence in the progress ICAO and the aviation community have achieved’.⁴⁰ However, Mayer and Ding argue that ‘no conclusion can be drawn from the absence of any mention of aviation in the Paris Agreement, as this treaty does not contain sector-specific provisions’,⁴¹ and emphasize that ‘the negotiators discussed, but rejected, a draft provision encouraging the ICAO to regulate emissions from international aviation’.⁴²

At the same time, the Paris Agreement requires parties to develop nationally determined contributions (NDCs) and impose obligations on them to ‘pursue domestic mitigation measures’ to achieve mitigation targets in NDCs.⁴³ Developed country parties should adopt economy-wide emission reduction targets in NDCs, and developing country parties are encouraged to move toward such targets.⁴⁴ However, neither this Agreement nor the following COP decisions clarify the scope of the ‘economy-wide’ target, which fails to clarify whether that includes international civil aviation. The relevant practices of parties are diverse. For example, the EU has voluntarily included international aviation emissions in its NDCs,⁴⁵ while the UK has explicitly excluded these emissions.⁴⁶ In this sense, whether the parties take obligations to ‘pursue’ mitigation measures addressing international aviation emissions depends on how they define their emission reduction targets in NDCs.

In short, regulating international aviation emissions through NDCs under the UNFCCC or the Paris Agreement is an option. However, the vague mitigation commitments under the UNFCCC and the uncertainties related to the ‘economy-wide’ targets under the Paris Agreement cast doubt on the prospect of decarbonizing international aviation through the UN climate regime. Besides, rather than being subject to substantial decision-making processes under the UN climate regime, regulating international aviation emissions has been continuously addressed by the Subsidiary Body for Scientific and Technology Advice (SBSTA) based on reports provided by ICAO.⁴⁷ Such co-operation between the UN climate regime and ICAO draws attention to the development of climate initiatives under ICAO’s purview.

26, at 217; F. Yamin and J. Depledge, *The International Climate Change Regime: A Guide to Rules, Institutions and Procedures* (2004), 84.

³⁸S. Truxal, *Economic and Environmental Regulation of International Aviation* (2017), 128.

³⁹*Ibid.*, 174.

⁴⁰ICAO, ‘The Postal History of ICAO: Annex 16 – Environmental Protection’, available at applications.icao.int/postalhistory/annex_16_environmental_protection.htm.

⁴¹See Mayer and Ding, *supra* note 33, at 21.

⁴²*Ibid.*

⁴³2015 Paris Agreement to the United Nations Framework Convention on Climate Change, 55 ILM 740, Art. 4.2 (Paris Agreement). See B. Mayer, ‘International Law Obligations Arising in Relation to Nationally Determined Contributions’, (2018) 7 TEL 251; Cf. D. Bodansky, ‘The Legal Character of the Paris Agreement’, (2016) 25 RECIEL 142, at 149.

⁴⁴See Paris Agreement, *supra* note 43, Art. 4.4.

⁴⁵European Union, The Nationally Determined Contribution of the European Union and its Member States (EU NDC) (2025), Ann., Para. 3(b), available at unfccc.int/sites/default/files/2025-11/DK-2025-11-05%20EU%20NDC.pdf.

⁴⁶United Kingdom of Great Britain and Northern Ireland, United Kingdom of Great Britain and Northern Ireland’s 2035 Nationally Determined Contribution (2025), at 6, available at unfccc.int/sites/default/files/2025-01/UK%27s%202035%20NDC%20ICTU.pdf.

⁴⁷See UNFCCC, ‘Emissions from Fuels Used for International Aviation and Maritime Transport’, available at unfccc.int/topics/mitigation/workstreams/emissions-from-international-transport-bunker-fuels#Relevant-documents-on-international-aviation-and-maritime-transport.

2.3. SARPs for addressing environmental protection and climate-related issues

ICAO's aims and objectives as a UN specialized agency are to 'develop the principles and techniques of international air navigation and to foster the planning and development of international air transport'.⁴⁸ Even though the Chicago Convention does not explicitly address the environment or environmental protection, that does not necessarily mean that ICAO lacks legal authority in this area.⁴⁹ To the contrary, environmental protection has become an essential component of ICAO's mission since the 1970s, with the adoption of SARPs included in Annex 16.

Article 37 of the Chicago Convention may be read as implying a mandate of ICAO on environmental protection by providing that ‘the International Civil Aviation Organization shall adopt and amend . . . international standards and recommended practices . . . dealing with . . . such other matters concerned with the safety, regularity, and efficiency of air navigation as may from time to time appear appropriate’.⁵⁰ This open provision gives ICAO the flexibility to adopt SARPs even if the subject matter is not specifically mentioned in Article 37 (a)–(k) of the Chicago Convention.⁵¹ In fact, ICAO has gone beyond the subjects listed in Article 37 many times.⁵²

The origin of Annex 16 (Environmental Protection) had nothing to do with carbon emissions. That annex was first adopted in 1971 to tackle aircraft noise. Realizing the environmental impacts of international aviation, states reached a resolution in the Eighteenth ICAO Assembly in 1971 on ICAO's responsibility to balance the development of civil aviation and the 'quality of the human environment'.⁵³ Consequently, the ICAO Council has adopted SARPs and designated them in Annex 16, Volume I: Aircraft Noise in 1971.⁵⁴ With a view to developing specific SARPs for aircraft engine emissions, the Committee on Aircraft Engine Emissions was established in 1977 by the ICAO Council and new SARPs for engine emissions were adopted in 1981⁵⁵ in Volume II: Aircraft Engine Emissions.⁵⁶ However, it is important to note that local air quality was considered when Volume II was adopted; the engine certification process entailed therein is based on the landing and take-off cycle, addressing pollutant emissions in the vicinity of airports.⁵⁷

Given growing concerns about climate impacts in the early 1990s, the 29th ICAO Assembly in 1992 decided to incorporate climate issues within the scope of environmental initiatives that should be kept within ICAO's purview.⁵⁸ In addition to technical solutions that ICAO has continued to emphasize, it has started to consider various forms of market-based measures (MBMs), such as emissions-related levies to emissions trading since 2001,⁵⁹ and taken carbon offset mechanisms into consideration in 2007.⁶⁰

⁴⁸See Chicago Convention, *supra* note 4, Art. 44.

⁴⁹See Havel and Sanchez, *supra* note 2, 228–9. See also B. P. Kerr, ‘Clear Skies or Turbulence Ahead? The International Civil Aviation Organization’s Obligation to Mitigate Climate Change’, (2020) 16 *Utrecht Law Review* 101; Z. Q. Ding, ‘ICAO’s Competence to Foster Climate Action’, (2023) 48 *Annals of Air and Space Law* 3.

⁵⁰See Chicago Convention, *supra* note 4, Art. 37.

⁵¹(a) Communications systems and air navigation aids, including ground marking; (b) Characteristics of airports and landing areas; (c) Rules of the air and air traffic control practices; (d) Licensing of operating and mechanical personnel; (e) Airworthiness of aircraft; (f) Registration and identification of aircraft; (g) Collection and exchange of meteorological information; (h) Log books; (i) Aeronautical maps and charts; (j) Customs and immigration procedures; (k) Aircraft in distress and investigation of accidents; and such other matters concerned with the safety, regularity, and efficiency of air navigation as may from time to time appear appropriate.’

⁵²M. Milde, *International Air Law and ICAO* (2016), 178.

⁵³ICAO Assembly Resolution A18-11 (1971), Para. 2.

⁵⁴ICAO, Annex 16 to the Convention on International Civil Aviation: Environmental Protection (2017), Vol. I.

⁵⁵See ICAO, *supra* note 40.

⁵⁶ICAO, Annex 16 to the Convention on International Civil Aviation: Environmental Protection (2023), Vol. II.

⁵⁷ICAO Environment, 'Local Air Quality Technology Standards', available at www.icao.int/environmental-protection/Page/s/LAQ_TechnologyStandards.aspx.

⁵⁸ICAO Assembly Resolution A29-12 (1992), Para. 2.

⁵⁹ICAO Assembly Resolution A33-7 (2001) App. I, Para. 2.

⁶⁰ICAO Assembly Resolution A36-22 (2007) App. L, Para. 1(c).

However, ICAO negotiations on climate change mitigation lagged far behind, especially considering the fast expansion of the air transportation market and the market's increasing climate impacts.⁶¹ Frustrated by ICAO's slow progress, the EU decided to extend its emissions trading scheme (ETS) to international flights, including intra-EU flights as well as flights arriving in or departing from airports in the EU in 2008.⁶² This decision aroused both political and legal controversy.⁶³ Finally, the EU decided to 'stop the clock' and constrain the geographical scope of its ETS to flights within and between states in the European Economic Area in 2013.⁶⁴ Even after such a retreat, the EU's unilateral action catalysed progress in multilateral negotiations about climate regimes under ICAO.⁶⁵

Since 2010, ICAO negotiations have led to some agreements with substantial impacts on limiting international aviation emissions. The Assembly in 2010 defined the global aspirational goals for climate change mitigation in international civil aviation, including fuel efficiency improvement⁶⁶ and keeping 'global net carbon emissions from international aviation from 2020 at the same level (CNG 2020)'.⁶⁷ Furthermore, the Assembly set the Council's working agenda: developing global CO₂ standards for aircraft⁶⁸ and exploring the feasibility of a global MBM scheme.⁶⁹

The Council sought to fulfil this mandate by adopting new SARPs on aircraft CO₂ certification and designating them as Annex 16, Volume 3: Aeroplane CO₂ Emissions in 2017.⁷⁰ These SARPs apply to new types of aircraft from 2020 and to aircraft in production from 2023.⁷¹ Also, aircraft currently in production that fail to meet relevant standards cannot be produced from 2028.⁷² Essentially, Volume III: Aeroplane CO₂ Emissions ensures that aircraft manufacturers engaged in international flights comply with CO₂ certification requirements. It aims to have a direct impact by increasing the importance of fuel efficiency in the aircraft design process.⁷³ As aircraft manufacturers sell aircraft globally, they are strongly incentivized to comply with ICAO

⁶¹See Mayer and Ding, *supra* note 33, at 23-6; J. W. Lee, 'A New Global Approach to Mitigating Emissions from International Aviation: The International Civil Aviation Organization's 39th Assembly (2016)', (2017) 1 *Chinese Journal of Environmental Law* 104.

⁶²Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 Amending Directive 2003/87/EC so as to Include Aviation Activities in the Scheme for Greenhouse Gas Emission Allowance Trading within the Community, OJ L 8/3 (2009), Ann., Para. 1(c).

⁶³The Court of Justice of the European Union upheld the legitimacy of the extension of the EU ETS to aviation in Case C-366/10 brought by US airlines. See *Case C-366/10, The Air Transport Association of America, American Airlines, Inc, Continental Airlines, Inc, United Airlines, Inc v The Secretary of State for Energy and Climate Change*, Judgment of the Court of Justice (Grand Chamber) of 21 December 2011, Para. 157. For legal analysis, see S. Bogojevic, 'Legalising Environmental Leadership: A Comment on the CJEU's Ruling in C-366/10 on the Inclusion of Aviation in the EU Emissions Trading Scheme', (2012) 24 *Journal of Environmental Law* 345; B. F. Havel and J. Q. Mulligan, 'The Triumph of Politics: Reflections on the Judgment of the Court of Justice of the European Union Validating the Inclusion of Non-EU Airlines in the Emissions Trading Scheme', (2012) 37 *Air & Space Law* 3; A. Gattini, 'Between Splendid Isolation and Tentative Imperialism: The EU's Extension of Its Emission Trading Scheme to International Aviation and the ECJ's Judgment in the ATA Case', (2012) 61 *ICLQ* 977.

⁶⁴Decision No 377/2013 of the European Parliament and of the Council of 24 April 2013 Derogating Temporarily from Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emission Allowance Trading within the Community, OJ L 113/1 (2013), Art. 1.

⁶⁵See Valdés, *supra* note 26, at 101; A. Bradford, *Brussel Effects: How the EU Rules the World* (2020), 220-1; see Bodansky, Brunnée, and Rajamani, *supra* note 27, 272-3.

⁶⁶ICAO Assembly Resolution A37-19 (2010), Para. 4.

⁶⁷*Ibid.*, Para. 6.

⁶⁸*Ibid.*, Para. 24.

⁶⁹*Ibid.*, Para. 18.

⁷⁰ICAO, Annex 16 to the Convention on International Civil Aviation: Environmental Protection (2017), Vol. III.

⁷¹*Ibid.*, Part II, Section 2.1.1.

⁷²*Ibid.*

⁷³ICAO Environment, 'Climate Change Technology Standards', available at www.icao.int/environmental-protection/Pages/ClimateChange_TechnologyStandards.aspx.

Standards, including Annex 16, Volume III: Aeroplane CO₂ Emissions. The direct impact of Volume III is on a limited number of states that are home to major commercial aircraft manufacturers such as Boeing (US), Airbus (EU), Embraer (Brazil) and COMAC (China).⁷⁴

In parallel to adopting these technical standards, the ICAO Council examined various forms of MBMs. Finally, the 2016 ICAO Assembly approved the global MBM scheme CORSIA.⁷⁵ The ICAO Council adopted SARPs on CORSIA as Annex 16, Volume 4: CORSIA in 2018.⁷⁶ This scheme aims to maintain CO₂ emissions from international aviation at the 2020 level by requiring airlines to acquire and cancel eligible carbon credits from climate programs elsewhere.⁷⁷

The implementation of CORSIA started with a 'pilot phase' from 2021 to 2023, followed by a 'first phase' from 2024 to 2026. In these two phases, states' participation is voluntary. In the second phase, from 2027 to 2035, the scheme applies to all ICAO member states except the least developed countries, small island developing states, and land-locked developing countries.⁷⁸ As of September 2024, 129 states have announced their intention to participate in this scheme.⁷⁹ The Council initially set the average of total CO₂ emissions covered by CORSIA in 2019 and 2020 as the baseline.⁸⁰ Due to the abnormally low level of aviation emissions in 2020, using the original baseline would mean 30 per cent more stringent offsetting requirements than the pre-pandemic level.⁸¹ The additional mitigation burdens was a major concern for the aviation industry, especially considering its priority on recovery from the pandemic.⁸² As a result, the Council adjusted the baseline used in the pilot phase to the value of 2019 emissions, and the 2022 Assembly set 85 per cent of that value as the baseline in the first and second phases.⁸³ Indeed, after the three years of hardship (2020–2022), the aviation market has recovered from the pandemic faster than expected.⁸⁴

CORSIA has attracted broad attention from industries and scholars.⁸⁵ On the one hand, it is a milestone in regulating international aviation emissions in a multilateral forum.⁸⁶ As a part of the 'basket of measures' adopted by ICAO, CORSIA complements the other measures in the basket by offsetting the amount of CO₂ emissions that cannot be reduced through the use of technological

⁷⁴A. Hayes, 'Who Are the Major Airplane Manufacturing Companies?', *Investopedia*, 31 August 2024, available at www.investopedia.com/ask/answers/050415/what-companies-are-major-players-airline-supply-business.asp.

⁷⁵ICAO Assembly Resolution A39-3 (2016), Para. 5.

⁷⁶ICAO, Annex 16 to the Convention on International Civil Aviation: Environmental Protection (2018), Vol. IV (Annex 16 Vol. IV).

⁷⁷See ICAO Assembly Resolution, *supra* note 75.

⁷⁸*Ibid.*, Para. 9; see Annex 16 Vol. IV, *supra* note 76, Part II, Section 3.1.3(b).

⁷⁹ICAO, 'CORSIA States for Chapter 3 State Pairs', available at www.icao.int/environmental-protection/CORSIA/Pages/state-pairs.aspx.

⁸⁰ICAO Assembly Resolution A39-3 (2016), Paras. 11(b) and 11(c).

⁸¹IATA, 'COVID-19 and CORSIA: Stabilizing net CO₂ at 2019 "Pre-Crisis" Levels, Rather than 2010 Levels', 2020, available at archives.greenairnews.com/www.iata.org/contentassets/fb745460050c48089597a3ef1b9fe7a8/covid19-and-corsia-baseline-190520.pdf.

⁸²*Ibid.*

⁸³ICAO Assembly Resolution A41-22 (2022), Para. 11(b); ICAO, Annex 16 to the Convention on International Civil Aviation: Environmental Protection (2023), Vol. IV, Part II, Section 3.1 'Note 1', Section 3.2 'Note 1'.

⁸⁴See J. W. Lee and S. Y. Yoon, 'Growing Stakeholderism in the Airline Industry after the COVID-19 Pandemic', (2024) 116 *Journal of Air Transport Management* 102574.

⁸⁵See ICAO, Industry Views on CORSIA, ICAO Doc. A40-WP/193 (2 August 2019), Para. 2.3, available at www2023.icao.int/Meetings/a40/Documents/WP/wp_193_en.pdf. See Valdés, *supra* note 26, at 101; M. T. Ahmad, *Climate Change Governance in International Civil Aviation: Towards Regulating Emissions Relevant to Climate Change and Global Warming* (2016); S. Maertens, W. Grimme, and J. Scheelhaase, 'ICAO's New CORSIA Scheme at a Glance – A Milestone Toward Greener Aviation?', in F. Fichert, P. Forsyth, and H. M. Niemeier (eds.), *Aviation and Climate Change: Economic Perspectives on Greenhouse Gas Reduction Policies* (2020), 117 at 117–26.

⁸⁶See Maertens, Grimme, and Scheelhaase, *ibid.*, at 118. ATAG, 'Countdown to CORSIA Nears Key Milestone', 18 October 2018, available at atag.org/news/countdown-to-corsia-nears-key-milestone/.

improvements, operational improvements, and sustainable aviation fuels.⁸⁷ On the other hand, this scheme has various limitations regarding its design elements, such as the exclusion of non-CO₂ emissions and an internal logic that aims to offset the increase in CO₂ emissions rather than limiting them fundamentally.⁸⁸

Beyond these technical constraints, the legal force of Annex 16, Volume 3: Aeroplane CO₂ Emissions and Annex 16, Volume 4: CORSIA is uncertain due to the ambiguous legal status of SARPs. The key question is about enforcement: what are the consequences if states do not comply with Annex 16? The following sections discuss the legal status and consequences of non-compliance with SARPs.

3. Legal status of SARPs

The Council of ICAO (hereinafter 'ICAO Council') has mandatory functions, one of those functions being the adoption of SARPs. Before being officially adopted by the ICAO Council, the development of SARPs follows a multi-stage process involving many technical and non-technical bodies that are either within ICAO or closely associated with ICAO and ICAO member states.⁸⁹ Article 54 (I) of the Chicago Convention states that 'The Council shall ... adopt ... international standards and recommended practices; for convenience, designate them as Annexes to this Convention'. Thus, SARPs are grouped into 19 Annexes to the Convention.

The first question that should be addressed is whether those 19 Annexes are an integral part of the Chicago Convention. Although there is a view that this question is 'largely academic' as SARPs are highly authoritative in practice,⁹⁰ this is a fundamentally important question, and the author is of the view that the Annexes are not an integral part of the Chicago Convention. First, from the perspective of treaty law, it is a general practice to explicitly provide that the annex is integral to the treaty when a treaty has an annex.⁹¹ In other words, 'unless there is an express provision that a particular document or documents are integral to the treaty, the presumption is that they are not'.⁹² There is no such provision in the Chicago Convention and the Annexes. Second, by emphasizing the words of 'for convenience' in Article 54 (I), it can be argued that the Annexes are not an integral part of the Chicago Convention but are so designated only for convenience.⁹³ Third, the Chicago Convention drafters emphasized the flexibility of the Annexes and their difference with the Convention as below:

In consideration of the recognized need for the utmost flexibility in the adoption and amendment of Annexes, in order that they may be kept abreast of the development of the aeronautical arts, the Convention leaves the Council with a free hand for future action. No Annex is specifically identified in the Convention; and there is no limit to the adoption by the Council of any Annexes which may in future appear to be desirable. On the other hand, and

⁸⁷ICAO, *Chapter Six Climate Change Mitigation: CORSIA* (2019), 208.

⁸⁸See Mayer and Ding, *supra* note 33, 25–6; C. Lyle, 'Beyond the ICAO's CORSIA: Towards a More Climatically Effective Strategy for Mitigation of Civil-Aviation Emissions', (2018) 8 *Climate Law* 104, at 112–14.

⁸⁹ICAO, 'How ICAO Develops Standards', available at www.icao.int/about-icao/airnavigationcommission/pages/how-icao-develops-standards.aspx.

⁹⁰F. L. Kirgis, 'Specialized Law-Making Processes', in O. Schachter and C. C. Jovner (eds.), *United Nations Legal Order* (1995), 126; For the summary of the debate, see R. Abeyratne, *Convention on International Civil Aviation: A Commentary* (2014), 421–4.

⁹¹A. Aust, *Modern Treaty Law and Practice* (2007), 437.

⁹²*Ibid.*, at 438; For instance, the Convention Relating to the Regulation of Aerial Navigation in 1919 (The Paris Convention) which is considered the predecessor to the Chicago Convention has the express provision (Art. 39): 'The provisions of the present Convention are completed by the Annexes A to H, which, subject to Article 34 (c), shall have the same effect and shall come into force at the same time as the Convention itself.'

⁹³See Milde, *supra* note 52, at 176–7.

in fact as a necessary consequence of that flexibility, the Annexes are given no compulsory force. It remains open to any State to adopt its own regulations in accordance with its own necessities.⁹⁴

The Annexes can basically be described as associated documents of the Chicago Convention. However, they are not an integral part of the Chicago Convention, and therefore SARPs do not have the same legal force as the Chicago Convention itself. That SARPs do not have the same legal force as the Chicago Convention does not stop the discussion about their legal status.

Essentially, there are three questions in relation to the legal status of SARPs: (i) Is there a legal obligation for states to comply with SARPs? (ii) What are the consequences if states fail to report to ICAO their departure from SARPs? (iii) What are the consequences if states do not comply with SARPs even after agreeing to comply? An analysis of these questions should start with Article 37 of the Chicago Convention (Adoption of International Standards and Procedures). That article stipulates that

each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation.

The interpretation of ‘undertakes to collaborate’ is essential to understanding the legal force of these standards and states’ obligation to comply with them. The International Court of Justice’s judgment in the *Genocide* case is helpful in grasping the meaning of ‘undertake’:

The ordinary meaning of the word ‘undertake’ is to give a formal promise, to bind or engage oneself, to a pledge or promise, to agree, to accept an obligation. It is a word regularly used in treaties setting out the obligations of the contracting parties. It is not merely hortatory or purposive.⁹⁵

Following this reasoning, the ‘undertake’ in Article 37 of the Chicago Convention suggests that states are making a commitment, in contrast with hortatory or purposive language that is completely non-binding.⁹⁶ At the same time, the imperative force of ‘undertake’ in terms of the application of standards is less strong than that of ‘shall’ adopted in other provisions in the Chicago Convention.⁹⁷ Besides, what states have committed to under Article 37 is to ‘collaborate’, rather than to ‘comply with’ standards.⁹⁸ Furthermore, the phrase ‘the highest practicable degree of uniformity’ offers considerable flexibility to states over the domestic application of standards.

Apart from a textual approach of Article 37 of the Chicago Convention, the legal obligation of SARPs should be interpreted together with ICAO member states’ obligation from Article 38 (Departures from International Standards and Procedures). That article allows states to deviate from standards when it is ‘impracticable to comply in all aspects with any such international standard or procedure’. However, in that case, the state in question ‘shall give immediate notification to the International Civil Aviation Organization of the differences between its own

⁹⁴ICAO, *Proceedings of the International Civil Aviation Conference* (1948), Vol.1, 92.

⁹⁵*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v. Serbia and Montenegro)*, Judgment of 26 February 2007, [2007] ICJ Rep. 43, at 111, Para. 162.

⁹⁶For a detailed analysis on hortatory language in treaties, see B. F. Havel and I. Savic, ‘Against Hortatory Language in Treaties: Lessons for International Law from the Battle Over Article 17 bis of the US-EU Air Transport Agreement’, (2019) 44 *Annals Air & Space Law* 1.

⁹⁷See Havel and Sanchez, *supra* note 2, at 61.

⁹⁸See Milde, *supra* note 52, at 173.

practice and that established by the international standard'.⁹⁹ This option of opt-out system with mandatory reporting under Article 38 supports the legal obligation for states to comply with SARPs. In other words, states that do not report that difference are bound to comply with SARPs. As Milde noted, 'the weak international commitment in Article 37 of the [Chicago] Convention must be complied with in good faith by all [Member] States, and the duty to notify any differences under Article 38 is an unconditional legal obligation'.¹⁰⁰

This leads to the second question: What are the consequences if states fail to report to ICAO their departure from SARPs? In fact, it has been reported that many states with limited technical and economic resources often fail to notify ICAO under Article 38 of the Chicago Convention of their inability to implement the standards.¹⁰¹ However, the Chicago Convention does not have an effective enforcement mechanism for noncompliance with Article 38. A more direct question to the legal power of SARPs is the third question: What are the consequences if states do not comply with SARPs even after agreeing to comply? As an international organization, ICAO does not have procedures for enforcing compliance with SARPs.

ICAO's lack of power for sanctioning noncompliance with SARPs led to unilateral action in the 1990s. The United States adopted the International Aviation Safety Assessment (IASA) program in 1992,¹⁰² and the EU launched the Safety Assessment of Foreign Aircraft (SAFA) program in 1996.¹⁰³ Under the IASA program, the US Federal Aviation Administration (FAA) visits foreign states whose air carriers operate or seek to operate in the United States to assess the state's ability to comply with SARPs on safety issues, especially Annex 1 (Personal Licensing), Annex 6 (Operation of Aircraft) and Annex 8 (Airworthiness of Aircraft).¹⁰⁴ Accordingly, states are classified into Category One (those that adhere to SARPs) and Category Two (those that fail to adhere). Air carriers from Category One States can receive operating permissions, while carriers from Category Two States are prohibited from expanding their services or commencing operations.¹⁰⁵ The EU's SAFA program focuses on the aircraft's compliance with relevant safety standards.¹⁰⁶ EU member states conduct ramp inspections on third-country aircraft that land at

⁹⁹*Ibid.* It is important to note that there is no legal duty to notify a non-compliance with the recommended practices. Although the Chicago Convention does not provide a definition of the 'standards' and 'recommended practices', the first ICAO Assembly (ICAO Assembly Resolution A1-13) provided the definitions and the following sessions of the ICAO Assembly and other regulatory instruments endorse the definitions as below: "Standards" means any specification for physical characteristics, configurations, material, performance, personnel, or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Member States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38 of the Convention. "Recommended Practices" means any specification for physical characteristics, configuration, material, performance, personnel, or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity, or efficiency of international air navigation, and to which Member States will endeavor to conform in accordance with the Convention."

¹⁰⁰See Milde, *supra* note 52, at 184.

¹⁰¹Michael Milde, a former ICAO Legal Director, notes that the ICAO Secretariat openly admitted the problem as follows: 'It is at present time impossible to indicate with any degree of accuracy or certainty what the state of implementation of regulatory Annex material really is, because a large number of States have not notified ICAO of their compliance with or differences to the standards in the Annexes for some considerable time', see ICAO Doc. C-WP/10216 (26 May 1995), at 5, in Milde, *supra* note 52, at 185.

¹⁰²US Federal Aviation Administration, 'International Aviation Safety Assessment (IASA) Program', available at www.faa.gov/about/initiatives/iasa.

¹⁰³EASA, The EU SAFA Programme (Safety Assessment of Foreign Aircraft) Aggregated Information Report (1 January 2011 to 31 December 2012), at 3.

¹⁰⁴See US Federal Aviation Administration, *supra* note 102, 'IASA Program and Process'.

¹⁰⁵*Ibid.*, 'IASA Results Definitions'.

¹⁰⁶EASA, 'Ramp Inspection Programmes (SAFA/SACA)', available at www.easa.europa.eu/en/domains/air-operations/ramp-inspection-programmes-safa-saca.

their airports.¹⁰⁷ Ramp inspections are essentially on-site checks to ensure aircraft's compliance with safety standards. This program was later expanded to the inspections of aircraft under the safety oversight of EU member states.¹⁰⁸ According to inspection results, EU member states can require aircraft operators to address deficiencies before a flight¹⁰⁹ or even impose a ban or conditions on the operation of a non-complaint aircraft.¹¹⁰

The development of these audit programs served as the impetus for establishing a global audit program under ICAO's purview.¹¹¹ The 32nd ICAO Assembly in 1998 decided to establish the Universal Safety Oversight Audit Programme (USOAP) 'comprising regular, mandatory, systematic and harmonized audits' and directed the Council to bring it into effect from 1 January 1999.¹¹² This program applied to all contracting states with their consent.¹¹³ It aimed to promote global aviation safety by auditing the effectiveness of states' implementation of safety oversight, determining their conformity with standards, observing and assessing their adherence to recommended practices, and advising states about how to improve their audit capability.¹¹⁴

After completing its auditing work, the ICAO audit team deliver final reports containing the findings of non-compliance with regulations promulgated by states or provisions of the Convention, nonconformity with ICAO standards, and non-adherence to recommended practices or other guidance materials.¹¹⁵ Since the results of the USOAP audits are made available to all other member states,¹¹⁶ ICAO is able to have a 'name and shame' effect despite its lack of enforcement measures for SARP noncompliance. Although the USOAP helps raise the level of SARP compliance, the legal force of SARPs is not strong enough on a multilateral level. Bilateral ASAs, however, provide more powerful and effective measures. The analysis in the following sections will examine how ASAs can help implement SARPs, first by focusing on safety provisions in Section 4, then turning to environmental provisions in Section 5.

4. ASA mechanisms for enforcing compliance with SARPs on aviation safety

The purpose of this section is to demonstrate how ASAs provide enforcement mechanisms for SARPs on safety issues. As aviation safety and environmental protections are the core principles of SARPs,¹¹⁷ it will offer insights about how ASAs can interact with SARPs on environmental protection, particularly on carbon emissions.

The following section traces this progress by examining 620 publicly available ASAs between different states on a best-effort basis. The timeframe of the 620 ASAs is as follows. There are ten from the 1940s, 11 from the 1950s, 21 from the 1960s, 45 from the 1970s, 42 from the 1980s, 154 from the 1990s, 149 from the 2000s, 168 from the 2010s and 20 from the 2020s. These ASAs have been collected from two main sources: the publicly accessible archives of ASAs in respective domestic departments of transportation or other authorities and the ICAO database of

¹⁰⁷Directive 2004/36/CE of the European Parliament and of the Council of 21 April 2004 on the Safety of Third-Country Aircraft Using Community Airports, OJ L 143/76 (2004), Arts. 1.1, 1.2 (Directive 2004/36/CE). That was repealed by Regulation (EC) No 216/2008, which was itself eventually repealed by Regulation (EU) 2018/1139.

¹⁰⁸Commission Regulation No 965/2012 of 5 October 2012 Laying Down Technical Requirements and Administrative Procedures Related to Air Operations Pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council, OJ L 296/1, (2012), Art. 4. See also EASA, *supra* note 106.

¹⁰⁹Directive 2004/36/CE, *supra* note 107, Arts. 7.1; Regulation (EU) 2018/1139 of the European Parliament and of the Council, OJ L 212/1 (2018), Art. 62.2 (d) (Regulation (EU) 2018/1139).

¹¹⁰See Directive 2004/36/CE, *ibid.*, Art. 9; see Regulation (EU) 2018/1139, *ibid.*, Art. 62.2(d)–(e).

¹¹¹See Havel and Sanchez, *supra* note 2, at 180.

¹¹²ICAO Assembly Resolution A32-11 (1998), Para. 1.

¹¹³*Ibid.*, Para. 3.

¹¹⁴ICAO, Safety Oversight Audit Manual, Doc. 9735 (2000), Sections 3.1, 3.2.

¹¹⁵*Ibid.*, Section 5.11.

¹¹⁶ICAO Assembly Resolution A 35-6 (2004), Para. 7.

¹¹⁷ICAO, 'Safety Report', 2024, available at www2023.icao.int/safety/Documents/ICAO_SR_2024.pdf, 3.

aeronautical agreements and arrangements (DAGMAR) that serves as a registry of ASAs.¹¹⁸ Given the fact that most ASAs are not publicly available, these two sources provide meaningful data sets to the best extent possible. To be clear, these data sets are a sample out of 4000+ ASAs. Therefore, it is possible that there are other ASA models that are designed to comply with SARPs on aviation safety. Another important consideration is that many states use Memorandums of Understanding, Annexes, or exchanges of letters as supplementary documents to ASAs that are not published as they are traditionally regarded as being confidential.¹¹⁹ That implies that SARPs on safety issues could be included in those supplementary documents rather than in the texts of ASAs. Regardless, since the purpose of this section is to demonstrate that many ASAs interact with SARPs on aviation safety, missing ASAs will not bias the general findings.

The 620 publicly available ASAs (183 countries are a party to at least one of them) were collected as follows: 140 ASAs adopted by the United States from the database of the Department of State;¹²⁰ 56 ASAs adopted by the Hong Kong Special Administrative Region from the database of agreements published by the Department of Justice;¹²¹ 58 ASAs adopted by Australia from the database of the department governing transportation;¹²² 103 ASAs adopted by India from the data on agreements provided by the Ministry of Civil Aviation;¹²³ seven ASAs adopted by New Zealand from the database on all its treaties;¹²⁴ 12 ASAs adopted by the United Kingdom from the archives of bilateral treaties;¹²⁵ two ASAs adopted by Iceland from the list published by the Ministry of Foreign Affairs;¹²⁶ 76 ASAs adopted by China from the database of the Civil Aviation Administration;¹²⁷ 31 ASAs adopted by Korea from the database on foreign policy;¹²⁸ six ASAs adopted by the EU from the database of EU legislation;¹²⁹ and 64 ASAs adopted by Canada from the dataset of the Treaty Law Division of the Department of Foreign Affairs, Trade, and Development.¹³⁰ Other ASAs, including 33 adopted by Singapore, seven adopted by Korea, and 25 adopted by China, were retrieved from DAGMAR.

Safety clauses are incorporated in 58 per cent of the reviewed ASAs. In this review, safety clauses consist of (i) clauses titled 'aviation safety' or 'safety' in ASAs, (ii) clauses titled 'airworthiness' in ASAs specifying that states may hold consultations about safety standards and (iii) clauses titled 'recognition of certificates and licenses and safety'. In essence, they are clauses that specifically mention safety standards in the text. Although 42 per cent of the reviewed ASAs do not have safety clauses, a vast majority of those ASAs (237 out of 263) were concluded in the

¹¹⁸ICAO, 'ICAO's Database of Aeronautical Agreements and Arrangements', available at cfapps.icao.int/dagmar/main.cfm.

¹¹⁹Australia Department of Infrastructure, Transport, Regional Development, Communication and the Arts, 'Australia's Air Services Agreements & Arrangements', available at www.infrastructure.gov.au/infrastructure-transport-vehicles/aviation/international-aviation/air-services-agreements-arrangements.

¹²⁰US Department of State, 'Full List of Air Transport Agreements and Record Documents', available at www.state.gov/full-list-of-air-transport-agreements-and-record-documents/.

¹²¹HK Department of Justice, 'List of Air Services Agreements and Air Services Transit Agreements', 26 October 2023, available at www.doj.gov.hk/en/external/table1ti.html.

¹²²See Australia Department of Infrastructure, Transport, Regional Development, Communication and the Arts, *supra* note 119.

¹²³India Ministry of Civil Aviation, 'Agreements', available at www.civilaviation.gov.in/index.php/air-services-agreements.

¹²⁴NZ Ministry of Foreign Affairs & Trade, 'New Zealand Treaties Online', available at www.treaties.mfat.govt.nz/search.

¹²⁵Gov. UK, 'Collection: Bilateral Treaties Published in the Country Series', 15 October 2013, available at www.gov.uk/government/collections/command-papers-by-country-2013#2022.

¹²⁶Iceland Ministry of Foreign Affairs, 'Iceland's Air Services Agreements', available at www.government.is/library/01-Ministries/Ministry-for-Foreign-Affairs/External-Trade/Overview%20ASA%20english%2013.01.2022%20FINAL.pdf.

¹²⁷Civil Aviation Administration of China, 'International Air Transport: Bilateral Agreements', available at www.caac.gov.cn/English/Transport/Bilateral/.

¹²⁸Ministry of Foreign Affairs, 'Treaty Information System', available at treatyweb.mofa.go.kr/usr/main/main.do;jsessionid=cu5yn5E7C82UoPsBA8T3PBj9-ZpmQ6J90yLMPJAw.treatyinter03.

¹²⁹European Union, 'Summaries of EU Legislation: Transport', available at eur-lex.europa.eu/summary/chapter/32.html.

¹³⁰Government of Canada, 'Treaty List', available at www.treaty-accord.gc.ca/result-resultat.aspx?lang=eng&type=10&subject=b8c00d15-c737-eb11-96a3-005056834bd1&page=1&maxRecords=50&t=638724220595203518.

twentieth century. Thus, revised ASAs that are not publicly available are also likely to include safety clauses.

It is important to note that the earliest ASAs, Bermuda I-type Agreements, did not incorporate a safety clause, except for a reproduction of Article 33 of the Chicago Convention on the mutual recognition of certificates and licenses.¹³¹ Starting in the 1970s, a separate clause on safety issues appeared in some ASAs. A typical example is the new ASA adopted by the United States and the United Kingdom in 1977, often called the Bermuda II Agreement.¹³² The safety provision in this agreement operates in three steps: consultation, requesting corrective actions and withholding operating authorization. Each contracting party can request consultations ‘concerning the safety and security standards and requirements’ maintained by the other party. Further, the requesting party shall notify the other one of findings on its failure to ‘maintain and administer safety and security standards and requirements . . . that are equal to or above the minimum standards that may be established pursuant to the Convention’, as well as the necessary corrective actions. The other party should take ‘such appropriate action within a reasonable time’; otherwise, the requesting party can withhold, revoke, or impose conditions on operating authorization.¹³³ Out of the 58 per cent of the reviewed ASAs that incorporate safety clauses, nearly all these safety clauses take this basic three-tier mode (see Figure 1).¹³⁴

Beyond the three-tier measures, many ASAs show some variations (see Figure 2). Some ASAs allow each contracting party to make ramp inspections,¹³⁵ reproducing Article 16 of the Chicago Convention on the search of aircraft.¹³⁶ When ramp inspection gives rise to serious concerns that an aircraft or its operation does not meet minimum standards or that safety standards are not being effectively maintained, the inspecting party is free to conclude that the other party is failing to meet relevant ICAO standards.¹³⁷ Denying ramp inspections can constitute grounds for the requesting party to freely ‘infer the serious concerns’ and ‘draw the conclusions’ referred to above.¹³⁸ Of the safety provisions in the reviewed ASAs, 53 per cent incorporate the provision of ramp inspections following the three-tier measures, and 36 per cent of them specify the consequences of such inspections. Of safety provisions, 11 per cent require the contracting party to inform the ICAO Secretary General if the other party remains in non-compliance with minimum standards, as well as the subsequent satisfactory solution.¹³⁹ However, these provisions are silent on what the ICAO Secretary General can actually do. In addition to these step-by-step measures, 69 per cent of the safety clauses allow for immediate action. If it is essential to the safety of aircraft operation, contracting parties can immediately suspend or vary operating authorization

¹³¹See Bermuda I, *supra* note 8, Art.4.

¹³²1977 Consolidated Air Services Agreement between the Government of the United States of America and the Government of the United Kingdom, US TIAS 8641 (Bermuda II).

¹³³*Ibid.*, Art. 6(2).

¹³⁴For example, see 1990 Air Services Agreement between the Government of the United Mexican States and the Government of the Republic of Singapore, Art. 8.2 (Singapore–Mexico ASA); 1996 Air Services Agreement between the Government of the Republic of Korea and the Government of the Argentina Republic, Arts. 8.2, 8.3 (Korea–Argentina ASA); 2008 Air Services Agreement between the Government of the Republic of India and the Government of the Republic of Chile, Art. 6 (India–Chile ASA); 2000 Agreement between the Government of the Hong Kong Special Administrative Region of the People’s Republic of China and the Government of the Republic of South Africa Concerning Air Services, HK Special Supplement No 5 to Gazette No 37 Vol 4 E1213, Art.9 (HK–South Africa ASA).

¹³⁵See, e.g., 2008 Agreement between the Government of Australia and the Swiss Federal Council relating to Air Services, [2011] ATS 19, Art. 5.4 (Australia–Switzerland ASA).

¹³⁶See Chicago Convention, *supra* note 4, Art. 16.

¹³⁷See, e.g., Australia–Switzerland ASA, *supra* note 135, Art. 5.5.

¹³⁸*Ibid.*, Art. 5.6.

¹³⁹2009 Agreement between Australia and the Kingdom of Spain relating to Air Services, [2011] ATS 16, Art. 5.10 (Australia–Spain ASA).

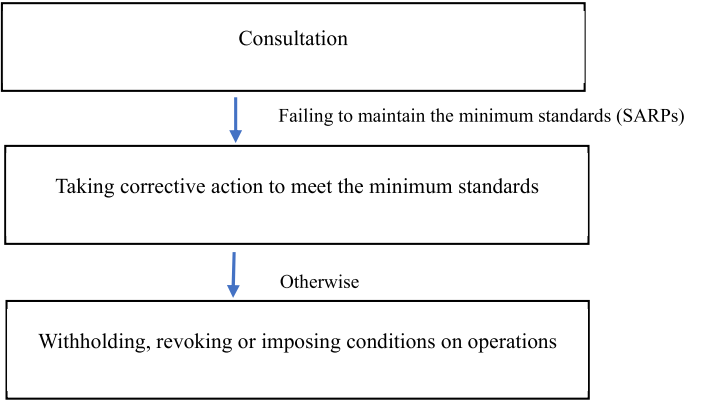


Figure 1. Basic structure of aviation safety enforcement mechanism.

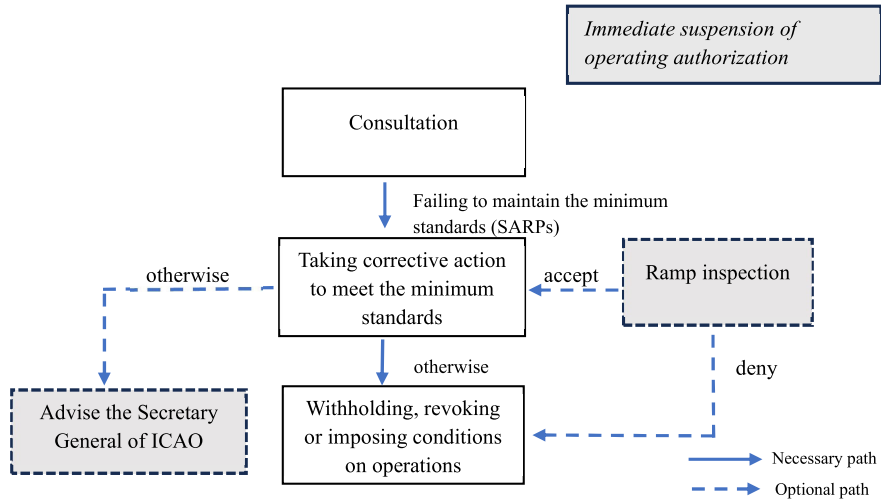


Figure 2. Comprehensive structure of aviation safety enforcement mechanism.

even before the consultation and the conclusion of the ramp inspection.¹⁴⁰ A very few ASAs – only two among all the ones reviewed – include all the above measures in one safety clause.¹⁴¹

The review of ASAs at different stages shows the broad spectrum of forms that safety clauses take. Even with great variation in wording and detailed measures, the shared logic behind these safety clauses is to ensure that the contracting parties comply with the safety standards established by ICAO in at least three senses. First, the main focus in the consultation procedure is to examine whether other parties ‘effectively maintain and administer safety standards and requirements equal to or above the minimum standards established pursuant to the [Chicago] Convention’.¹⁴² Such ‘minimum standards established pursuant to the Convention’ are also the benchmark

¹⁴⁰*Ibid.*, Art. 5.7.

¹⁴¹2016 Agreement between the Government of Australia and the Government of the Republic of Mauritius relating to Air Services, [2018] ATS 7, Art. 5 (Australia–Mauritius ASA); 2018 Agreement on Air Services between the Republic of Korea and the Portuguese Republic, Treaty No. 2441, Art. 14 (Korea–Portuguese ASA).

¹⁴²See Australia–Spain ASA, *supra* note 139, Art. 5.5; see Korea–Portuguese ASA, *ibid.*, Art. 14.2.

against which one contracting party assesses the ‘validity of the aircraft documents and its crew and conditions of aircraft and its equipment’¹⁴³ during the ramp inspection of another party’s aircraft.

Those safety clauses in ASAs impose obligations on contracting parties to take corrective action to meet the minimum standards.¹⁴⁴ In contrast to the vague wording in Article 37 of the Chicago Convention (‘undertakes to collaborate in securing the highest practicable level’), the language in ASAs is straightforward. Consequently, if one party finds that the other party does not effectively maintain and administer safety standards, the other contracting party is required to take appropriate corrective action. Such arrangements in ASAs strongly encourage states to comply with SARPs on safety issues.

Most importantly, safety clauses in ASAs specify the consequences of failing to meet such minimum standards; namely, withholding, revoking, or imposing conditions on operating authorization. In 36 per cent of the reviewed ASAs, failure to comply with ICAO safety standards is grounds for revoking or limiting authorization. With this serious economic punishment, the minimum safety standards (that is, SARPs) offer powerful enforcement measures.

Overall, ASAs interconnect with the SARPs adopted by ICAO and together form a net for regulating safety issues in international civil aviation. The safety clauses in ASAs explicitly define the obligations for contracting parties to enforce ICAO’s safety standards, which specify states’ commitments to secure ‘the highest practicable degree of uniformity’ in standards under the Chicago Convention. Further, ASAs offer a wide spectrum of enforcement measures, ranging from the moderate to the serious – that is, from consultation to restricting or even revoking operating authorization.

5. Environmental clauses in ASAs

The well-established mechanism of regulating aviation safety issues by ASAs provides a lesson on the regulation of carbon emissions from international civil aviation. In brief, ASAs can be instrumental in promoting states’ implementation of SARPs on environmental protection despite the weakness of SARPs on a multilateral level. After outlining the environmental provisions in ASAs, this section will evaluate the different nuances of these provisions in addressing international aviation emissions. This section will show that environmental clauses in ASAs are developing from simply including environmental clauses without binding language to having CORSIA-specific clauses that will interact with the ICAO-developed SARPs.

The environment was not a topic in ASAs in the twentieth century, but since the 2000s, some ASAs have started to incorporate the environment. The EU–US ASA adopted in 2007 set a precedent for environmental provisions that was amended by the protocol adopted in 2010. Environmental provisions are included in 20 other ASAs reviewed for this article. Although that number is small, it is very likely that other ASAs contain environmental provisions as well. Not only are there many more ASAs that are not publicly available, but many states use supplementary documents to ASAs (e.g., Memorandums of Understanding, Annexes or exchanges of letters) that are generally confidential.¹⁴⁵ The environment is an issue that can be included in those supplementary documents. Although this survey on environmental provisions in ASAs is admittedly incomprehensive, various environmental provisions below provide exemplary structures and modalities. Broadly, three categories of environmental clauses have been observed.

¹⁴³See Australia–Switzerland ASA, *supra* note 135, Art. 5.4; see Korea–Portuguese ASA, *supra* note 141, Art. 9.1.

¹⁴⁴See Australia–Switzerland ASA, *supra* note 135, Art. 5.3.

¹⁴⁵See Australia Department of Infrastructure, Transport, Regional Development, Communication and the Arts, *supra* note 119.

5.1. Environmental clause with hortatory language

The first group of environmental clauses derives from the EU's new ASAs with various countries: namely, the US (2007 and 2010), Canada (2010), Morocco (2006), Jordan (2012), and Israel (2013). The adoption of environment clauses in those ASAs demonstrates one of the objectives behind the EU's external aviation policy – to 'ensure overriding public safety and security and environmental goals'.¹⁴⁶ In the EU-US ASA, the lengthy 'Environment' article¹⁴⁷ broadly categorizes three environmental measures: aspirational pledges, responses to the aircraft noise issue, and consultation and co-ordination through the joint committee. Aspirational pledges emphasize on environmental protection, calling for parties to 'work together' and to consider 'regional, national, or local' environmental measures evaluating the adverse effects of environmental measures on exercising economic rights, and exchanging environmental information.¹⁴⁸ Article 15, Paragraph 3, of the ASA contains binding commitments on the enforcement of environmental standards established by

¹⁴⁶European Commission, The EU's External Aviation Policy–Addressing Future Challenges, COM/ 2012/0556 final (2012), available at eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52012DC0556, Para. 32. One of the three parallel objectives of the EU's external aviation policy is 'wider public policy objectives going beyond traffic rights (the EU approach will therefore seek to ensure overriding public safety, security and environmental goals)'.

¹⁴⁷For a detailed analysis, see Havel and Savic, *supra* note 96.

¹⁴⁸2010 Protocol to EU-US Air Transport Agreement, US TIAS 22-505.1 (2010), Art. 15. Environment,

1. The Parties recognise the importance of protecting the environment when developing and implementing international aviation policy, carefully weighing the emits and benefits of measures to protect the environment in developing such policy, and, where appropriate, jointly advancing effective global solutions. Accordingly, the Parties intend to work together to limit or reduce, in an economically reasonable manner, the impact of international aviation on the environment.
2. When a Party is considering proposed environmental measures at the regional, national or local level, it should evaluate possible adverse effects on the exercise of rights contained in this Agreement, and, if such measures are adopted, it should take appropriate steps to mitigate any such adverse effects. At the request of a Party, the other Party shall provide a description of such evaluation and mitigating steps.
3. When environmental measures are established, the aviation environmental standards adopted the International Civil Aviation Organisation in Annexes to the Convention shall be followed except where differences have been filed. The Parties shall apply any environmental measures affecting air services under this Agreement in accordance with Article 2 and 3(4) of this Agreement.
4. The Parties reaffirm the commitment of Member States and the United States to apply the balanced approach principle.
5. The following provisions shall apply to the imposition of new mandatory noise-based operating restrictions at airports which have more than 50,000 movements of civil subsonic jet aeroplanes per calendar year:
 - (a) The responsible authorities of a Party shall provide an opportunity for the views of interested parties to be considered in the decision-making process.
 - (b) Notice of the introduction of any new operating restriction shall be made available to the other Party at least 150 days prior to the entry into force of that operating restriction. At the request of that other Party, a written report shall be provided without delay to that other Party explaining the reasons for introducing the operating restriction, the environmental objective established for the airport, and the measures that were considered to meet that objective. That report shall include the relevant evaluation of the likely costs and benefits of the various measures considered.
 - (c) Operating restrictions shall be (i) non-discriminatory, (ii) not more restrictive than necessary in order to achieve the environmental objective established for a specific and (iii) non-arbitrary.
6. The Parties endorse and shall encourage the exchange of information and regular dialogue among experts, in particular through existing communication channels, to enhance consistent with applicable laws and regulations, on addressing international aviation environmental impacts and mitigation solutions, including:
 - (a) research and development of environmentally-friendly aviation technology;
 - (b) improvement of scientific understanding regarding aviation emissions impacts in order to better inform policy decisions;
 - (c) air traffic management innovation with a view to reducing the environmental impacts of aviation;
 - (d) research and development of sustainable alternative fuels for aviation; and
 - (e) exchange of views on issues and options in international fora dealing with the environmental effects of aviation, including the coordination of positions, where appropriate.

ICAO.¹⁴⁹ To be clear, this ASA was established before CORSIA, and its focus was aircraft noise under Annex 16, Volume 1: Aircraft Noise. Under this ASA, the joint committee is mandated to develop recommendations to address the ‘overlap’ between national MBMs and avoid duplication. Additionally, the joint committee should assess the legitimacy of national environmental measures upon the parties’ request. Seemingly, such arrangements reflect the history of the EU’s controversial decision to extend ETS to international aviation¹⁵⁰ and correspond to general guidance on considering ‘regional, national, or local’ environmental measures.

The environmental provision in the EU–Canada ASA¹⁵¹ follows the pattern established by the EU–US ASA but with some variations. To be specific, the EU–Canada ASA duplicates the indefinite guidance on environmental protection in the EU–US ASA.¹⁵² However, neither of the two ASAs mentions the climate impacts of international civil aviation. Rather than requesting an exchange of information, the EU–Canada ASA defines the parties’ obligation to consult each other on various environmental matters.¹⁵³ In addition to enforcing ICAO’s environmental standards, this ASA obliges parties to apply environmental measures ‘without distinction as to nationality’.¹⁵⁴

There are environmental provisions in the Euro–Mediterranean aviation agreements between the EU and Morocco (2006), Jordan (2012), and Israel (2013). The common elements shared by this group of environmental clauses are the obligation for states to conform with SARPs on aircraft

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7. If so requested by the Parties, the Joint Committee, with the assistance of experts, shall work to develop recommendations that address issues of possible overlap between and consistency among market-based measures regarding aviation emissions implemented by the Parties with a view to avoiding duplication of measures and costs and reducing to the extent possible the administrative burden on airlines. Implementation of such recommendations shall be subject to such internal approval or ratification as may be required by each Party.
 8. If one Party believes that a matter involving aviation environmental protection, including proposed new measures, raises concerns for the application or implementation of this Agreement, it may request a meeting of the Joint Committee, as provided in Article 18, to consider the issue and develop appropriate responses to concerns found to be legitimate.

¹⁴⁹*Ibid.*, Art. 15.3.

¹⁵⁰See references at notes 63–65, *supra*.

¹⁵¹2009 Agreement on Air Transport between Canada and the European Community and its Member States, [2010] OJ L 207/32, Art. 18 Environment (EU–Canada ASA).

1. The Parties recognise the importance of protecting the environment when developing and implementing international aviation policy.
2. Without prejudice to the rights and obligations of the Parties under international law and the Convention, each Party within its own sovereign jurisdiction shall have the right to take and apply the appropriate measures to address the environmental impacts of air transport provided that such measures are applied without distinction as to nationality.
3. The Parties recognise that the costs and benefits of measures to protect the environment must be carefully weighed in developing international aviation policy. When a Party is considering proposed environmental measures, it should evaluate possible adverse effects on the exercise of rights contained in this Agreement, and, if such measures are adopted, it should take appropriate steps to mitigate any such adverse effects.
4. The Parties recognise the importance of working together, and within the framework of multilateral discussions, to consider the effects of aviation on the environment and the economy, and to ensure that any mitigating measures are fully consistent with the objectives of this Agreement.
5. When environmental measures are established, the aviation environmental standards adopted by International Civil Aviation Organization in Annexes to the Convention shall be followed except where differences have been filed.
6. The Parties shall endeavour to consult each other on matters of the environment, including on planned measures likely to have a significant effect on the international air services covered by this Agreement, with a view to achieve compatible approaches to the extent possible. Consultations shall start within 30 days of receipt of such a request, or any other period of time where mutually determined.

¹⁵²*Ibid.*

¹⁵³*Ibid.*, Art. 18.6.

¹⁵⁴*Ibid.*, Art. 18.

noise¹⁵⁵ and the confirmation of their right to apply environmental measures ‘without distinction as to nationality’.¹⁵⁶ However, they are silent about climate impacts.

As one of the first ASAs that incorporated environmental provisions, the EU–Morocco ASA addresses the issue only briefly.¹⁵⁷ That shows, however, that there are more details in the confidential annex of the ASA. The EU–Jordan and EU–Israel ASAs incorporate some extra components, such as hortatory provisions on the significance of environmental protection and co-operation between the contracting parties.¹⁵⁸ The EU–Israel ASA further ‘acknowledges’ the need for ‘effective global, regional, national and/or local action’.¹⁵⁹

¹⁵⁵2006 Euro–Mediterranean Aviation Agreement between the European Community and its Member States, of the One Party and the Kingdom of Morocco, of the Other, [2006] OJ L 386/57, Art. 17.1 (EU–Morocco ASA); 2010 Euro–Mediterranean Aviation Agreement between the European Union and its Member States, of the One Part, and the Hashemite Kingdom of Jordan, of the Other Part, [2012] OJ L 334/3, Art. 16.4 (EU–Jordan ASA); 2013 Euro–Mediterranean Aviation Agreement between the European Union and its Member States, of the One Part and the Government of the State of Israel, of the Other Part, [2013] OJ L 208/3, Art. 16.5 (EU–Israel ASA).

¹⁵⁶See EU–Morocco ASA, *ibid.*, Art.17.2; see EU–Jordan ASA, *ibid.*, Art. 16.3; see EU–Israel ASA, *ibid.*, Art. 16.4.

¹⁵⁷See EU–Morocco ASA, *supra* note 155, Art. 17 Environment,

1. The Contracting Parties shall act in conformity with Community Legislation relating to air transport specified in Part C of Annex VI.
2. Nothing in this Agreement shall be construed to limit the authority of the competent authorities of a Contracting Party to take all appropriate measures to prevent or otherwise address the environmental impacts of the international air transport performed under the Agreement provided that such measures are applied without distinction as to nationality.

¹⁵⁸See EU–Jordan ASA, *supra* note 155, Art. 16 Environment,

1. The Contracting Parties recognize the importance of protecting the environment when developing and implementing international aviation policy.
2. The Contracting Parties recognize the importance of working together, and within the framework of multilateral discussions, to consider the effects of aviation on the environment and the economy, and to ensure that any mitigating measures are fully consistent with the objectives of this Agreement.
3. Nothing in this Agreement shall be construed to limit the authority of the competent authorities of a Contracting Party to take all appropriate measures within its sovereign jurisdiction to prevent or otherwise address the environmental impacts of air transport provided that such measures are fully consistent with their rights and obligations under international law and are applied without distinction as to nationality.
4. The Contracting Parties shall ensure that their legislation delivers the standards specified in Part D of Annex III to this Agreement;

See EU–Israel ASA, *supra* note 155, Art. 16 Environment,

1. The Contracting Parties recognize the importance of protecting the environment when developing and implementing international aviation policy.
2. The Contracting Parties acknowledge that effective global, regional, national and/or local action is needed to minimise the impact of civil aviation on the environment.
3. The Contracting Parties recognize the importance of working together, and within the framework of multilateral discussions, to consider and minimise the effects of aviation on the environment and the economy, and to ensure that any mitigating measures are fully consistent with the objectives of this Agreement.
4. Nothing in this Agreement shall be construed to limit the authority of the competent authorities of a Contracting Party to take all appropriate measures to prevent or otherwise address the environmental impacts of air transport provided that such measures are applied without distinction as to nationality.
5. The Contracting Parties shall ensure that their relevant legislation, rules or procedures deliver, at minimum, the regulatory requirements and standards relating to air transport specified in Part C of Annex IV as detailed in Annex VI.

¹⁵⁹See EU–Israel ASA, *supra* note 155, Art. 16.2.

Table 1. Sample environmental clauses with obligation to comply with environmental SARPs.

UK–Vietnam 2011/UK–Indonesia 2013	UK–Switzerland 2018/UK–Bahamas 2019 (Article 19)/UK–Montenegro 2019 (Article 18)/UK–Iceland 2020 (Article 18)/UK–Norway 2020 (Article 20)/UK–Saint Vincent 2022 (Article 19)/UK–Bahrain 2022 (Article 20)/UK–Georgia 2023 (Article 18)/UK–Saudi Arabia 2023 (Article 18)	UK–Kuwait 2018/Iceland–Israel 2018
Environmental Protection (1) The Contracting Parties support the need to protect the environment by promoting the sustainable development of aviation. (2) When environmental measures are established, the aviation environmental standards adopted by the International Civil Aviation Organisation in Annexes to the Chicago Convention shall be followed except where differences have been filed.	Environmental Protection 1. The Contracting Parties support the need to protect the environment by promoting the sustainable development of aviation. 2. When environmental measures are established, the aviation environmental standards adopted by the International Civil Aviation Organisation in Annexes to the Chicago Convention shall be followed except where differences have been filed. 3. Nothing in this Agreement shall be construed to limit the authority of the competent authorities of a Contracting Party to take all appropriate measures to prevent or otherwise address the environmental impacts of air services, provided that such measures are fully consistent with their rights and obligations under international law and are applied without distinction as to nationality.	Environmental Protection The Contracting Parties support the need to protect the environment by promoting the sustainable development of aviation. The Contracting Parties agree with regard to operations between their respective territories to comply with the International Civil Aviation Organisation Standards and Recommended Practices (SARPs) of Annex 16, except where differences have been filed, and the existing International Civil Aviation Organisation policy and guidance on environmental protection.

5.2. Environmental clause with obligation to comply with environmental SARPs

The second group refers to environmental provisions in the ASAs reached by the UK, Iceland, and other states. These articles on ‘Environmental Protection’ in this group are remarkably similar (see Table 1). The provision starts with an introductory description of the states’ consensus on supporting ‘the need to protect the environment by promoting the sustainable development of aviation’.¹⁶⁰ The phrases following this general description set the obligations of the contracting parties to enforce environmental standards adopted by ICAO¹⁶¹ and apply appropriate environmental measures without distinction as to nationality.¹⁶² While this group of environmental articles avoid lengthy wording and hortatory expressions, they do not specifically mention climate impacts. At the same time, it is important to note that most ASAs in this group were concluded after the adoption of Annex 16, Volume 4: Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Therefore, it can be assumed that SARPs on GHG are included in those ASAs.

¹⁶⁰2020 Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of Iceland Air Services, Iceland No.1 (2021), Art. 18 (1) (UK–Iceland ASA).

¹⁶¹See UK–Iceland ASA, *ibid.*, Art. 18(2).

¹⁶²Some of the UK’s ASAs do not adopt such provisions. For example, see 2013 Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Republic of Indonesia Concerning Air Services, Indonesia No. 1 (2017), Art. 16 (UK–Indonesia ASA); 2011 Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Socialist Republic of Vietnam Concerning Air Services, Vietnam No.1 (2013), Art. 19 (UK–Vietnam ASA).

Table 2. Sample environmental clauses with a reference to GHG emissions.

EU–Qatar 2021	EU–ASEAN 2022
Article 16 Environment 1. The Parties support the need to protect the environment by promoting the sustainable development of aviation. The Parties intend to work together to identify issues related to the impacts of aviation on the environment. 2. The Parties recognise the importance of working together, to consider and minimise the effects of aviation on the environment consistent with the objectives of this Agreement. 3. The Parties recognise the importance of addressing climate change and therefore of limiting or reducing greenhouse gas (GHG) emissions associated with domestic and international air transport. They agree to cooperate on these matters, with a view to develop and implement instruments, including implementing rules for the development of the Carbon Offset and Reduction Scheme for International Aviation (CORSIA) and any other aspect of particular relevance to address GHG emissions in the aviation sector. 4. The Parties undertake to exchange information and have regular dialogue among experts to enhance cooperation on addressing aviation environmental impacts including: (a) on research and development of environmentally-friendly aviation technology; (b) in air traffic management innovation with a view to reducing the environmental impacts of aviation; (c) on research and development of sustainable alternative fuels for aviation; (d) exchange of views on issues dealing with the environmental effects of aviation and mitigation of climate-related emissions of aviation; and (e) in noise mitigation and monitoring, with a view to reducing the environmental impacts of aviation. 5. The Parties shall also, in compliance with their multilateral environmental rights and obligations, enhance cooperation, including financial and technological, in relation to measures aimed at addressing greenhouse gas emissions from international aviation. 6. The Parties recognise the need to take appropriate measures to prevent or otherwise address the environmental impacts of air transport provided that such measures are fully consistent with their rights and obligations under international law.	Article 18 Environment 1. The Parties support the need to protect the environment by promoting the sustainable development of aviation. The Parties intend to work together to identify issues related to the impacts of international aviation on the environment. 2. The Parties recognise the importance of working together and with the global community, to consider and minimise the effects of aviation on the environment. 3. The Parties reiterate the importance of tackling climate change and towards this end, agree to cooperate in addressing greenhouse gas (hereinafter referred to as “GHG”) emissions associated with aviation, both at domestic and international levels. 4. The Parties agree to exchange information and have regular dialogue among experts to enhance cooperation to address the environmental impact of international aviation including in areas such as research and development, sustainable aviation fuels, noise related matters, and on other measures aimed at addressing GHG emissions, taking into account their multilateral environmental rights and obligations. 5. The Parties recognise the need to take appropriate measures to prevent or otherwise address the environmental impacts of air transport provided that such measures are fully consistent with their rights and obligations under international law.

5.3. Environmental clause with reference to GHG emissions

The third group of environmental clauses in the EU–Qatar ASA and the Association of Southeast Asian Nations (ASEAN)–EU ASA explicitly introduce a reference to reducing GHG emissions associated with domestic and international aviation (see Table 2).¹⁶³ At the same time, hortatory commitments were used instead of mandating conformity with environmental SARPs. In the EU–Qatar ASA, the contracting parties agree to co-operate on mitigating international aviation emissions ‘with a view to developing and implementing’ CORSIA and exchanging information on environmental impacts and mitigation options.¹⁶⁴ The EU–ASEAN ASA maintains the arrangement on dialogue and communication of information;¹⁶⁵ however, it does not specifically mention either ICAO or any SARPs on environmental issues.

¹⁶³2021 Agreement on Air Transport between the European Union and its Member States, of the One Part, and the State of Qatar, of the Other Part, [2021] OJ L 391/3, Art. 16.3 (EU–Qatar ASA); 2022 Annexes to the Proposal for a Council Decision on the Signing, on Behalf of the Union, of the Comprehensive Air Transport Agreement between the Member States of the Association of Southeast Asian Nations, and the European Union and its Member States, COM (2022) 194 final, Art. 18.3 (EU–ASEAN ASA).

¹⁶⁴See EU–Qatar ASA, *ibid.*, Art. 16.4.

¹⁶⁵See EU–ASEAN ASA, *supra* note 163, Art. 18.4.

6. How carbon emissions from international aviation will be regulated by ASAs

The development of environmental provisions in ASAs, and especially the incorporation of the phrases ‘GHG emissions with aviation’ and ‘CORSIA’ in the EU–Qatar and EU–ASEAN ASAs, raise a significant question about these provisions’ implications for climate change mitigation in international aviation. This question can further be framed as two sub-questions: (i) Can environmental clauses in ASAs function as safety clauses to ensure states’ compliance with SARPs, especially Annex 16, Volume 4: CORSIA? (ii) Will other provisions in ASAs, most importantly those on revoking authorization, affect states’ compliance with SARPs on CORSIA, as they have incentivized action on aviation safety?

A comparative analysis of safety and environmental provisions in ASAs is critical to answering the first question. The examination of environmental provisions in ASAs finds that, even with many changes in form and phrasing, they consistently stress the co-operation between states in aspirational formulations but refrain from introducing legal obligations for environmental protection. The only obligation for environmental protection deriving from the EU–Qatar ASA is to enhance co-operation in mitigating international aviation emissions. The EU–ASEAN ASA does not have any such binding commitments.

Safety provisions in ASAs are distinct from those on environmental issues in two obvious ways. First, although safety provisions differ considerably across ASAs, they share the same message – they obligate states to conform with safety standards adopted by ICAO. Second, those safety provisions are accompanied by a package of enforcement measures, the most serious of which is revoking operating permissions authorized by the ASA. Together with substantial economic loss in the relevant aviation market, revoking authorization generates reputational damage for a state and undermines other states’ confidence in its safe governance, which further constrains its participation in other bilateral aviation markets.¹⁶⁶ In contrast, the environmental provisions in ASAs featuring hortatory phrases and the absence of enforcement measures have, at present, only a limited role in facilitating states’ conformity with CORSIA to address the climate impacts of aviation.

However, including the environment in ASAs is a growing and unavoidable trend that will only accelerate and expand due to the urgency of climate change. In addition, states that commit to comply with CORSIA would want to introduce the same standards under ASAs. To illustrate the point, if State A complies with CORSIA but State B does not, airlines from State A must comply with various regulatory requirements under CORSIA but airlines from State B do not need to comply. As discussed in Section 3, the Chicago Convention allows the possibility of noncompliance. Assuming that airlines from State A and State B compete in the same international aviation market, airlines from State A would protest about unfair competition as SARPs place a disproportionate burden on them, thereby weakening their ability to compete with airlines from State B. Therefore, State A will likely pressure State B to incorporate CORSIA in their ASA.

The gradual expansion of the scope of revoking authorization has significant implications as well. ASAs usually define the grounds for limiting or revoking authorization as the failure to meet safety standards, conditions about substantial local ownership of designated airlines, and requirements about security issues.¹⁶⁷ Interestingly, Article 5 of the EU–ASEAN ASA expands the scope of those grounds. It stipulates that this article ‘does not limit the right of any Party to refuse, revoke, suspend, impose conditions on, or limit the operating authorization or technical permissions . . . in accordance with the provisions of Articles 8, 15, 16, or 25’.¹⁶⁸ Article 8 of this

¹⁶⁶See Havel and Sanchez, *supra* note 2, at 63; see Milde, *supra* note 52, at 175.

¹⁶⁷For example, see 1995 Agreement between the Government of Australia and the Government of the Republic of South Africa relating to Air Services, [1995] ATS 23, Art. 4.1 (Australia–South Africa ASA); see India–Chile ASA, *supra* note 134, Art. 4.1.

¹⁶⁸See EU–ASEAN ASA, *supra* note 163, Art. 5.5.

ASA refers to the fair competition issue.¹⁶⁹ Accordingly, the failure of one party to fulfil duties pertaining to the provision of fair competition may face the same punishment as failure to maintain safety standards.

Such a development demonstrates a certain level of flexibility about the grounds for revoking operating authorization. It also implies that revocation of that authorization could be prescribed as a consequence of failure to enforce environmental standards, including CORSIA. Such a proposition may be especially feasible in ASAs between states with a strong political will for environmental protection.

Reducing the climate impacts of aviation through ASAs is likely to start with hortatory language in environmental provisions. Goldsmith and Posner note that hortatory wording helps give treaties flexibility, speed up negotiations and facilitate broad participation and effective implementation.¹⁷⁰ The flexibility inherent in hortatory clauses on environmental issues gives states room to upgrade them into legally concrete clauses with enforcement mechanisms. Thus, hortatory clauses are significant in that they can clarify states' respective intentions and create common focal points for future co-ordination.¹⁷¹ Following this argument, the adoption of hortatory environmental clauses can be interpreted as a stepping stone toward binding environmental provisions.

Another important trend is states' changing attitude to aviation safety and environmental issues related to aviation in the context of global standards. Although states initially held starkly different attitudes towards adopting and implementing global standards in the fields of safety and emissions reduction,¹⁷² that situation is changing. Some states have already started to reach a consensus on regulatory co-operation over safety and environmental issues in ASAs. A notable example is found in the EU–Qatar ASA, which groups together provisions on safety and the environment under the title of 'regulatory cooperation'.¹⁷³ Many of New Zealand's ASAs with other states prescribe the obligation to exchange information on environmental measures under the provisions of 'Civil Aviation Safety Cooperation'.¹⁷⁴ This trend suggests a certain level of convergence in their stances on regulating safety and climate issues. It lays the groundwork for putting lessons learned from addressing safety issues – promoting states' conformity with SARPs on safety issues through ASAs into regulating GHG emissions from international aviation by ASAs.

7. Conclusion

In his comprehensive analysis of GHG emissions from international aviation in 2015, Piera noted that ASAs make it harder for states to deviate from safety and security standards with the caveat that 'this is not all the case with climate change'.¹⁷⁵ Yet he correctly predicted that 'states could also gradually start introducing amendments to their ASAs to allow for the imposition of operational bans upon aircraft operators of other states to the extent that they are not in compliance with

¹⁶⁹*Ibid.*, Art. 8.

¹⁷⁰J. L. Goldsmith and E. A. Posner 'International Agreements: A Rational Choice Approach', (2003) 44 *Virginia Journal of International Law* 113, at 133.

¹⁷¹*Ibid.*, at 140.

¹⁷²See Havel and Sanchez, *supra* note 2, at 176.

¹⁷³See EU–Qatar ASA, *supra* note 163, 'Title II: Regulatory Cooperation'. It covers Art. 13 on aviation safety and Art. 16 on the environment.

¹⁷⁴See 2018 Air Services Agreement between the Government of New Zealand and the Government of the Republic of Peru, B2018-14, Art. 7. That agreement stipulates that 'The Parties shall promote cooperation . . . that facilitates (1) the exchange of information on civil aviation safety and environment matters; (2) mutual recognition of safety regulatory certification and/or processes; and (3) trade in civil aviation-related goods and services'. See also 2013 Air Services Agreement between the Government of New Zealand and the Government of the Federative Republic of Brazil, B2013-08, Art. 8.

¹⁷⁵See Valdés, *supra* note 26, at 339.

ICAO's global MBM'.¹⁷⁶ Piera's conclusion was based on the view that ASAs have served as 'additional enforcers' for ICAO standards.¹⁷⁷

In 2018, ICAO's global MBM scheme was adopted in the name of CORSIA and designated in Annex 16 of the Chicago Convention. More and more states are explicitly committing to participate in the global MBM–CORSIA and applying relevant SARPs.¹⁷⁸ CORSIA will apply to the vast majority of ICAO member states from 2027. Despite its own limitations, CORSIA was the best possible outcome on which states with conflicting interests were able to agree. As the first global market-based measure for a particular sector, CORSIA will contribute to reducing GHG emissions by international aviation. That said, making rules is one thing, and enforcing them is another. Without enforcement mechanisms, CORSIA may not have a meaningful effect on reducing emissions.

Meanwhile, the transformation of ASAs deserves our scrupulous attention. From exclusively dealing with the exchange of commercial rights for international air transport, a new generation of ASAs have started to cover new issues, including the environment. This article ends with the prediction that as more and more ASAs address the environment, they will help effectively regulate GHG emissions from international aviation by enforcing CORSIA. Indeed, that change has already begun.

¹⁷⁶*Ibid.*, at 346.

¹⁷⁷*Ibid.*

¹⁷⁸See reference in note 80, *supra*.