**INTRODUCTION**

**BACKGROUND**

Despite the cyclical crises in international aviation, the sector is expected to grow annually by approximately 5 percent,¹ making it the fastest growing mode of transportation.² The sector’s enormous contribution to the world’s economy and society at large is undeniable;³ however, international aviation’s projected growth poses significant challenges to the environment and in particular to concerns over climate change.⁴ At present, international aviation contributes approximately 2 percent of total global greenhouse gas (GHG) emissions.⁵ If the international aviation industry were a State, it would rank seventh in the world in terms of global contribution of GHG emissions.⁶ Aviation’s carbon footprint is expected to increase 3 to 4 percent annually, leading the sector to introduce a number of technological and operational measures to reduce its negative environmental impact.⁷ However, these initiatives will not offset the emissions expected to be generated as a result of its projected growth. At this pace and in the absence of regulation or massive deployment of alternative fuels, reports estimate that aviation’s CO₂ emissions will rise fourfold by 2050.⁸

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⁶ See ICAO, HGCC/3-AIP/6 at 1 (Presentation of the International Coalition for Sustainable Aviation at the third meeting of the High Level Group on International Aviation and Climate Change, 25-27 March 2013) [HGCC/3-AIP/6].
⁷ See ICAO CAEP/8-WP/80, Committee on Aviation Environmental Protection (CAEP) Eighth Meeting, Montreal, 1 to 12 February 2010 Agenda Item 1 at 1-32.
⁸ See “Hedegaard Sets out Conditions on ICAO Agreement as EU Legislators Approve EU ETS ‘Stop the Clock’ Measure”, Green Air Online (17 April 2013) online: <www.greenaironline.com/news.php?view-Story=1681> [“Hedegaard Sets out Conditions on ICAO Agreement”]. ICAO’s estimates are a bit more conservative. In 2013, ICAO forecasted that by 2050 GHG emissions from international aviation will increase between 2.8 and 3.9 times compared with 2010 levels. See Gregg Fleming and Urs Ziegler, “Environmental Trends in Aviation to 2050” in ICAO, *supra* note 5 at 22.
Those outside aviation circles have been unimpressed by the sector’s achievements in confronting climate change. Critics argue that international aviation should be responsible for the environmental externality it generates. In addition, a number of international institutions have singled out international aviation as a potential source of funds for mitigation and adaptation activities in the wider climate change context. Likewise, various States have levied international departure taxes (e.g. embarkation taxes) on the aviation sector for climate change purposes although it is not entirely clear whether these funds are allocated to climate change-related measures. Increasingly, international aviation is facing mounting pressure to address its climate change impact.

In an effort to establish an overall legal framework to regulate anthropogenic GHG emissions, the international community adopted the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. In order to operationalize this framework, States adopted the Kyoto Protocol during the third Conference of Parties (COP/3) of the UNFCCC in 1997. This instrument tasked developed States to limit or reduce GHG emissions from aviation by working through the International Civil Aviation Organization (ICAO). In practice, this has been interpreted as an implicit mandate bestowed upon ICAO by the UNFCCC regime to handle the aviation sector’s GHG emissions. However, the mandate is extremely vague and imprecise, allowing States to interpret it in furtherance of parochial national interests. This mandate has also made it extremely difficult to reconcile the UNFCCC’s cardinal principle of common but differentiated responsibilities and respective capabilities (CBDR) with the Convention on International Civil Aviation’s non-discrimination principle. In the UNFCCC context, on the basis of CBDR, only developed States bear quantified emissions limitation/reduction commitments (QELRCs). Developing countries ought to report emissions, maintain national inventories, and cooperate to achieve the regime’s objectives. In international civil aviation, by invoking CBDR, developing countries argue that their aircraft operators should not be subject to emission reduction obligations. Developed States contend that CBDR cannot be applied in civil aviation, because it contravenes ICAO’s non-discrimination principle and leads to market distortions.

9 See Joyce E Penner et al., eds, Aviation and the Global Atmosphere, Published for the Intergovernmental Panel on Climate Change (Cambridge: Cambridge University Press, 1999) at 341 [IPCC Aviation Report].
10 See ICAO, HGCC/3-IP/5, Addressing Carbon Emissions From Aviation: Industry Views (Presented by the Air Transport Action Group (ATAG) on behalf Airports Council International (ACI), Civil Air Navigation Services Organisation (CANSO), International Air Transport Association (IATA), International Business Aviation Council (IBAC), International Coordinating Council for Aerospace Industries Associations (ICCAIA)).
13 Ibid at art 2.2.
14 Also known as the Chicago Convention; see Chapter 2.
A long time has passed since the Kyoto Protocol was adopted, yet GHG emissions from international aviation continue to be essentially unregulated. ICAO has undertaken an impressive amount of technical work. It has produced myriad guidance material and recommendations on the subject for States. Currently, however, there is no system in place to reduce or limit emissions. These continue to grow. Frustrated by the lack of progress at ICAO and the unwillingness of the international community, the European Commission unveiled a comprehensive plan to include foreign aircraft operators into its emissions trading scheme (EU ETS) in 2005. To this end, the European Union adopted Directive 2008/101/EC in December 2008, which indicated its intention to subject all European and foreign aircraft operators flying to and from airports situated in the EU to the EU ETS with effect from 1 January 2012. Under the Directive, emissions were to be computed for the whole duration of the flight even when portions thereof were produced in airspace that is outside European jurisdiction (i.e. over the high seas or over the airspace of non-EU States). Strong international opposition was assembled to challenge the scheme. As a result, in November 2012, Europe was forced to suspend the application of the scheme to foreign aircraft operators for a period of one year. In addition, in April 2014, the European Parliament announced that the scheme will be put on hold until 2017.

Ever since Europe announced its intention to incorporate aviation into its ETS, the airline industry, led by the International Air Transport Association (IATA), has been extremely active in addressing climate change issues. IATA has adopted non-binding, aspirational industry targets that have proved to be very influential in ICAO’s work.

In the meantime, at the 38th session of the ICAO Assembly held in October 2013, ICAO’s Member States finally agreed to develop a global market-based measure (MBM) to regulate GHG emissions from international aviation. Specifically, the Assembly tasked the Council to work on the design elements of a concrete MBM proposal to be presented for consideration at the 39th Assembly in September 2016. At this stage, it is expected...
that the Assembly will adopt such a scheme to be implemented as of 1 January 2020. At present, ICAO is working toward developing such a scheme.

The Research Problem

GHG emissions from international aviation continue to grow steadily. At their current rate of growth and projected future growth, technological and operational efficiencies cannot be relied on to offset emissions. Without regulation, the international aviation sector will not be in a position to reduce its emissions. It is certainly in the best interest of the sector to do so now since failure to tackle the issue will only result in the imposition of an enormous burden upon the sector by external forces. For instance, in an attempt to fund 100 billion US dollars annually until 2020 for climate change mitigation in developing countries, the UN Secretary-General’s High Level Advisory Group on Climate Change Financing has suggested that international air transport could contribute between 1 and 6 billion US dollars annually through the establishment of levies.\(^{23}\) Likewise, a World Bank report prepared for the G20 recommended levying 25 US dollars per tonne of CO\(_2\).\(^{24}\) This proposal could levy a fee of up to 12 billion US dollars per year for climate financing.\(^{25}\) In this context, the sector can no longer postpone an appropriate regulatory mechanism to address GHG emissions from international aviation.

Research Objective

This book examines aspects of the legal framework underlying the aviation and climate change discourse with a view to providing some recommendations that may facilitate the adoption, implementation, and, ultimately, compliance with ICAO’s global MBM to limit GHG emissions from international aviation. In other words, it seeks to analyze certain issues that have directly or indirectly influenced discussions on aviation and climate change and that have played or will play a significant role in ICAO’s global MBM scheme. To this end, the book deals with five broad areas. First, it examines ICAO’s relationship with the climate change regime, the implicit mandate provided by the Kyoto Protocol, and the interplay between the core principles of the UNFCCC regime and those of the international


\(^{24}\) See International Monetary Fund and the World Bank, Market-Based Instruments for International Aviation and Shipping as a Source of Climate Finance, Background Paper to the G20 on the Mobilizing Sources of Climate Finance, (November 2011) online: IMF <www.imf.org/external/np/g20/pdf/110411a.pdf> at 5 [International Monetary Fund and the World Bank Report].

\(^{25}\) Ibid.
aviation regime. In this connection, the theory of fragmentation of international law is used as an analytical framework for the resolution of normative conflict. Second, the book explores ICAO’s institutional setting and its suitability for handling climate change. Third, it comprehensively analyzes the EU ETS, its influence on the climate change discourse, as well as the legal issues associated with it. Fourth, by resorting to the theory of norm entrepreneurship, the book assesses the role of the major players involved in the climate change discourse. Fifth, in its closing chapters, the book highlights issues that should be carefully considered during the design of ICAO’s global MBM. These considerations should not be construed as an attempt to develop a comprehensive global MBM scheme for international aviation. Such an endeavor requires substantial qualitative and quantitative research that is outside the scope of this project.

Relevance of the Subject Matter of the Research

Climate change exerts enormous pressure on States, industry stakeholders, non-governmental organizations (NGOs), and ICAO. Climate change has almost hijacked the last four sessions of the ICAO Assembly to the point where discussions on other aviation-related issues were put on hold until an agreement could be reached. This is a testimony to the subject’s predominance.26 In recent years, ICAO’s budget for environmental protection has increased, whereas funds for activities of other more traditional sectors of the industry are diminishing.27 There is no indication that the significance and importance accorded to the aviation and climate change issue is likely to dwindle in the near future, and it is up to the international aviation community to stand ready for the challenge.

Original Contribution to Legal Research and Knowledge

This book contributes to legal research and knowledge in at least five ways. First, commentators have been quick to point out ICAO’s lack of achievement and slow progress on climate change issues. Yet, to date, there has not been a careful examination of ICAO’s institutional setting and an assessment of whether the organization is the appropriate forum to address climate change issues. Also missing from the literature is an assessment of whether ICAO’s institutional setting inhibits or promotes participation by Member States. This book tackles precisely this issue28 by examining ICAO’s constitutional framework and its recently adopted strategic objectives and proposing realistic corrective measures.

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26 See Michel Wachenheim, “Interview with Michel Wachenheim: President of the 38th Session of the ICAO Assembly” in The European Civil Aviation Conference Magazine, ECAC News 50 (Winter 2013) 10 at 11.
28 See Chapter 1.
measures that may ultimately bear influence in the design and implementation of ICAO’s global MBM.

Second, most of the legal scholarship on aviation and climate change primarily centers on the legality or illegality (depending on the reader’s point of view) of the EU ETS. Perhaps this is understandable if one considers that, since it was first announced in 2005, this regional initiative has monopolized discussions on aviation and climate change. While this book explores some of the legal issues surrounding the EU ETS (such as its unquestionable extraterritoriality) in great detail, it goes further to analyze issues such as the contribution of the EU ETS to the ICAO process of regulating GHG emissions from international aviation and the negative impacts as well as the missed opportunities of the EU ETS. This book is innovative in the sense that it provides a critical assessment of the EU ETS rather than simply defending or attacking the scheme. It also draws lessons from the EU ETS that may enhance the design and implementation of ICAO’s global MBM scheme and enable it to avoid certain pitfalls.\(^{29}\)

Third, most of the political discourse and industry allegations on aviation climate change issues have been dominated by self-interested statements. Quite often, these have been taken for granted. By challenging these assumptions, this book not only identifies the merits and shortcomings of the activities carried out by the main actors involved but also identifies potential corrective measures that may contribute to the success of ICAO’s global MBM scheme.\(^{30}\)

Fourth, State representatives and scholars have argued that either CBDR or the non-discrimination principle should govern ICAO’s work on climate change. This approach, which selects one principle over the other depending on the political perspective held by the proponent(s), has not been successful in achieving the intended results. I attempt to reconcile these seemingly divergent principles in a manner that is compatible with the aviation industry. In fact, it advances some concrete proposals as to how this reconciliation may be operationalized in the design of the ICAO’s global MBM.\(^{31}\) This may well be a fundamental issue for the success of the scheme, for it may facilitate broader acceptance.\(^{32}\)

Fifth, although States, industry stakeholders, ICAO, and many authors have proposed ideas for the global MBM scheme, there has been no consideration of the legal vehicle to bring about the optimal adoption of such a scheme. If unaddressed, this may well prove to be the stumbling block. This book comprehensively analyzes the advantages and disad-

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29 See Chapters 4-6.
30 See Chapter 7.
31 See Chris Lyle’s perspective on Green Air Online, ”Mitigating International Air Transport Emissions through a Global Measure: Time for Some Lateral Thinking” (2014) (noting that “ICAO equal application principle and the UNFCCC’s CBDR can be reconciled through transitional implementation of MBMs on a route or route group basis”) online: Green Air Online <www.greenaironline.com/news.php?viewStory=1820> [Lyle, “Mitigating International Air Transport”].
32 See Chapter 8.
The book examines primary sources such as jurisprudence, legislation, regulations, and proposed amendments to existing legislation. It reviews secondary legal materials such as books, journal articles, and theses. Given their strong influence in the aviation and climate change discourse, the book also analyzes industry reports, studies, and publications in this field. To avoid a natural bias, such data is often contrasted with that provided by other organizations such as ICAO and NGOs.

In light of the fact that ICAO serves as the institutional platform where, for the most part, aviation and climate change discussions take place, the book devotes significant consideration to the organization’s assembly resolutions, guidance materials, standards and recommended practices, manuals, and the minutes and the decisions of the Council. More specifically, the book tracks all Council discussions and Assembly resolutions on the issue of climate change since 1998, the year following the adoption of the Kyoto Protocol. This is intended to facilitate understanding of the different positions of States and also to document the progressive evolution of this subject matter at ICAO.

Although there are some scattered references to UNFCCC documents, for the most part, the book is not so much concerned with these sources. Admittedly, the UNFCCC process influences discussions at ICAO. However, much if not all of the aviation and climate change discussions have occurred at ICAO. It is also evident that States and industry stakeholders prefer to hold such deliberations under the auspices of ICAO. Similarly, the Kyoto Protocol expressly tasked ICAO to address GHG emissions from international aviation. At this stage, it is highly unlikely that the UNFCCC would be able and willing to address aviation and climate change issues.

Although this book primarily studies legal materials, it also relies on some political science and international relations literature. This is particularly the case in Chapter 7 where the issues of norm entrepreneurship and norms in general are considered.

Organization of Chapters

The book comprises nine chapters. Chapter 1 describes the setting in which the aviation and climate change discourse evolves. In particular, it discusses the growth trends in the aviation sector, its expected contribution to global GHG emissions, as well as the techno-
logical and operational efficiencies introduced by the industry. In essence, this chapter makes the point that, given its projected growth trends in the next 20-30 years, technological and operational efficiencies will not be sufficient to limit international aviation’s GHG emissions. The chapter also suggests that, at this stage, there is no indication that alternative fuels will be available in sufficient quantities and at reasonable prices to play a major role in reducing the sector’s emissions – at least in the foreseeable future. In addition to briefly introducing the international legal regime, the chapter explains the risks that the sector is likely to face if it decides not to tackle its climate change impact.

Through the lens of the theory of fragmentation of international law, Chapter 2 looks into the interplay between the climate change regime and ICAO. More specifically, the chapter thoroughly investigates the implicit mandate that the Kyoto Protocol granted to ICAO to limit or reduce GHG emissions from international aviation. It examines the practical and operational implications of this mandate, studying the apparent conflict between the UNFCCC’s CBDR principle and the Chicago Convention’s non-discrimination principle. Seeking to reconcile these two principles, the chapter explores the seminal work of the International Law Commission (ILC) on fragmentation and, more specifically, whether the rules contained in the Vienna Convention on the Law of Treaties (VCLT) governing conflicts between treaties and other legal obligations may provide a viable solution. The chapter advances an innovative approach to reconciling these principles; a central concern of this book is reconciling these two principles in the design of ICAO’s global MBM. This should facilitate adherence to the scheme by a broader audience. In fact, it is submitted that one of the reasons why States have yet to implement a measure to limit or reduce GHG emissions from international aviation has been their inability to agree on how the relationship between these two principles should be handled.

Chapter 3 addresses ICAO’s involvement in climate change. This assessment is necessary in order to better understand what the organization may achieve and what corrective measures may be implemented to contribute toward the success of the global MBM scheme. Before discussing the organization’s specific achievements in this field, the chapter carefully examines ICAO’s institutional setting and its suitability to handle climate change issues. Particular attention is paid to its governing structure and its institutional objectives, and whether these inhibit or foster participation by its Member States in the climate change discourse. Similarly, the chapter assesses the role of industry stakeholders and NGOs and the influence (or lack thereof) they exert in the formation of climate change policy at ICAO. It also examines the work of the Committee on Aviation Environmental Protection (CAEP) – ICAO’s technical body in charge of environmental issues.

After providing a brief historical background, the chapter then examines ICAO’s specific work on climate change with particular emphasis on the CO₂ standard, State actions plans, the framework for MBMs, and the agreement to develop a global MBM scheme.
Chapters 4 to 6 deal with the EU ETS. Considerable attention is devoted to the scheme’s architectural design as well as the policy and legal issues involved. Although a number of legal arguments have been advanced against the EU ETS, the most serious legal allegation has focused on the issue of extraterritoriality. Because the original geographical scope of the scheme envisioned that fuel consumption would be computed for the whole duration of the flight, non-EU States did contend that it was tantamount to an unlawful exercise of extraterritorial jurisdiction. To examine these allegations, the book digs into the principles of international law on jurisdiction. It also explores whether the principles of State responsibility may exonerate the EU ETS.

A thorough analysis of the European scheme, how it came into existence, its struggles, and missed opportunities, is necessary not only to provide a clear understanding of how ICAO, its Member States, and the airline industry reached an agreement to develop a global MBM scheme but also to take advantage of the true potential of the scheme. In fact, the EU ETS is central to the purpose of this book for a number of reasons. First, it stands as a policy response to the unwillingness of the international aviation community to regulate GHG emissions from international aviation. Europe decided to include foreign aircraft operators into its ETS only after it became abundantly clear that States gathered at ICAO were unwilling to do so.

Second, the EU ETS prompted the formation of an unprecedented international coalition to challenge it. As described in Chapter 4, instead of working toward establishing a mechanism to regulate GHG emissions from international aviation at ICAO, States and the airline industry devoted an enormous amount of time, effort, and resources in a concerted attempt to derail the EU ETS.

Third, in spite of the dire opposition it ignited, the EU ETS has exerted considerable pressure on ICAO, its Member States, and industry stakeholders to take action. Had it not been for the EU ETS, ICAO would not have agreed to develop a global scheme for international aviation, and it is also doubtful that the airline industry would have ever developed a dedicated strategy to combat climate change. As explored in Chapter 7, the industry’s engagement in climate change came about as a reactive response to the EU ETS. In addition, the fact that climate change now ranks very high on ICAO’s policy agenda may, to a large extent, be attributed to the European normative push.

Fourth, the EU ETS represents the first robust normative approach to regulate GHG emissions from international aviation. Moreover, having been implemented by States representing almost 23 percent of the ICAO membership, the EU ETS serves as a fantastic learning experience for ICAO’s global MBM scheme. For instance, it is highly likely that in developing standards for GHG emissions monitoring, reporting, and verification (MRVs), ICAO will resort to the same methodologies as those applied in the EU ETS. Further, given the animosity that the EU ETS has prompted, it is quite likely that the international community will adopt any other regulatory option apart from emissions trading when
designing ICAO’s global MBM scheme. As a policy instrument, emissions trading is viewed as a highly toxic regulatory option because it is so closely linked to Europe.

The climate change discourse is full of dogmatic statements. Most often, these are taken at face value without much corroboration. The industry contends that it has a comprehensive strategy to address climate change issues; it has set ambitious targets and is on course to achieve them. ICAO says that it is the first UN-specialized agency with a concrete global plan to address GHG emissions from the sector it regulates. Other States also claim that emissions generated by their respective aviation sectors have been dramatically reduced. If this is the case, then climate change should not pose a major challenge to international aviation. To assess the various actors’ achievements, shortcomings, and missed opportunities, Chapter 7 relies heavily upon the theory of norm entrepreneurship. In so doing, the chapter identifies those actors who by challenging the status quo have pushed for normative change. The application of the norm entrepreneurship theory also enables us to identify the conditions under which these changes are likely to occur and the requirements for norm internalization (e.g. acceptance). In addition, this assessment facilitates the identification of corrective measures that may have to be taken into account for a successful global MBM scheme. It also provides an appropriate platform to assess the level of acceptance that the proposed normative change (e.g. proposal to adopt global MBM scheme) has received within the membership of ICAO and, should it be necessary, the required measures to introduce corrective action.

In Chapter 8 the book presents some issues that must be considered in the design of the global MBM scheme. Particular attention is paid to a practical way of integrating the principles of CBDR and non-discrimination. In this regard, Chapter 8 proposes the adoption of a route-based approach where different routes will be phased in accordance to a set of criteria. It also examines in detail the potential legal vehicles to be used in adopting such a global scheme, their respective benefits and drawbacks, as well as possible enforcement mechanisms. It highlights some additional roles that key actors should play that may contribute to the success of the global MBM scheme. Finally, Chapter 9 provides some concluding remarks. As this project deals with evolving issues, the reader should be aware that the facts and data presented herein are up to date as of November 2014.