UDAYANA JOURNAL OF LAW AND CULTURE

E-ISSN 2549-0680
Vol. 7, No. 2, July 2023, pp. 120-143

German Environmental Concerns on Carbon Offsetting and Reduction: How it Deals with European and International Rules?

Samuel Corbalán Arévalo[1]

[1] Faculty III - Wirtschaftswissenschaften, Wirtschaftsinformatik und Wirtschaftsrecht, University of Siegen, Germany.

Keywords

Climate protection; CORSIA; Environmental sustainability; EU-ETS; International aviation.

DOI

https://doi.org/10.24843/UJLC.2023.v07.i02.p05

Author E-mail

[1] Correspondence: samuel.carevalo@student.uni-siegen.de

Abstract

This paper analyzes the international climate protection instrument Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which is based on the International Civil Aviation Organization (ICAO) Assembly No. A39-3, and its relation to the European Union Emissions Trading System (EU-ETS) in aviation, which is based on Directive 2008/101/EC. It is still unclear whether or to what extent the already existing EU-ETS in aviation can continue due to CORSIA. Questions regarding the implementation, enforcement and practicability of the climate protection instruments remain. The aim of this paper is to present a comparative analysis of the two climate protection instruments. In particular, to explore the question of the legal relationship between CORSIA and the EU-ETS in aviation as well as the legal compatibility of the two climate protection instruments is essential. It will also explore how the European Union (EU) and especially Germany intends to implement CORSIA in parallel to the EU-ETS in aviation. Germany actively participates in international and European discussions and contributes towards harmonizing the implementation of CORSIA with the EU-ETS, however, implementing CORSIA raises environmental concerns and brings challenges due to conflicting European and international rules. Therefore, this paper explores how Germany manages these conflicts and strives to strike a balance between regional and global approaches to mitigate the environmental impact of aviation. This conceptual paper analyzes relevant international, European, German legal instruments and textbooks, journal articles, academic works, and reports.

1. INTRODUCTION

The rapid growth of international aviation has created environmental problems including a tangible impact on climate change as a fast growing source of greenhouse gas (GHG) emissions.[1] It is estimated that global

[1] See Florian Wozny et al, "CORSIA - A Feasible Second Best Solution?," *Applied Science* 12 (2022): 5, 12; Marina Efthymiou, "The Fundamentals of Environmental Regulation of Aviation: A Focus on EU Emissions Trading Scheme," *Aeron Aero Open Access Journal* 5, no. 1 (2021): 9; and Ariane Debyser, "ICAO Agreement on CO_2 Emissions from Aviation," European Parliamentary Research Service, 2019, 1.

anthropogenic carbon dioxide CO_2 emissions from international aviation is currently around 2.5-2.8%.[2] If other GHGs are also considered, this value increases to around 4.9%.[3] However, according to current forecasts and calculations, these emissions will increase by up to 200% by 2050, and will be 4 to 6 times higher than that in 2010, due to the growing volume of international air traffic.[4] For this reason, a comprehensive and far-reaching GHG reduction in international aviation is necessary.

Accordingly, several legal instruments have been created, with the aim of stabilizing projected global warming attributable to GHG emissions. The aviation sector was included in the EU-ETS in 2012 through Directive 2008/101/EC15.[5] However, since this measure was adopted, it has been deemed insufficient to stabilize the CO_2 concentration in the atmosphere and achieve the desired targets. Several non-EU states have expressed their anxiety about the environmental effectiveness of EU-ETS and whether the EU approach conforms to international law.[6] The EU-ETS inclusion of aviation emissions led to international dispute settlement, legal action prohibiting airlines from signatory countries participating in the EU-ETS, market restrictions, and additional levies.[7]

Climate change is an urgent problem that must be tackled jointly by all countries of the world. For this reason, the climate protection instrument CORSIA, the first global mechanism for emission reduction in the aviation industry, was adopted by the General Assembly of the ICAO on an international basis in October 2016 by Resolution A39-316 after decades of challenging negotiations.[8] CORSIA arranges ICAO certified offsetting programme that aims to stabilize CO_2 emissions from 2021 to 2019–2020 levels.[9] Under this climate protection instrument, airlines will initially be

[2] Jörgen Larsson et al, "International and National Climate Policies for Aviation: A Review," *Climate Policy* 19, no. 6 (2019): 787-799; European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning Aviation, 2020, 2.

[3] David S. Lee et al, "Aviation and Global Climate Change in the 21st Century," *Atmospheric Environment* 43, no. 22-23 (2009): 3525; Sven Maertens et al, "Options to Continue the EU-ETS for Aviation in a CORSIA-World," *Sustainability* 11, no. 20 (2019) (subsequently, Maertens et al 1).

[4] See Council Decision (EU) 2016/915 of 30.05.2016, Recital 1 and Weijun Liao, Ying Fan, and Chunan Wang, "How Does COVID-19 Affect the Implementation of CORSIA?," *Journal of Air Transport Management* 99 (2022): 1.

[5] Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008, ABl. L 8/3 from 13 January 2009.

[6] Martin Schaefer et al, "The Economic Impact of the Upcoming EU Emissions Trading System On Airlines and EU Member States - an Empirical Estimation," *European Transport Research Review* 2 (2010): 190.

[7] Felicity Deane and Callum Brockett, "Carbon Border Adjustments: A Legal Tool for Mitigation or a Barrier to Justice?," *Climate Law* 13, no. 1 (2023): 49.

[8] See ICAO, Assembly Resolution A39-3, 2016; Liao, Fan, and Wang, *loc.cit.*; and Janina Scheelhaase and Sven Maertens, "How to Improve the Global 'Carbon Offsetting and Reduction Scheme for International Aviation' (CORSIA)?," *Transportation Research Procedia* 51 (2020): 109.

[9] See United Nations Development Programme, "Report on CORSIA Implications and Carbon Market Development: Assess CORSIA Implications and Carbon Market Development, 2022, 7 and Baine P. Kerr, "Clear Skies or Turbulence Ahead? The

required to voluntarily compensate their growth-related CO_2 emissions by means of emission credits. CORSIA plans three phases of development: pilot phase (2021-2023), first phase (2024-2026) and second phase (2027-2035).[10]

It remains to be seen if and how the EU-ETS in aviation can concurrently operate with CORSIA, particularly regarding its implementation, enforcement, and practicability of the two climate protection instruments. Of particular future interest is the intention of the EU and its member states to implement CORSIA in parallel to the EU-ETS in aviation.

As a member of the EU, Germany actively participates in international and European discussions and works towards harmonizing the implementation of CORSIA with the EU-ETS to ensure a balanced approach. However, implementing CORSIA raises environmental concerns and brings challenges due to conflicting European and international rules. Germany is also very actively involved in Trading in European Allowances (EUA, EUAA), which takes place primarily in Amsterdam, the Netherlands (ICE Endex) and Leipzig-Germany (EEX) trading venues. Auctions are held almost daily to ensure that the auctions fit seamlessly into general market activity. All auction results are published online within a few minutes to provide the highest possible market transparency. The German Emissions Trading Authority (DEHSt) regularly reports on all market activity relating to allowances in its monthly auction reports. A large portion of the proceeds from the auctions is utilized to promote decarbonisation in both the energy sector and industry. 100 percent of Germany's proceeds go to the Energy and Climate Fund (EKF), which finances various climate protection, energy efficiency, and renewable energy measures. This amount is double the obligation of member countries to use at least 50 percent of their national auction proceeds for climate protection.[11]

Some previous studies have discussed the topic of this article. Buissing (2022) argues that sustainability is the keyword for global discussion on environmental issues, in particular climate change, relating to air transport activities.[12] Efthymiou (2021) views emissions trading as a market-based policy tool that combines interests of economic efficiency and environmental issues.[13] Regarding CORSIA, Gonçalves (2017) suggests that this international agreement does not promote the direct reduction of GHG

International Civil Aviation Organization's Obligation to Mitigate Climate Change," *Utrecht Law Review* 16, no. 1 (2020): 102.

[10] Liselotte Jensen, "Aviation's Contribution to European Union Climate Action Revision of EU ETS as regards Aviation," European Parliamentary Research Service, June 2023, 3.

[11] German Emissions Trading Authority, "Structure of the EU ETS," https://www.dehst.de/EN/european-emissions-trading/understanding-emissions-trading/structure/structure_node.html. Regarding EUA and EUAA, see Janina Scheelhaase, Sven Maertens, and Wolfgang Grimme, "Options for Improving the EU Emissions Trading Scheme (EU ETS) for Aviation," *Transportation Research Procedia* 59 (2021): 195-196.

[12] Niall Buissing, "EU Air Transport and the EU's Environmental Agenda Struggle: A Leap of Faith or Can a CBAM Level the Playing Field?," *Air and Space Law* 47, no. 6 (2022): 577.

[13] Efthymiou, *op.cit.*, 15.

emissions, but instead only compensation and argues that this does not accord with the principles and objectives of the climate regime.[14] Reflecting that both EU-ETS and CORSIA have not yet reached expected progress in reducing emissions, Gürçam (2022) argues that direct taxes on carbon and fuel offers a more effective solution, and therefore proposes that implementing localised carbon and fuel taxes should be permitted in a global context in due course.[15] Regarding the response of non-EU countries to the EU-ETS, Domingos (2012) suggests that the political position of the United States of America (US) strongly rejects the EU-ETS,[16] despite this, the scheme has an economic impact on the US aviation sector, as studied by Malina (2012).[17] Besides the US, May and Yan (2023) discuss China's disappointment towards EU policy and involvement in an aviation dispute regarding the inclusion of international flights under the EU-ETS.[18] Liang and Zhang (2014) explore the Joint Declaration of the Moscow Meeting on Inclusion of International Civil Aviation in the EU-ETS as adopted by 23 countries that expressly objected to such an inclusion.[19] While Efthymiou (2021) believes that air transportation contributes to economic prosperity, facilitating growth particularly in developing countries, [20] this is contrasted with Nkuepo (2012), who argues that the EU-ETS implies discrimination against developing countries.[21] Nugraha (2018) identifies mistakes related to EU-ETS and argues that these should be used as lessons for the Association of South East Asian Nations (ASEAN) in implementing environmental schemes for the aviation sector.[22] Kotzampasakis (2023) and Nelissen et al (2021) assessed recent developments and suggested that the current scheme of the EU-ETS be expanded to include the international maritime shipping sector, while the construction and road transport sectors be arranged in a separate ETS.[23]

---

[14] Veronica Korber Gonçalves, "Climate Change and International Civil Aviation Negotiations," *Contexto Internacional* 39, no. 2 (2017): 226.

[15] Selçuk Gürçam, "Global Commercial Aviation Policies in the Context of the Climate Crisis and an Analysis of these Approaches from the Perspective of Türkiye," *Environmental Research Technology* 5, no. 3 (2022): 235.

[16] Domingos Nicole de Paula Domingos, "Fighting Climate Change in the Air: Lessons from the EU Directive on Global Aviation," *Revista Brasileira de Política Internacional* 55 (2012): 71.

[17] Robert Malina et al, "The Impact of the European Union Emissions Trading Scheme on US Aviation," *Journal of Air Transport Management* 19 (2012): 36-41.

[18] Duong Thi Thuy Mai and Bo Yan, "Divergences between the European Union and China on Reducing International Aviation Emissions," *Asia European Journal* 21 (2023): 4.

[19] Wenqiong Liang and Liying Zhang, "Legal Issues Concerning the EU Unilateral Aviation ETS: A Chinese Perspective," *South Carolina Journal of International Law and Business* 11, no. 1 (2014): 4-5.

[20] Efthymiou, *op.cit.*, 9.

[21] Henri J. Nkuepo, "EU ETS Aviation Discriminates against Developing Countries," *Africa's Trade Law Newsletter* no. 7 (2012): 3-5.

[22] Ridha Aditya Nugraha, "Preserving the Environment within the ASEAN Skies: Lessons from the European Union Emissions Trading Scheme," *Hasanuddin Law Review* 4, no. 1 (2018): 17, 26.

[23] See Manolis Kotzampasakis, "Intercontinental Shipping in the EU ETS: A 'Fifty-Fifty' Alignment with the Law of the Sea and International Climate Law?," *Review of European, Comparative and International Environmental Law* 32, no. 1 (2023): 29-30;

This paper, therefore, aims to compare the climate protection scheme under CORSIA and EU-ETS and analyzes the legal relationship between the two instruments. It discusses how Germany manages the applicability of both CORSIA and the EU-ETS and strives to strike a balance between regional and global approaches to mitigate the environmental impact of aviation. This legal writing is a conceptual paper that assesses international legal instruments, regionally-based European law and policies, and the national law of Germany. The legal analysis is built by referring to textbooks, journal articles, academic works, and reports.

2. RESULT AND ANALYSIS

2.1 EU-ETS and CORSIA: Conflicting Or Complementary Rules?

There is a growing body of jurisprudence giving greater consideration to the problems arising from conflicts created by climate related instruments, especially those arising through international agreements. However, there are only a few climate protection regulations which have been enacted in connection with international aviation. It seems that international aviation has been excluded from almost all major international agreements regarding climate protection. As a result, questions and controversy remain regarding who is responsible and, above all, who has the competence to regulate climate protection in the international aviation sector.

The first step towards combating climate change was taken with the commitments made in the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. However, further steps are necessary to achieve the 2.0°C long-term target of the Paris Agreement and the ICAO's goal of CO_2-free air traffic growth from 2020. The UNFCCC includes commitments on adaptation which stresses identifying adaptation priorities and planning has been supplemented by efforts at implementation, and later the Paris Agreement which further increases requisite action and obligations on adaptation.[24] However, the international climate change regime, including the Kyoto Protocol and Paris Agreement, seem to offer a challenging mechanism for reporting emissions and emission reductions.[25] Although the Kyoto Protocol does not include international aviation, it addressed ICAO to its pursuit of limitating and reducing GHG emissions. ICAO later responded by issuing a resolution on mitigating climate change.[26] The Kyoto Protocol, as well as the EU-ETS, basically views the emission of

Dagmar Nelissen et al, The Aviation and Maritime Sectors and the EU Emission Trading System (EU ETS): Challenges and Impacts, Final Study, Research for TRAN Committee, European Parliament, 2021; and Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC Establishing a System for Greenhouse Gas Emission Allowance Trading within the Union and Decision (EU) 2015/1814 concerning the Establishment and Operation of a Market Stability Reserve for the Union Greenhouse Gas Emission Trading System.

[24] Lauren Nishimura, "Adaptation and Anticipatory Action: Integrating Human Rights Duties into the Climate Change Regime," *Climate Law* 12, no. 2 (2022): 100.

[25] David Rossati, "A Question of Value: On the Legality of Using Kyoto Protocol Units under the Paris Agreement," *Climate Law* 11, no. 3-4 (2021): 320.

[26] See Kerr, *op.cit.*, 107-108 and David S. Lee et al, "Transport Impacts on Atmosphere and Climate: Aviation," *Atmospheric Environment* 44, no. 37 (2010): 4679.

pollutants as a commodity that requires a measure to calculate the degree of equivalence between the different GHGs.[27]

Market-based measures, such as the EU-ETS or the future climate protection instrument CORSIA, represent extremely attractive options for implementing the requirements of the international climate protection agreements. Although the two systems are market-based instruments, they are fundamentally different and difficult to compare.[28] The EU-ETS is a "cap-and-trade emissions trading system"[29] in which the EU attempts to induce aviation to reduce emissions and CORSIA is a "baseline and credit compensation system" in which only offsetting of emissions is required. Both instruments represent environmental approaches with economic incentives in the form of certificate solutions.

The question that now arises is whether the regulatory provisions of CORSIA and the EU-ETS can be combined and thus complement each other, or whether they are incompatible and thus conflict with each other. In order to explore this question, the two different climate protection instruments are presented and analyzed in detail.

2.1.1 ETS by the European Union

EU is a regional-based international organization that aims to address climate change through various schemes. The most recent scheme is Carbon Border Adjustment Mechanism (CBAM) which places a price on carbon embedded in imports from certain energy-intensive sectors entering the EU. It will commence its transition period in 2023 with expected implementation in 2027.[30] In the context of civil aviation, the EU's aviation scheme was made as a unilateral response to an unsuccessful undertaking to seek international commitment on the issue from ICAO.[31]

a. History and Legal Development

In order to fulfil the requirements and obligations of the Kyoto Protocol, the Emissions Trading Directive 2003/87/EC (ETS Directive) was adopted on 13 October 2003 based on EU law and according to Article 192 (1) of the Treaty on the Functioning of the European Union (TFEU). Subsequently, the Greenhouse Gas Emissions Trading Act (TEHG)[32] was enacted in Germany to implement the directive domestically. Since these

[27] Efthymiou, *loc.cit.*

[28] Maertens et al 1, *op.cit.*, 16.

[29] Tobias Eriksson, "EU ETS vs. CORSIA – A Neoliberal Institutionalist Study of European Emission Reduction Policy" (Master-Thesis, Department of Political Science Centre for European Studies (CES), University of Gothenburg, 2019), 7.

[30] Natalie L. Dobson, "(re)framing Responsibility? Assessing the Division of Burdens Under the EU Carbon Border Adjustment Mechanism," *Utrecht Law Review* 18, no. 2 (2022): 163, 165.

[31] Lorand Bartels, "The WTO Legality of the Application of the EU's Emission Trading System to Aviation," *European Journal of International Law* 23, no. 2 (2012): 433-434.

[32] Gesetz zur Umsetzung der Richtlinie 2003/87/EG über ein System für den Handel mit Treibhausgasemissionszertifikaten in der Gemeinschaft of 08 Juli 2004, BGBl. 2004 I of 14 Juli 2004 / Act implementing Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community of 8 July 2004, BGBl. 2004 I of 14 July 2004.

legal instruments were not applicable to international aviation, the EU Commission submitted a proposal for a directive[33] in 2006 to include air traffic in the EU-ETS. With Directive 2008/101/EC of 19 November 2008, emissions trading was then extended to international aviation from 1 January 2012. However, the scope of Directive 2008/101/EC was limited by the so-called "stopping-the-clock decision", because non-EU airlines from third-party countries also had to purchase emission certificates in order to be allowed to operate within European airports.

Based on these developments and the negative reaction from the global aviation industry, the European Court of Justice (ECJ), in the Air Transport Association of America (ATAA) case, assessed the jurisdictional basis of EU ETS.[34] The ruling of ECJ excluded non-EU airlines from the scope of Directive 2008/101/EC even though Directive 2008/101/EC does not create conflict with obligations under international law.[35] Due to this suspension of Regulation 421/2014/EU, the application of the EU-ETS to non-EU carriers was interrupted until 2020.[36] In order to support the ICAO with the CORSIA project, the EU has adopted further temporary exemptions and continues to limit the scope of the Directive until 31 December 2026,[37] which is why only flights within the European Economic Area (EEA) are still subject to emissions trading. The EU-ETS does not include certain types of flights from the cap-and trade system, such as military, circular and public service obligation flights.[38]

b. Content and Mechanism

With more than 11.500 participants in 27 countries, the EU-ETS is the largest cap-and-trade system for CO_2 emissions.[39] In such a system, a fixed upper limit, referred to as a "cap", of maximum available emission allowances is initially set.[40] This emission cap applies to a defined area in a specific period for participating sectors.[41] In the EU-ETS, the emission cap was 97% in 2012 and 95% from 2013 onwards.[42] Pursuant to this scheme, 85% of the allowances were issued free of charge in the first trading period

[33] European Commission (2006), 818 of 20 Desember 2006.

[34] Dobson, *op.cit.*, 164.

[35] European Court of Justice. Case C-366/1 Air Transport Association of America, American Airlines, Inc, Continental Airlines, Inc, United Airlines, Inc v The Secretary of State for Energy and Climate Change [2011] ECR I-0000 (ATAA case) https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62010CJ0366

[36] Regulation (EU) 421/2014 of 16 April 2014, ABl. L 129/1 of 30 April 2014.

[37] European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning aviation, 2020, 1; Maertens et al, *op.cit.*, 3; and European Commission, "EU Emissions Trading System (EU ETS)," https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

[38] Marina Efthymiou and Andreas Papatheodorou, "EU Emissions Trading Scheme in Aviation: Policy analysis and Suggestions," *Journal of Cleaner Production* 237 (2019): 2.

[39] A. Denny Ellerman, Frank J. Convery, and Christian de Perthuis. *Pricing Carbon, the European Emissions Trading Scheme* (Cambridge: Cambridge University Press, 2010), 28.

[40] Kruse-Andersen, Endogenizing the Cap in a Cap-and-Trade System: Assessing the Agreement on EU ETS Phase 4, 2018, 5.

[41] *Ibid.*, 14.

[42] Maertens et al 1, *op.cit.*, 2; Directive 2008/101/EG of 19.11.2008, ABl. L 8/3 of 13 January 2009, Art. 3 (c).

and around 82% in the second trading period.[43] Each allowance entitles the holder to emit a certain amount of harmful CO_2 emissions. Over time, this emissions cap is reduced to incentivize participants to further reduce CO_2 emissions and steer them towards more environmentally conscious behavior.[44] It is critically important for the success of schemes structured this way that the cap is not exceeded. This is because the market mechanism is to incrementally decrease the supply of available certificates, thereby creating higher prices for available certificates over time. The increased price of certificates provides an economic incentive for participants to invest in technologies and promote efficient business practices that are more environmentally friendly and emit less CO_2.[45]

As a result, CO_2 emissions trading pursues the goal of adhering to an emissions cap by incentivising airlines to make cost-effective reductions.[46] In this context, the EU-ETS is an environmental law instrument, but also an economic instrument for indirect behavioral control, in that it offers users a financial incentive to behave in a more environmentally conscious manner.[47]

2.1.2. CORSIA by the International Civil Aviation Organisation

a. History

After several years of difficult negotiations, CORSIA was launched by the ICAO at the 39th General Assembly in October 2016.[48] CORSIA is an independent, global and market-based measure for international aviation under international law. The main objectives of CORSIA are twofold: firstly, to improve fuel efficiency by 1.5-2.0% by 2050 and secondly, to introduce Compressed Natural Gas in 2020. In addition, CORSIA is intended to further the achievement of the stated goals contained in the UNFCCC and the Paris Agreement. The climate instrument is part of a comprehensive climate protection strategy of the ICAO, which consists of a bundle of measures in areas including technology and infrastructure, but also includes the use of sustainable fuels and the development of new aircraft concepts. Aviation is thus the first industry to be covered by a global climate protection instrument.

b. Content

CORSIA is designed as a climate compensation system. In such a system, there is no absolute, politically determined emissions cap, as in an ETS.[49] Rather, emission credits must be acquired for emissions that exceed

[43] Directive 2008/101/EG of 19.11.2008, ABl. L 8/3 of 13 January 2009, Art. 3 (e).

[44] Sven Maertens et al, "Klimaschutz im Luftverkehr: of EU-Emissionshandel zu CORSIA," *Wirtschaftsdienst - Zeitschrift für Wirtschaftspolitik* 97, no. 8 (2017): 589. (subsequently, Maertens et al 2)

[45] *Ibid.*

[46] Hendrik Plath. *Die Einbeziehung des Luftverkehrs in den EU-Emissionshandel, in: Internationale Göttinger Reihe, Rechtswissenschaften* (Frankfurt: Band 59, 2014), 57.

[47] Lambert Schneider and Nora Wissner, "Fit for Purpose? Key Issues for the First Review of CORSIA," Öko-Institut, Berlin, 2022, 5.

[48] ICAO, Assembly Resolution, A39-3, 2016; Maertens et al 1, *op.cit.*, 2.

[49] Schneider and Wissner, *op.cit.,* 11.

a predetermined baseline.[50] These emission credits can be acquired through investments in climate-protection-friendly projects. [51] Independent institutions then create certifications according to the standards set out in the Kyoto Protocol. [52] With regard to CORSIA, the UN Climate Change Secretariat is responsible for collecting, awarding and certifying these projects.[53] The certifications are called “offset certificates”. These are legal fictions and do not represent physical goods.[54] Rather, they are simple notes in electronically managed registers.[55] Due to the COVID-19 pandemic, the values were adjusted so that only the values from 2019 are used for calculating the baseline. In this sense, all growth-related CO_2 emissions emitted by airlines above this new baseline must be offset.

c. Legal Scope

The legal basis of CORSIA consists of a complex collection of different international legal decisions, guidelines and recommendations. The legal framework and the regulations of CORSIA consist primarily of the "ICAO Policies", which are derived from the Chicago Agreement and the Resolutions of the General Assemblies, or "Assembly Resolutions". Resolution A39-3 of the ICAO forms the founding basis of the CORSIA Agreement, expanded by international guidelines and recommendations, also known as "Standards and Recommended Practices" (SARPs) and the ICAO guidelines and manuals, or "ICAO Guidances".

The SARPs are the main implementation instrument for CORSIA and were added to the Chicago Agreement by the ICAO Council on 27 June 2018 as Annex 16, Volume IV, entitled CORSIA.[56] The SARPs contain guidelines and detailed recommendations for the administration of CORSIA in participating states.[57] The Monitoring, Reporting and Verification (MRVs) of CORSIA is set out in Annex 16, Volume IV of the Chicago Agreement and has been in force since 2019. The MRVs are applicable in all ICAO member states.[58] Therefore, all aircraft operators, including those that are not parties to the CORSIA Agreement, must monitor, report and verify their CO_2 emissions.[59] The reporting of CO_2 emissions takes place annually, while the offsetting obligation only comes into effect after three years.[60] The EU has, subject to some differences regarding CORSIA’s MRVs, nevertheless fully transposed them into EU law through Implementing Regulation (EU)

[50] *Ibid.* See also Scheelhaase and Maertens, *loc.cit.*

[51] *Ibid.*

[52] *Ibid.*, 15.

[53] *Ibid.*

[54] Uwe M. Erling, “International Aviation Emissions under International Civil Aviation Organization’s Global Market-based Measure Ready for Offsetting,” *Air & Space Law* 42, no. 1 (2017): 9. (subsequently, Erling 1)

[55] *Ibid.*

[56] ICAO, Annex 16 to the Convention on International Civil Aviation, Environmental Protection IV, 2018, Table A, Amendments to Volume IV of Annex 16.

[57] IATA, An Airline Handbook on CORSIA, 2019, 7.

[58] *Ibid.*; ICAO, *loc.cit.*

[59] IATA, *op.cit.,* 12.

[60] ICAO, Assembly Resolution A39-3, 2016, para. 16; IATA, *op.cit.*, 32; and Erling 1, *op.cit.*, 5.

2018/2066. Accordingly, Germany and all other EU member states must also transpose this EU-Regulation into national law.

d. Mechanism

CORSIA only covers international air traffic, it does not encompass domestic air traffic. The scope of CORSIA is limited to the routes flown between states.[61] CORSIA is applicable to all international flights (civil aviation flights that depart from one country and arrive in another) between participating states.[62] As a result, airlines operating such a route must offset their growth-related CO_2 emissions.[63] CORSIA does not apply if one or both states are not contracting states.[64] The obligation to hold offsetting certificates therefore depends on the route flown.[65] For the calculation of growth-related CO_2 emissions, it applies the sectoral approach as well as an individual approach on part of relevant airline operators.[66] Under the sectoral approach,[67] airlines must collectively offset the industries' CO_2 emissions in relation to the average CO_2 growth rate. In contrast, under the individual approach,[68] each individual airline compensates for its total own growth-related CO_2 emissions. In Decision A39-3, the ICAO General Assembly agreed to pursue a dynamic approach. This begins with the sectoral approach and is then incrementally expanded until 2035 to encompass individual shares.[69]

2.1.3. Is It Possible to Harmonize the EU-ETS and CORSIA?

In order to limit CO_2 aviation emissions, the two systems discussed, CORSIA and the EU-ETS, are likely to shortly be in concurrent operation. However, a problem arises from the fact that CO_2 emissions from international aviation may be covered by both CORSIA and the EU-ETS in aviation. Since all EU member states have repeatedly declared their participation in CORSIA, the EU Commission may have to adapt the EU-ETS in consideration of CORSIA. However, an adjustment of the EU-ETS in aviation encounters a highly debated problem both in the EU and in the ICAO. The following section is therefore dedicated to reviewing the enforcement, implementation and practicability of CORSIA and the EU-ETS in aviation. In this context, a distinction must be made between national and international aviation emissions regarding the legal feasibility of climate protection instruments,[70] because the EU-ETS in aviation, in contrast to CORSIA, also includes national aviation emissions.

---

[61] Schneider and Wissner, *op.cit.*, 12.
[62] See Decision A39-3, paras. 5 and 10 (a); Scheelhaase and Maertens, *op.cit.*, 110.
[63] Schneider and Wissner, *loc.cit.*
[64] Decision A39-3, paras.10 (b) and (c).
[65] Schneider and Wissner, *loc.cit.*
[66] Resolution of ICAO Assembly No. A39-3, para. 11 (a).
[67] Sectoral approach is defined in Resolution of ICAO Assembly No. A39-3, para. 11 (b).
[68] Individual approach is defined in Resolution of ICAO Assembly No. A39-3, para. 11 (c).
[69] Resolution of ICAO Assembly No. A39-3, para. 11 (e).
[70] Larsson et al., *op.cit.*, 792.

a. International and European Approach

The following permutations are potential regulatory scenarios and outcomes:

CORSIA: This option illustrates the planned implementation, enforcement and practicability of CORSIA in accordance with the relevant standards, resolutions and Annex 16, Volume IV Chicago Agreement. As a result, CORSIA must then fully replace the EU-ETS in aviation, so that CO_2 emissions in the sense of Resolution of ICAO Assembly No. A39-3 are not compensated twice by both CORSIA and the EU-ETS. Such a double burden would lead to extreme and disproportionate distortions of competition within the EEA. CORSIA would then be the only global climate protection instrument for international aviation emissions in the EEA.[71] However, under these circumstances, national aviation emissions are completely disregarded.[72] Considering the fact that the EU-ETS in aviation already covers national CO_2 aviation emissions from constituent member states, this results in a significantly higher compensation of CO_2 emissions taking place, this option does not seem to be very suitable for the EU.

CORSIA + CORSIA NATIONAL: Similar to the previous option, CORSIA is implemented as planned in the participating countries. Notwithstanding the fact that CORSIA was conceived as an international climate protection instrument, a corresponding national application of CORSIA is quite conceivable. In this sense, the EU can additionally enforce CORSIA on a voluntary basis in its member states. Norms prohibiting such an application of CORSIA are currently not apparent.[73] Finally, the voluntary application of the system at a national level would also achieve significantly broader coverage. Consequently, the EU must also separate aviation from the EU-ETS in this scenario to avoid an undesirable double burden on airlines within the EEA, especially in accordance with Resolution of ICAO Assembly No. A39-3.

CORSIA + EU-ETS NATIONAL: However, a complete exclusion of aviation from the EU-ETS may not be a sensible option for the EU and is a rather less intended option.[74] In order to meet the requirements of CORSIA set out in Annex 16, Volume IV of the Chicago Agreement and specifically Resolution of ICAO Assembly No. A39-3, the EU must restrict Directive 2008/101/EC once again and at least limit the scope to domestic flights. In this option, the EU-ETS in aviation thus remains in place for national aviation.[75] From an environmental-economic point of view this option could be extremely attractive for the EU. As previously mentioned, national CO_2 emissions from aviation are the responsibility of individual states under the UNFCCC and the territorial principle. If CORSIA is implemented in parallel

[71] Eriksson, EU ETS vs. CORSIA, Master-Thesis, 2019, 14.

[72] Bundesverband der Deutschen Industrie e.V, "Anmerkungen zum Inception Impact Assessment," 2020, 2.

[73] Uwe M. Erling," How to Reconcile the European Union Emissions Trading System (EU-ETS) for Aviation with the Carbon Offsetting and Reduction Scheme for international Aviation (CORSIA)?," *Air & Space Law* 43, no. 4/5 (2018): 385. (subsequently, Erling 2)

[74] Maertens et al 1, *op.cit.*, 9.

[75] *Ibid.*, 2; Van Velzen, "CORSIA, EU-ETS and the EU2030 aviation emissions target," (2018): 7.

with the EU-ETS in aviation, legal implementation of this option may be possible and is therefore particularly sensible.

CORSIA + EU-ETS MIX: This combination first involves a limited application of the EU-ETS in aviation and then the scheduled and full application of CORSIA.[76] As a result, the CO_2 emissions of the EEA would be regulated up to the baseline of CORSIA by the EU-ETS in aviation. All CO_2 emissions above the baseline would then fall within the scope of CORSIA.[77] This option considers both the application of the EU-ETS and the application of CORSIA.[78] The EU could be in favor of this option, as it would allow it to continue the EU-ETS in aviation almost entirely with only a few restrictions. In terms of environmental effectiveness, a much more comprehensive coverage of CO_2 emissions within the EEA would be achieved.

CORSIA + EU-ETS CLEAN CUT: In the "CLEAN CUT" combination, the current reduced scope of Directive 2008/101/EC will continue to be maintained by the EU.[79] Accordingly, all flights within the EEA will basically be covered by the EU-ETS. All flights that take place outside the EEA between CORSIA states will then be covered by the guidelines and recommendations of CORSIA.[80] As a result, CORSIA is completely neglected within the EEA. In accordance with the ICAO definitions of an international flight, all flights between EU member states would also have to be considered as such and thus be subject to the scope of CORSIA without exception.[81] Both the common approach of a global solution demanded by the EU and the realization of an international compromise would be completely abandoned and not fulfilled by this option. The retention of international flights within the EEA in the EU-ETS contradicts the actual international consensus and thus also the requirements and resolutions of CORSIA. [82] Although this option appears to be quite sensible from an environmental-economic perspective, this scenario should be rejected for the reasons mentioned. Legal implementation of such a scenario also appears to be particularly difficult, as there would be serious differences between the EU-ETS in aviation and CORSIA.[83]

In the event that none of these possible scenarios is approved by the EU and no amendment to the ETS Directive is adopted by the EU Parliament and Council by 31 December 2023, the EU-ETS for aviation

[76] Van Velzen, *Ibid.*

[77] European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning aviation, 2020, 3.

[78] Van Velzen, *loc.cit.*; Bundesverband der Deutschen Industrie e.V, *loc.cit.*

[79] *Ibid.*; Maertens et al 1, *op.cit.*, 9; European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning aviation, 2020, 3; and Eriksson, *op.cit.*, 14.

[80] Van Velzen, *op.cit.,* 7; Maertens et al 1, *Ibid.*

[81] ICAO, Assembly Resolution A39-3, 2016, para. 5; Erling 2, *op.cit.,* 382.

[82] Bundesverband der Deutschen Industrie e.V, *loc.cit.*

[83] Eriksson, *op.cit.*, 9.

would automatically revert to its original scope of application.[84] As a result, all aircraft operating within the EEA would again become subject to emissions trading.[85] Since the full scope of Directive 2008/101/EC, as initially implemented, led to unexpected trade policy conflicts, an implementation of this option also appears to be particularly difficult under international law and would violate the requirements of CORSIA.[86]

In the decisions of the General Assembly and pursuant to Annex 16, Volume IV of the Chicago Convention, CORSIA has been settled upon the only climate protection instrument for international aviation. Therefore, it seems to make sense to remove aviation from the scope of the ETS Directive with the commencement of CORSIA, especially since all EU member states have committed to participate in the voluntary pilot phase of CORSIA. However, this option could not help the EU to achieve its targets of reducing overall CO_2 emissions by at least 40% from the Paris Agreement. For environmental and economic reasons, the other options listed above should therefore continue to be considered.

b. Environmental Concerns

When evaluating the efficacy of climate protection instruments, it is particularly important to examine their actual or projected impact on the environment.[87] Setting aside matters of legal implementation, enforcement and practicability of CORSIA and the EU-ETS in aviation, it is important, especially for the EU, due to its ambitious climate protection targets for 2030, to examine and compare the effectiveness of the two climate protection instruments in achieving their policy objectives. For this reason, the EU Commission is currently examining the environmental compatibility of CORSIA and the EU-ETS in aviation. One reason for the EU to continue to adhere to the EU-ETS is that the CORSIA targets are less ambitious. It should also be noted that the environmental effectiveness of CORSIA and the EU-ETS depends on different aspects.[88]

As discussed in Section 2.1.2, the environmental concern of CORSIA is stipulated in Annex 16, Volume IV of the Chicago Agreement. Although CORSIA, as a global climate protection instrument, encompasses significantly more states and more routes than the EU-ETS in aviation, and thus initially has a significantly higher potential, the EU-ETS can nevertheless be expected to be considerably more environmentally effective in the context of EU CO_2 emissions. This is due to the fact that CORSIA only takes into account the additional CO_2 emissions beyond the stipulated baseline. Participants whose CO_2 emissions are below that baseline remain

[84] Maertens et al 1, *op.cit.*, 3; European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning aviation, 2020, 3.

[85] Directive 2008/101/EG of 19 November 2008, ABl. L 8/3 of 13 January 2009, Recital 16.

[86] Janina Scheelhaase et al, "EU ETS versus CORSIA – A Critical Assessment of Two Approaches to Limit Air Transport's CO_2 Emissions by Market-Based Measures," *Journal of Air Transport Management* 67 (2018): 60.

[87] Larsson et al, *op.cit.,* 792.

[88] Eriksson, *op.cit.*, 11.

unregulated as so-called "base emissions".[89] However, the environmental effectiveness of CORSIA depends not only on the amount of CO_2 to be offset, but also on the quality of the available replacement measures.[90]

The problem is that not enough high-quality offset certificates are available, especially if a huge sector such as aviation is suddenly added to the demand.[91] In this context, it is advantageous that CORSIA invests in climate-friendly projects, but whether these are also investments in new climate protection projects or only in existing projects is currently not clear.[92] In this respect, the ICAO has not been specific enough about the requirements for offset certification.[93] The biggest challenges of such an offset scheme is the ability to maintain the environmental integrity and credibility of the system.[94] Therefore, any emission reduction offered through offset certificates must lead to a real verifiable and permanent CO_2 reduction.[95] Further, a criticism of CORSIA is that it contains too many exemptions, for example, in the mandatory second phase around 118 out of a total of 193 ICAO states would be excluded from the program,[96] unless these states commit themselves voluntarily. Moreover, CORSIA does not reduce CO_2 emissions in absolute terms, because airlines can continue to emit harmful CO_2 emissions through the offsetting system.[97] For this reason, CORSIA in a way grants a cumulative growth in emissions and does not guarantee a significant reduction in CO_2 emissions.

In this sense, CORSIA is not aligned with the Paris Agreement and thus will not achieve the 2 °C long-term target.[98] The EU also fears that it will miss its reduction targets from the Paris Agreement if the EU-ETS in aviation is abandoned. In contrast, the EU-ETS has become one of the most important environmental policy instruments in the EU in recent years. Although the EU-ETS in aviation currently only covers 9% of global air traffic, it has a significant advantage from an environmental point of view as it addresses the total amount of CO_2 emissions emitted and has a stricter and more ambitious emissions cap.[99]

In summary, it can be said that CORSIA currently makes only a very small contribution to achieving the goals of the Paris Agreement, especially within the EU. It will therefore be difficult to reach the 40% target. In order to increase environmental effectiveness and to continue to comply with the

---

[89] Schneider and Wissner, *op.cit.*, 11.

[90] Maertens et al 1, 7.

[91] Maertens et al 2, 593.

[92] Yvonne Karimi-Schmidt, "Klimaschutz aus Völkerrechtlicher Sicht unter Besonderer Berücksichtigung der Zivilen Luftfahrt," *Zeitschrift für öffentliches Recht* 74, no. 1 (2019): 49; Maertens et al 1, *op.cit.*, 4.

[93] *Ibid.*

[94] *Ibid.*

[95] Erling 1, *op.cit.*, 8.

[96] Ellen Schep, Andre van Velzen, and Jasper Faber, "A comparison between CORSIA and the EU ETS for Aviation," (2016): 6.

[97] Larsson et al, *op.cit.*, 789.

[98] Megan Darby, "UN Aviation Pact Will Not be Aligned with Paris Climate Goals, Climate Change News," http://www.climatechangenews.com/2016/10/06/un-aviation-pact-will-not-be-aligned-with-paris-climate-goals/

[99] Maertens et al 1, *op.cit.*, 10.

Paris Agreement obligations, the possibilities of maintaining some elements of the EU-ETS in aviation are therefore being discussed in the EU.[100]

2.2. Implementation of CORSIA by the German Government

2.2.1. German Environmental Concerns of Aviation

The German Constitution contains a policy directive on environmental protection, determining that the state shall provide legal protection for the natural foundations of life and animals.[101] Germany is concerned about the impact of air pollution and carbon emissions on climate change.

Regarding national law, the German Aviation Act (*Luftverkehrsgesetz)* encompasses issues of air pollution by aircraft. This Aviation Act determines that an advisory committee, established by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety as well as the Federal Ministry for Transport and Digital Infrastructure, may deliver recommendations for protection against air pollution from aircraft.[102]

Additionally, the Federal Climate Change Act (*Bundes-Klimaschutzgesetz*) was enacted to ensure the achievement of national climate targets and compliance with the European targets by considering ecological, social, and economic impacts and referring to obligations stipulated in the Paris Agreement under the UNFCCC.[103] This Climate Change Act provides that annual reduction targets shall be arranged by stipulating annual emission budgets to achieve the national climate targets for transport sectors, including domestic civil aviation.[104]

2.2.2.Germany between EU-ETS and CORSIA

In the context of aviation, Germany, along with the EU and its other member states, have been striving to achieve an international approach to reduce the impact of CO_2 emissions from aviation since 1997.[105] As a result, the EU has adopted some legislation to limit CO_2 aviation emissions in the form of the EU-ETS. The EU also supports, in principle, the ICAO's plan to introduce a global, market-based mechanism for CO_2 emissions from international aviation to combat climate change.[106] In this context, the EU has already made three temporary exemptions from the EU-ETS in aviation to support ICAO's progress on CORSIA.[107] Most recently, the ETS Directive was revised in 2017 to extend the current geographical scope exemption until 31 December 2023.[108] Ultimately, the EU and Germany are some of the first jurisdictions in the world to have adopted legally binding provisions for

[100] *Ibid.*, 1.

[101] See Wolfgang Babeck, "How Constitutional Courts Navigate Climate Litigation," *Iustitia* 1, no. 4 (2023): 24 and German Basic Law, Art. 20 (a).

[102] German Aviation Act (*Luftverkehrsgesetz),* Section 32 (a) (1).

[103] German Federal Climate Change Act (*Bundes-Klimaschutzgesetz*), Section 1.

[104] *Ibid.*, Section 4 (1) and Annex 1.

[105] Regulation (EU) 2017/2392 of 13 December 2017, ABl. L 350/7 of 29 December 2017, Recital 5.

[106] Decision (EU) 8758/20 CORSIA, 1 of 23 June 2020.

[107] European Commission (2019) 1644 of 06 March 2018.

[108] European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning aviation, 2020, 1.

the implementation of CORSIA.[109] In particular, with Regulation (EU) 2017/2392, the EU has taken the first steps towards implementing the ICAO mechanism. However, CORSIA is only considered to the extent that the EU's climate targets from the Paris Agreement are not neglected.[110] In Decision (EU) 2018/2027,[111] the EU points out that there are still some differences between the ETS Directive and the requirements of CORSIA.[112]

In this context, the statements of the EU Transport Commissioners should also be considered. Violetta Bulc stated in September 2019 that the EU Commission wants to expand the EU-ETS contrary to the decisions of CORSIA, specifically against Decision A40-19, para. 18.[113] Adina Valean announced in May 2020 that the EU Commission will stick to the EU-ETS for aviation but also wants to fulfil the obligations of CORSIA in order to prevent the program from failing.[114] CORSIA will most likely not replace the EU-ETS in aviation, but rather complement it in some aspects. In this context, the two previously discussed scenarios of "CORSIA + EU-ETS NATIONAL" and "CORSIA + EU-ETS MIX" come into consideration.

The current and future differences between EU law and the legal framework of CORSIA must be considered in order to preserve the legal framework of the EU-ETS.[115] The EU thus makes the future of the EU-ETS dependent on the success of CORSIA. The EU and Germany have repeatedly confirmed to ICAO that they will intensively support ICAO in the implementation of CORSIA,[116] despite some differences between ETS Directive 2003/87/EC and the SARPs of CORSIA.[117] The EU's position has triggered unrest about whether CORSIA will be generally adopted, transcribed and fully implemented by all contracting states under these circumstances. However, the ICAO expects from its contracting states to transpose the SARPs into their respective national laws largely unchanged.[118] States that have confirmed their participation in CORSIA should therefore transpose the ICAO guidelines into national law in a legally binding manner within the framework of the Chicago Agreement. The ICAO further argues that this process is imperative, firstly to preserve the environmental integrity of CORSIA and secondly to avoid market distortions.[119]

---

[109] *Ibid.*, 1; European Commission (2019) 1644 of 06 March 2019.

[110] European Commission (2020) 194 of 13 May 2020.

[111] Beschluss (EU) 2018/2027 of 29 November 2018, ABl. L 325/25 of 20 December 2018.

[112] Jordan Labkon and Barry Moss, "CORSIA Creates Compliance Complexities for Aviation Financiers," *The Air and Space Lawyer* 32, no. 1 (2019): 4.

[113] "Staaten drohen mit Boykott von CORSIA – ICAO-Versammlung in der Zwickmühle," http://www.airliners.de/eu-boykott-un-emissionshandel-zwick-muehle/52027?utm_campaign=readmore&utm_medium=articlebox&utm_source=air

[114] "Europa geht auf Konfrontationskurs zur ICAO," http://www.air-liners.de/europa-corsia-konfrontationskurs-icao/55430

[115] European Commission (2019) 1644 of 6 March 2019.

[116] *Ibid.*, 1.

[117] Council Decision (EU) 2018/2027 of 29 November 2018.

[118] Labkon and Moss, *op.cit.*, 4.

[119] IATA, *op.cit.*, 7.

By participating in the ICAO Programme, Germany has decided to implement the legal framework of CORSIA as far as possible. At this point, however, it should be emphasized that the German government, like the EU, is of the opinion that the EU-ETS in aviation is compatible with CORSIA.[120] The German government states that Resolution of ICAO Assembly No. A39-3 has no direct impact on the EU-ETS in aviation, as the CORSIA Agreement itself is not of a legally binding nature. In this context, the German government points out that the final relationship between the EU-ETS in aviation and CORSIA has not yet been conclusively determined. The German government also expects a proposal from the EU Commission this year on the CORSIA Agreement.[121] In order to implement the provisions of CORSIA uniformly and quickly in the national legal systems of all EU member states, a European legal act is therefore absolutely necessary. CORSIA can then be implemented in national legal systems.

Thus, the success of CORSIA also depends on which legally binding measures the individual contracting states of CORSIA outside the EU adopt. For this reason, the EU must also decide quickly whether and how it wishes to continue with the EU-ETS in aviation.

3. CONCLUSION

Currently, it remains unclear whether and to what extent the already existing EU-ETS in aviation will continue upon commencement of CORSIA. The results of this final work and the current position of the EU indicate that CORSIA will not be implemented according to Annex 16, Volume IV of the Chicago Agreement. Rather, the EU and especially Germany indicate that they will retain elements of the EU-ETS in aviation. Based on this, two scenarios appear more likely: CORSIA + EU-ETS NATIONAL and CORSIA and EU-ETS NATIONAL, and warrant further consideration. The important question of whether and to what extent CORSIA will be applied within the EU remains unanswered. To date, the European Commission has not submitted its report and legislative proposal, which means that future decisions by the legislature are still pending. Finally, it should be noted that the development and implementation of CORSIA is an ongoing process that will continue into the years ahead.

Author's Statement of Acknowledgment
This article is the personal work of the Author. The article's analysis and opinion reflect the Author's ideas and shall not be associated with the affiliation where the Author is studying at the Faculty III - Wirtschaftswissenschaften, Wirtschaftsinformatik und Wirtschaftsrecht, University of Siegen, Germany.

[120] European Commission, Inception Impact Assessment, Revision of the EU Emission Trading System Directive 2003/87/EC concerning aviation, 2020, 3.

[121] German Bundestag, Antwort der Bundesregierung zur Vereinbarkeit des europaïschen Zertifikatehandels im Luftverkehr mit CORSIA, 2019, 2.

BIBLIOGRAPHY

Book

Ellerman, A. Denny, Frank J. Convery, and Christian de Perthuis. *Pricing carbon, the European Emissions Trading Scheme*. Cambridge: Cambridge University Press, 2010.

Plath, Hendrik. *Die Einbeziehung des Luftverkehrs in den EU-Emissionshandel, in: Internationale Göttinger Reihe, Rechtswissenschaften*. Frankfurt: Band 59, 2014.

Journal Article

Babeck, Wolfgang. "How Constitutional Courts Navigate Climate Litigation." *Iustitia* 1, no. 4 (2023): 19-27. https://doi.org/10.59172/2667-9876/2023-1/19-27

Bartels, Lorand. "The WTO Legality of the Application of the EU's Emission Trading System to Aviation." *European Journal of International Law* 23, no. 2 (2012): 429-467. https://doi.org/10.1093/ejil/chs017

Buissing, Niall. "EU Air Transport and the EU's Environmental Agenda Struggle: A Leap of Faith or Can a CBAM Level the Playing Field?." *Air and Space Law* 47, no. 6 (2022): 577-600. https://doi.org/10.54648/aila2022035

Deane, Felicity and Callum Brockett. "Carbon Border Adjustments: A Legal Tool for Mitigation or a Barrier to Justice?." *Climate Law* 13, no. 1 (2023): 36-55. https://doi.org/10.1163/18786561-bja10038

Dobson, Natalie L. "(re)framing Responsibility? Assessing the Division of Burdens Under the EU Carbon Border Adjustment Mechanism." *Utrecht Law Review* 18, no. 2 (2022): 162–179. https://doi.org/10.36633/ulr.808

Domingos, Nicole de Paula. "Fighting Climate Change in the Air: Lessons from the EU Directive on Global Aviation." *Revista Brasileira de Política Internacional* 55 (2012): 70-87. https://doi.org/10.1590/S0034-73292012000300005

Efthymiou, Marina. "The Fundamentals of Environmental Regulation of Aviation: A Focus on EU Emissions Trading Scheme." *Aeron Aero Open Access Journal* 5, no. 1 (2021): 9-16. https://doi.org/10.15406/aaoaj.2021.05.00122

Efthymiou, Marina and Andreas Papatheodorou. "EU Emissions Trading Scheme in Aviation: Policy analysis and Suggestions." *Journal of Cleaner Production* 237 (2019): 1-10. https://doi.org/10.1016/j.jclepro.2019.117734

Erling, Uwe M. "How to Reconcile the European Union Emissions Trading System (EU-ETS) for Aviation with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)?." *Air & Space Law* 43, no. 4/5 (2018): 371-386. https://doi.org/10.54648/aila2018026

Erling, Uwe M. "International Aviation Emissions under International Civil Aviation Organization's Global Market-based Measure Ready for Offsetting." *Air & Space Law* 42, no. 1 (2017): 1-12. https://doi.org/10.54648/aila2017001

Gonçalves, Veronica Korber. "Climate Change and International Civil Aviation Negotiations." *Contexto Internacional* 39, no. 2 (2017): 215-230. http://dx.doi.org/10.1590/S0102-8529.2017390200012

Gürçam, Selçuk. "Global Commercial Aviation Policies in the Context of the Climate Crisis and an Analysis of these Approaches from the Perspective of Türkiye." *Environmental Research Technology* 5, no. 3 (2022): 227-240. https://doi.org/10.35208/ert.1113781

Karimi-Schmidt, Yvonne. "Klimaschutz aus Völkerrechtlicher Sicht unter Besonderer Berücksichtigung der Zivilen Luftfahrt." *Zeitschrift für öffentliches Recht* 74, no. 1 (2019): 35-68. https://doi.org/10.33196/zoer201901003501

Kerr, Baine P. "Clear Skies or Turbulence Ahead? The International Civil Aviation Organization's Obligation to Mitigate Climate Change." *Utrecht Law Review* 16, no. 1 (2020): 101–116. https://doi.org/10.36633/ulr.551

Kotzampasakis, Manolis. "Intercontinental Shipping in the EU ETS: A 'Fifty-Fifty' Alignment with the Law of the Sea and International Climate Law?." *Review of European, Comparative and International Environmental Law* 32, no. 1 (2023): 29-43 https://doi.org/10.1111/reel.12485

Labkon, Jordan and Barry Moss. "CORSIA Creates Compliance Complexities for Aviation Financiers." *The Air and Space Lawyer* 32, no. 1 (2019): 4-6.

Larsson, Jörgen et al. "International and National Climate Policies for Aviation: A Review." *Climate Policy* 19, no. 6 (2019): 787-799. https://doi.org/10.1080/14693062.2018.1562871

Lee, David S et al. "Aviation and Global Climate Change in the 21st Century." *Atmospheric Environment* 43, no. 22-23 (2009): 3520-3537. https://doi.org/10.1016/j.atmosenv.2009.04.024

Lee, David S et al. "Transport Impacts on Atmosphere and Climate: Aviation." *Atmospheric Environment* 44, no. 37 (2010): 4678–4734. https://doi.org/10.1016/j.atmosenv.2009.06.005

Liang, Wenqiong and Liying Zhang. "Legal Issues Concerning the EU Unilateral Aviation ETS: A Chinese Perspective." *South Carolina Journal of International Law and Business* 11, no. 1 (2014): 1-27.

Liao, Weijun, Ying Fan, and Chunan Wang. "How Does COVID-19 Affect the Implementation of CORSIA?." *Journal of Air Transport Management* 99 (2022): 1-8. https://doi.org/10.1016/j.jairtraman.2022.102180

Maertens, Sven et al. "Options to Continue the EU-ETS for Aviation in a CORSIA-World." *Sustainability* 11, no. 20 (2019): 1-19. https://doi.org/10.3390/su11205703

Maertens, Sven et al. "Klimaschutz im Luftverkehr: vom EU-Emissionshandel zu CORSIA." *Wirtschaftsdienst - Zeitschrift für Wirtschaftspolitik* 97, no. 8 (2017): 588-595. https://doi.org/10.1007/s10273-017-2181-7

Mai, Duong Thi Thuy and Bo Yan. "Divergences between the European Union and China on Reducing International Aviation Emissions." *Asia European Journal* 21 (2023): 1-21. https://doi.org/10.1007/s10308-023-00657-x

Malina, Robert et al. "The Impact of the European Union Emissions Trading Scheme on US Aviation." *Journal of Air Transport Management* 19 (2012): 36-41. http://dx.doi.org/10.1016/j.jairtraman.2011.12.004

Nishimura, Lauren. "Adaptation and Anticipatory Action: Integrating Human Rights Duties into the Climate Change Regime." *Climate Law* 12, no. 2 (2022): 99-127. https://doi.org/10.1163/18786561-20210001

Nkuepo, Henri J. "EU ETS Aviation Discriminates against Developing Countries." *Africa's Trade Law Newsletter* no. 7 (2012): 3-5. https://dx.doi.org/10.2139/ssrn.2047247

Nugraha, Ridha Aditya. "Preserving the Environment within the ASEAN Skies: Lessons from the European Union Emissions Trading Scheme." *Hasanuddin Law Review* 4, no. 1 (2018): 15-29. http://dx.doi.org/10.20956/halrev.v4i1.1343

Rossati, David. "A Question of Value: On the Legality of Using Kyoto Protocol Units under the Paris Agreement." *Climate Law* 11, no. 3-4 (2021): 298-321. https://doi.org/10.1163/18786561-11030005

Schaefer, Martin et al. "The Economic Impact of the Upcoming EU Emissions Trading System On Airlines and EU Member States—an Empirical Estimation." *European Transport Research Review* 2 (2010): 189-200. https://doi.org/10.1007/s12544-010-0038-x

Scheelhaase, Janina et al. "EU ETS versus CORSIA – A Critical Assessment of Two Approaches to Limit Air Transport's CO_2 Emissions by Market-Based Measures." *Journal of Air Transport Management* 67 (2018): 55-62. https://doi.org/10.1016/j.jairtraman.2017.11.007

Scheelhaase, Janina and Sven Maertens. "How to Improve the Global 'Carbon Offsetting and Reduction Scheme for International Aviation' (CORSIA)?." *Transportation Research Procedia* 51 (2020): 108-117. https://doi.org/10.1016/j.trpro.2020.11.013

Scheelhaase, Janina, Sven Maertens, and Wolfgang Grimme. "Options for Improving the EU Emissions Trading Scheme (EU ETS) for Aviation." *Transportation Research Procedia* 59 (2021): 193-202. https://doi.org/10.1016/j.trpro.2021.11.111

Wozny, Florian et al. "CORSIA—A Feasible Second Best Solution?." *Applied Science* 12 (2022): 1-17. https://doi.org/10.3390/%20app12147054

Thesis

Eriksson, Tobias. "EU ETS vs. CORSIA – A Neoliberal Institutionalist Study of European Emission Reduction Policy." Master-Thesis, Department of Political Science Centre for European Studies (CES), University of Gothenburg, 2019.

Legal Documents

European Commission. Commission Delegated Regulation (2019) 1644 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards Measures Adopted by the International Civil Aviation Organisation for the Monitoring, Reporting and Verification of Aviation Emissions for the Purpose of Implementing a Global Market-Based Measure of 6 March 2019.

European Commission. Commission Implementing Regulation (EU) 2020/194 of 12 February 2020 laying down detailed rules for the application of Council Regulation (EU) No 904/2010 as regards the Special Schemes for Taxable Persons Supplying Services to Non-Taxable Persons, Making Distance Sales of Goods and Certain Domestic Supplies of Goods.

European Union. Gesetz zur Umsetzung der Richtlinie 2003/87/EG über ein System für den Handel mit Treibhausgasemissionszertifikaten in der Gemeinschaft of 8 July 2004, BGBl. 2004 I of 14 July 2004.

European Union. Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, COM (2006), 818 of 20 December 2006.

European Union. Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008, ABl. L 8/3 from 13 January 2009.

European Union. Regulation (EU) 421/2014 of the European Parliament and the Council of 16 April 2014, ABl. L 129/1 of 30 April 2014.

European Union. Council Decision (EU) 2016/915 of 30 May 2016 on the Position to be Taken on Behalf of the European Union with regard to the International Instrument to be Drawn up within the ICAO Bodies and Intended to Lead to the Implementation from 2020 of a Single Global Market-Based Measure for International Aviation Emissions.

European Union. Regulation (EU) 2017/2392 of the European Parliament and the Council of 13.12.2017, ABl. L 350/7 of 29 December 2017.

European Union. Decision (EU) 8758/20 COR1 of 23 June 2020.

European Union. Directive 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a System for Greenhouse Gas Emission Allowance Trading within the Union and Decision (EU) 2015/1814 concerning the Establishment and Operation of a Market Stability Reserve for the Union Greenhouse Gas Emission Trading System. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023L0959

Germany. Basic Law. https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html

Germany. Federal Aviation Act (*Luftverkehrsgesetz)*. https://www.gesetze-im-internet.de/luftvg/BJNR006810922.html

Germany. Federal Climate Change Act (*Bundes-Klimaschutzgesetz*). https://www.bmuv.de/fileadmin/Daten_BMU/Download_PDF/Gesetze/ksg_final_en_bf.pdf

International Civil Aviation Organization. ICAO Assembly Resolution A39-3, Consolidated statement of continuing ICAO Policies And Practices Related to Environmental Protection – Global Market-based Measure (MBM) Scheme, 2016. http://www.icao.int/environmental-protection/documents/resolution_a39_3.pdf

International Civil Aviation Organization. ICAO, Annex 16 to the Convention on International Civil Aviation, Environmental Protection IV, 2018, Table A, Amendments to Volume IV of Annex 16.

Other Documents

Debyser, Ariane. "ICAO Agreement on CO_2 Emissions from Aviation, European Parliamentary Research Service." http://www.europarl.europa.eu/RegData/etudes/ATAG/2019/640169/EPRS_ATA(2019)640169_EN.pdf

European Commission. "Inception Impact Assessment, Revision of the EU Emissions Trading System Directive 2003/87/EC concerning aviation." http://ec.europa.eu/info/law/better-regulation/have-yoursay/initiatives/12494-Revision-of-the-EU-Emission-Trading-System-Directive-con-cerning-aviation-

Federal Ministry of Transport and Digital Infrastructure. "ICAO State Action Plan for CO2 Emissions Reduction – Germany." https://bmdv.bund.de/blaetterkatalog/catalogs/429104/pdf/complete.pdf

German Bundestag. "Antwort der Bundesregierung zur Vereinbarkeit des europäischen Zertifikatehandels im Luftverkehr mit CORSIA." https://dserver.bundestag.de/btd/19/159/1915965.pdf

Intergovernmental Panel on Climate Change 2014. "Climate Change 2014, Synthesis Report, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, R. K. Pachauri and L. A. Meyer (eds.)), IPCC, 2014, Genf, Schweiz." https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf

Intergovernmental Panel on Climate Change 2007. "Climate Change 2007, Synthesis Report, Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, Pachauri, R. K. and Reisinger, A. (eds.)), IPCC, 2007, Genf, Schweiz." https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf

International Air Transport Association. "An Airline Handbook on CORSIA, 2019."

Jensen, Liselotte. "Aviation's Contribution to European Union Climate Action Revision of EU ETS as regards Aviation." https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/698882/EPRS_BRI(2022)698882_EN.pdf

Kruse-Andersen, Peter K. "Endogenizing the Cap in a Cap-and-Trade System: Assessing the Agreement on EU ETS Phase 4, 2018." https://dors.dk/files/media/publikationer/arbejdspapirer/2018/arbejdspapir_2018.02.pdf

Nelissen, Dagmar et al. "The Aviation and Maritime Sectors and the EU Emission Trading System (EU ETS): Challenges and Impacts, Final Study, Research for TRAN Committee, European Parliament, 2021." https://www.europarl.europa.eu/RegData/etudes/ATAG/2021/690878/IPOL_ATA(2021)690878_EN.pdf

Schep, Ellen, Andre van Velzen, and Jasper Faber. "A comparison between CORSIA and the EU ETS for Aviation." https://cedelft.eu/wp-content/uploads/sites/2/2021/04/CE_Delft_7K17_finalpaper_JF.pdf

Schneider, Lambert and Nora Wissner. "Fit for Purpose? Key Issues for the First Review of CORSIA." https://www.oeko.de/fileadmin/oekodoc/Key-issues-for-first-review-of-CORSIA.pdf

United Nations Development Programme. "Report on CORSIA Implications and Carbon Market Development: Assess CORSIA Implications and Carbon Market Development, 2022." https://www.undp.org/sites/g/files/zskgke326/files/2023-02/Report%20on%20CORSIA%20implications%20and%20carbon%20market%20development%20%28Deliverable%203.2.%29.pdf

Van Velzen, André. "CORSIA, EU ETS and the EU2030 aviation emissions target, Report pre- pared for Transport and Environment (T&E), Report No. 18-13." http://www.transportenvironment.org/sites/te/files/publications/2018_09_Study_CORSIA_EU_ETS_and_EU2030_aviation_emissions_target_Final.pdf

Court Decision

European Court of Justice. Case C-366/1 Air Transport Association of America, American Airlines, Inc, Continental Airlines, Inc, United Airlines, Inc v The Secretary of State for Energy and Climate Change [2011] ECR I-0000 (ATAA case).

Website Content

Bundesverband der Deutschen Industrie e.V. "Stellungnahme, Inception Impact Assessment zur Initiative "Revision of the EU Emissions Trading System Directive 2003/87/EC concerning aviation." http://bdi.eu/publikation/news/revision-eu- ets/.

Darby, Megan. "UN Aviation Pact Will Not be Aligned with Paris Climate Goals." http://www.climatechangenews.com/2016/10/06/un-aviation- pact-will-not-be-aligned-with-paris-climate-goals/

"Europa geht auf Konfrontationskurs zur ICAO." https://www.airliners.de/europa-corsia-konfrontationskurs-icao/55430

German Emissions Trading Authority. "Structure of the EU ETS." https://www.dehst.de/EN/european-emissions-trading/understanding-emissions-trading/structure/structure_node.html

"Staaten drohen mit Boykott von CORSIA – ICAO-Versammlung in der Zwickmühle." http://www.airliners.de/eu-boykott-un-emissionshandel-zwick- muehle/52027