

## Introduction

### *Sustainable Development, International Aviation, and Treaty Implementation*

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#### I.1 BACKGROUND

This book addresses an important and urgent concern: the need to facilitate sustainable growth of the international air transport industry while dramatically reducing the emissions of greenhouse gases (GHGs) and other environmental and social impacts, which are currently the by-product of every commercial flight. This book argues that sustainable aviation law can integrate economic, social, and environmental concerns for the future of this important industry and the world alike. Many chapters of this volume focus on climate change, which presents perhaps the most immediate challenge to the social license of this global industry. As the world worked slowly past the Kyoto Protocol and toward the Paris Climate Agreement, the international civil aviation community adopted a wait and see attitude. All too often, rather than taking an active part in this global effort to reduce the emissions of GHGs, the international civil aviation community – commercial, industrial, and governmental – has maintained that it represents a small percentage of the phenomenon and should thus not be regarded as part of the problem. On the contrary, it has been asserted that international civil aviation is already doing all it can and that its options are limited by technological or economic imperatives. Successive sessions of the Assembly of the International Civil Aviation Organization (ICAO) paid lip service to the need to act and postponed meaningful action to the next session of the Assembly.

All this radically changed at the 39th Session of the ICAO Assembly in September to October 2016, which approved a mandate for the ICAO Council to implement a global market-based carbon offsets scheme, namely CORSIA, to reduce carbon dioxide (CO<sub>2</sub>) after 2020. The decision taken by the 39th Session of the ICAO Assembly followed the decisions taken at the 21st Session of the Conference of the Parties (COP 21) to the United Nations

2 Armand de Mestral, Peter Paul Fitzgerald, and Md Tanveer Ahmad

Framework Convention on Climate Change in Paris in December 2015. After that point, it was no longer possible for the ICAO to plead that civil aviation was not part of the problem or that it represented too small a source of GHGs to matter. International civil aviation is the only activity whose emissions principally occur in the upper atmosphere; it continues to grow at a significant rate and is expected to do so for the indefinite future. Nor will it be possible to plead that deliberate action to reduce GHGs will be too costly or that only one part of the international community should assume the cost. Landmark decisions were taken at Paris and Montreal to reduce GHG emissions, and it is now up to States and the international civil aviation industry to find the means of achieving this goal.

In late 2012, Students of the McGill University Institute of Air and Space Law (IASL) began to focus on the issues of sustainable development and climate change in the previous decade. The controversy surrounding the 2009 decision of the European Union (EU) to extend its Emissions Trading System (ETS) to international civil aviation proved to be an important catalyst focusing the interest of students upon these issues. However, the long-term concerns posed by emissions controls are only one facet of a much greater set of issues and this book attempts to respond to this fact. Most of the authors of the chapters of this book are graduates and academics associated with the IASL, most of whom have embarked upon careers in the field of international air law and are thus actively dealing with the issues addressed in this book.

Climate change and the need to reduce GHG emissions from international civil aviation constitute the most pressing series of issues addressed by this book. However, the challenges posed by a commitment to sustainable development policies are much broader, and this book attempts to highlight many facets of the challenges that are currently posed to international civil aviation.

## 1.2 CLIMATE CHANGE: THE CHALLENGE FOR INTERNATIONAL CIVIL AVIATION

One of the central challenges to international civil aviation and, hence, to the Member States of the ICAO, concerns climate change. International civil aviation significantly contributes to climate change through emissions of gases and particles from, *inter alia*, aircraft, ground support services, auxiliary power units providing electricity and air conditioning to aircraft parked at airport terminal gates, stationary airport power sources, and construction equipment

operating at the airport. Aviation is a small but significant contaminator in a variety of ways. At present, civil aviation accounts for some 2 percent of total global CO<sub>2</sub> emissions, which is 3 percent of the total manmade contribution to climate change. This contribution is projected to grow around 3–4 percent per year. Aviation is responsible for 12 percent of total CO<sub>2</sub> emissions from the transportation sector and such emissions are projected to grow to 23 percent by 2050 unless effective measures to check such emissions are initiated. Aviation would have been the 17th largest emitter of CO<sub>2</sub> in 2010, if international aviation were a “country.”

Concern over aviation’s contribution to climate change has been rising, since the industry and related activities continue to outpace technological innovation in this field toward lowering emissions. Passenger traffic is expected to grow at an average rate of 4.8 percent per year through the year 2036. Aircraft engines emit gases and particles directly into the upper atmosphere that affect atmospheric composition by, *inter alia*, altering the concentration of atmospheric GHGs, prompting formation of condensation trails and increasing cirrus cloudiness. These effects of GHG emissions from aircraft accelerate climate change. It should also be borne in mind that natural catastrophic events caused by climate change are detrimental to the aviation industry, since those events cause disruption to air travel and air transport facilities. In 2017 alone, airports serving major cities, such as Boston, Chicago, Delhi, Houston, London, Miami, Montreal, Mumbai, New York, Philadelphia, Phoenix, Tokyo, Toronto, and Washington, were fully or partially closed at least on one occasion due to weather or weather-related events. This demonstrates the need for immediate and firm action from the air transport sector to diminish the environmental footprint of aviation, if it is to attain sustainable civil aviation. Furthermore, global, simultaneous, and collective actions by all the sectors are required to combat climate change.

### I.3 DEFINING THE REQUIREMENTS OF SUSTAINABLE DEVELOPMENT AS IT APPLIES TO INTERNATIONAL CIVIL AVIATION

#### I.3.1 *Sustainable Development Is the Objective*

Sustainable development requires that environmental, economic, and social dimensions be balanced with each other. For aviation, this means that climate concerns, the economic growth of the industry, and the social dimension of airline travel need to be balanced in a way that does not completely ignore any one of these dimensions.

The *Chicago Convention* adopted in 1944 must be interpreted in light of today's world, which since 2015 includes firm Sustainable Development Goals.<sup>1</sup> Sustainable development should thus be part of a living interpretation of the *Chicago Convention* itself. Nonetheless, it is also an objective for all ICAO Member States and as such becomes part of the interpretative canon for the *Chicago Convention* in accordance with the Vienna Convention on the Law of Treaties. Sustainable development has been identified as a concept around which all the international civil aviation community can rally. It can help to move away from the sterile debate between developed and developing States on the right to differential rates of environmental degradation to a more integrated world, in which all States participate and all industries focus on integrated sustainable economic, social, and environmental concerns.

This all reflects a shared duty to cooperate. For example, Annexes to the *Chicago Convention* contain standards and recommended practices (SARPs) that, though without the full force of an international treaty, entail legal obligations for the contracting States to the *Chicago Convention*. Such States have “accepted an explicit legal undertaking to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to [air navigation].”<sup>2</sup>

The ICAO SARPs are the current multilateral mechanism used to govern or guide, at the international level, the consequential national regulations concerning air transport. Compliance with these standards is of the highest concern for States. Without that compliance, cooperation and faith in international air transport are jeopardized. Article 33 of the *Chicago Convention* seeks to ensure compliance by ensuring that SARPs are recognized, on a reciprocal basis, by every contracting State.<sup>3</sup> This means that certificates of airworthiness, competency, and licenses “issued or rendered valid by the contracting State in which the aircraft is registered, shall be recognized as valid by the other contracting States, provided that the requirements under which such certificates or licenses were issued or rendered valid are equal to or above the minimum standards which may be established from time to time.” Article 33, therefore, dictates that one State may not reject or

<sup>1</sup> UNGA, “Transforming our world: The 2030 agenda for sustainable development,” *A/Res/70/1*, [www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E) last accessed October 31, 2017, at 14.

<sup>2</sup> M. Milde, “Problems of safety oversight: Enforcement of ICAO standards,” in C. J. Cheng (ed.), *The Use of Air and Outer Space: Cooperation and Competition* (Boston: Kluwer Law International, 1998), 254.

<sup>3</sup> *Convention on International Civil Aviation* (adopted December 7, 1944, entered force April 4, 1947) 15 UNTS 295, Can TS 1944 No 36, ICAO Doc 7300/9, Art 33 [*Chicago Convention*].

discriminate against the aircraft of another State, where that aircraft is complying with the minimum standards annexed to the *Chicago Convention*. States must, therefore, ensure that any initiatives put in place do not have the effect of invalidating another State's Annex-compliant air transport framework.

Adopting the goal of sustainable development for international civil aviation will have a profound impact on the airline industry as it is currently entirely dependent on carbon-based fuels. While other modes of transport have the possibility of electric or nuclear propulsion in the foreseeable future, the means of propulsion of the airline industry are primarily carbon-based, with the result that any reduction in GHG emissions is derived almost exclusively from decreased fuel consumption. Measures such as more efficient air traffic management practices, improved operation of airport slots, gates, and terminals, increasingly efficient engines, and the reduction of airframe weight through the use of composite materials like carbon fiber will all help to reducing fuel consumption and, consequently, GHG emissions. Given that fuel costs are one of the greatest components of an airline's expenses, any reduction in fuel consumption is greeted with great enthusiasm in airline boardrooms. Thus, initially, airlines are strong supporters of initiatives to make flying more fuel efficient.

However, there is an upward limit to the GHG emission reductions that can be achieved by increased efficiency. Moreover, while such progress might be impressive in terms of an intensity-based GHG reduction target, where progress is measured in terms of GHG emission reduction per unit of production, such emissions might actually grow if there is an expansion in units of production.<sup>4</sup> Thus, if GHG emissions are to be reduced 20 percent below 1990 levels by 2020,<sup>5</sup> this target will not be achieved simply by reducing GHG emissions per flight.

### *1.3.2 Precaution, Inter-Generational Equity, and Common but Differentiated Responsibilities and Respective Capabilities*

Precaution is a key factor not only in climate change and environmental law in general, but also for the future approach to aviation and climate change.

<sup>4</sup> See D. Marshall, "Intensity-based targets: Not the solution to climate change" (David Suzuki Foundation, February 26, 2007) at 1.

<sup>5</sup> This is the EU's commitment under the United Nations Framework Convention on Climate Change 2011. See Center for Climate and Energy Solutions, "2020 country emissions targets," [www.c2es.org/international/history-international-negotiations/2020-targets](http://www.c2es.org/international/history-international-negotiations/2020-targets) last accessed October 31, 2017.

6 *Armand de Mestral, Peter Paul Fitzgerald, and Md Tanveer Ahmad*

A precautionary approach would suggest at least analyzing the risks involved in not acting or not acting decisively. At current rates, GHG emissions from aviation may increase by 176 percent over the next few decades as estimated by the ICAO, and might quadruple by 2050.<sup>6</sup> For this reason, inaction or *status quo* are no longer options.<sup>7</sup> The emergence of the precautionary principle in international environmental law<sup>8</sup> thus suggests taking measures as soon as possible. This would also correspond to demands regarding intergenerational equity.

However, especially in developing States, resistance to any robust new regulations is often based on arguments of common but differentiated responsibilities and respective capabilities (CBDRRC). As most of the GHGs currently in the atmosphere have been produced by developed, industrialized States, there is a feeling of injustice in developing States, which believe that they now have the right to exploit their natural resources accordingly. It has been pointed out by economists that a market-based measure, and an emissions trading scheme in particular, would be superbly placed to realize the necessary differentiation in a politically attractive way, through the allocation and administration of allowances.<sup>9</sup> From the starting point of a cap and allocation on a business as usual basis, the stringency of the regime can be tightened while also increasing differentiation of the burdens among State participants by means of differentiation in the allocation and administration of allowances, including, for example, the granting of preferential auction rights to some States rather than others. Ellerman calls this “inconspicuous

<sup>6</sup> See “Aviation’s contribution to climate change,” in ICAO, Environmental report 2010, 44, ch.1, figure 3.

<sup>7</sup> See also FOI, “Developing a sustainable framework for UK aviation: Scoping document – Consultation response from Friends of the Earth” (2011), [https://friendsoftheearth.uk/sites/default/files/downloads/sustainable\\_aviation.pdf](https://friendsoftheearth.uk/sites/default/files/downloads/sustainable_aviation.pdf) last accessed October 31, 2017.

<sup>8</sup> So far, the precautionary principle can be only deemed to be an emerging customary norm; although included in various agreements, it lacks so far positive acknowledgment and confirmation through courts and tribunals, M. Pyhälä, A. C. Brusendorff, and H. Paulomäki, “The precautionary principle,” in M. Fitzmaurice, D. M. Ong, and P. Markouris (eds.), *Research Handbook on International Environmental Law* (Cheltenham: Edward Elgar, 2010), 203–10. The ICJ mentioned the precautionary principle in the request for an examination of the situation in accordance with para. 63 of the Court’s Judgment of December 20, 1974 in the Nuclear Tests Case (*New Zealand v. France*), [1995] ICJ Rep. 288, Order September 22, 1995, para. 35, but did not decide upon its legal nature in contrast to the dissenting opinions in the same case of, Judges Palmer, 412, and Weeramantry, 342.

<sup>9</sup> See D. Ellerman, “The EU’s emissions trading scheme: A prototype global system?” (MIT Report No 170, February 2009). See also his lecture “European CO<sub>2</sub> trading: Dead end or path to the future” (Bren School of Environmental Science and Management, University of California, Santa Barbara, March 29, 2011), [www.youtube.com/watch?v=GeacfaKNY0](http://www.youtube.com/watch?v=GeacfaKNY0) last accessed October 31, 2017.

differentiation.” For this to work, formulae for allocation would have to be subject to multilateral decision-making, but the potential for inconspicuous differentiation in this way to address CDDRRC requirements is certainly a valid point that several States criticizing the market-based measure option do not seem to have fully considered.

More recently, the International Maritime Emissions Reduction Scheme (IMERS) has set out detailed proposals for dealing with CDDRRC concerns overtly in both the international maritime and aviation transport sectors. The IMERS proposals seek to use carbon pricing of international transport as a mechanism to increase mitigation and financing ambitions for climate change action, while at the same time delivering on equity.<sup>10</sup> IMERS calculations show the international aviation carbon footprint being concentrated in the North, and the potential burden of aviation carbon pricing – as a percentage of GDP – being largest in the South, impacting most on less developed countries, as they often disproportionately rely on international transport as a percentage of GDP. IMERS addresses the question as “not whether, but how” to relate differentiated climate principles and provisions to uniform carbon pricing for international aviation. The proposed scheme focuses on the inclusion of a Rebate Mechanism (RM). The RM could apply to any revenue-raising market-based measure, such as a levy/charge or emissions trading scheme. Under the scheme, all planes pay for their emissions. Developing States could<sup>11</sup> obtain rebates of the cost burden incurred by participating in the market-based measure to ensure they are at least not worse off.<sup>12</sup> The remaining revenue (net revenue) dedicated for climate action would, therefore, come from consumers in developing States only, complying with the UNFCCC principles. It would be disbursed by an agreed entity or entities (e.g. GCF, ICAO). The most vulnerable States would benefit through the relevant rules and provisions (SIDS, LDCs, African countries), and the aviation sector would also benefit, potentially through a new global Aviation Technology Fund. Rebates to developing States might amount to a third of revenue raised; the remaining two thirds would be a predictable and affordable source of climate change financing and research and development for clean international transport.

<sup>10</sup> A. Stochniol, “Increasing mitigation and financing ambitions through action on international transport” (side event, Bonn Climate Change Conference, June 7, 2013).

<sup>11</sup> The IMERS proposals also address the issue of “graduation,” proposing that high income developing countries may agree voluntarily to forgo the rebate, or part of it, with such money potentially going toward South-South collaboration.

<sup>12</sup> The IMERS proposals suggest the rebate key could be based, for example, on a country share of fuel uplifted for international flights, as proposed in the IMF/WB report for G20.

In line with the principles of precaution, intergenerational equity, and CBD/RR, the further development of technological improvements must be pursued as part of the solution.<sup>13</sup>

### 1.3.3 Integration

Integration suggests that, in the upcoming negotiations, social and environmental aspects have to be considered on an equal footing to economic considerations. Thus, any solution that ignores the different pillars of sustainable development should be rejected on principle.

### 1.3.4 Sustainable Use of Natural Resources

Especially in the aviation industry, it is of key importance to observe the principle that natural resources should be sustainably used. While ever lighter airplanes are constructed using less metal and more carbon-based materials, the use of fossil fuels in aviation will always be a key issue.

In this context, one might be tempted to question the way biofuels are treated under the EU-ETS scheme.<sup>14</sup> Aircraft flying with biofuel are technically exempted from the scheme. This is because emissions are calculated using the following formula: Fuel Consumption X Emission Factor. And, the emission factor for biomass is zero. This means that using biofuel would mean “zero emissions.”<sup>15</sup> This complete exemption granted to aircraft flying with biofuel can be questioned from the perspective of sustainable development.

Whereas, on the one hand, it is commendable that industries, including the aviation sector, become more and more independent of nonrenewable resources, on the other hand, the *carte blanche* given to airlines regarding

<sup>13</sup> Measures likely to reduce emissions are not only new airplane designs and propulsion engines, but also changes to alternative energy sources in the form of low carbon intensive fuels and power sources, as well as improved aviation management, including more links with other means of transportation. D. L. McCallom, G. Gould, and D. L. Greene, “Greenhouse gas emissions from aviation and marine transportation: Mitigation potential and politics” (Pew Center on Global Climate Change, 2009), 1–2.

<sup>14</sup> L. Bartels, “The WTO legality of the application of the EU’s emission trading system to aviation,” *European Journal of International Law*, 23 (2012), 429, 431–32. Part B of Annex IV of Directive 2008/101/EC (November 19, 2008), amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowing trading within the Community.

<sup>15</sup> See European Commission, Directive 2008/101/EC of the European Parliament and of the Council of November 19, 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, OJ 2009 No L 8/3, Ann. [Directive 2008/101].



their allowance quota raises several problems. First of all, it compromises the pressure on airlines to develop more fuel-efficient systems and mechanisms that might be more expensive than the additional costs for biofuel. On a larger scale, it opens up an accumulation of other factors linked to biofuels. The farming of monocultures (which is the common method for the production of biofuel) not only has detrimental repercussions for the environment, but has also been linked to price increases for wheat and other grains on the stock markets, and resulting food shortages and even famine around the world. The blanket exemption of all biofuels, therefore, does not appear to be compatible with an overall objective of sustainable development. In order to implement the principle of sustainable use of natural resources, it would be appropriate to include fuel quality standards also for airplane biofuels. *This would require an amendment of the current EU-ETS.* An airplane flying with biofuel should be exempted depending on certain biofuel standards, i.e. second or third generation biofuels, and thus allow operators to actually reduce their emissions, and not be trapped in the ETS with no possible reduction of GHG emissions from their activities.<sup>16</sup>

#### 1.4 IS THE *CHICAGO CONVENTION* ABLE TO ADAPT TO THE IMPERATIVES OF SUSTAINABLE DEVELOPMENT?

In a world preoccupied with climate change, addressing the GHG emissions from international civil aviation and the development of a legal framework based on principles of sustainable development are not simple matters. It must be discussed in an international forum and any GHG emissions strategy will include various elements. This book seeks to address primarily the legal considerations arising from promoting, designing, and implementing sustainable development in the aviation industry – a policy urged by the EU and now the policy of the ICAO. It thus serves to highlight the importance of the 1944 *Chicago Convention*, the primary source of public international air law, for broader sustainable development objectives.

Although the *Chicago Convention*, adopted in 1944, does not explicitly address protection of the environment or social development, various provisions of the Convention, including its Preamble, tacitly endorse sustainable development of international civil aviation. In its Preamble, the contracting parties to the Convention “agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly

<sup>16</sup> See M. Gehring and C. Robb, *Addressing the Aviation and Climate Change Challenge: A Review of Options* (Geneva: ICTSD, 2013), 20.

manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically.” While the environmental dimension of the sustainable development concept is absent from the *Chicago Convention*, the agreement of States to develop international civil aviation in, *inter alia*, an orderly manner and to operate international air transport soundly and economically arguably encompasses sustainable development of aviation. The Convention tacitly confers responsibility on the ICAO to address aviation environmental and social issues. According to Article 44 of the Convention, one of the aims and objectives of the ICAO is “to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport so as to ... promote generally the development of all aspects of international civil aeronautics.” Certainly, reducing environmental and negative social impacts of aviation to ensure sustainable development are aspects of international civil aeronautics and, hence, the ICAO has a duty to regulate environmental impacts, such as emissions, from international civil aviation.

The ICAO Council adopted Annex 16 to the *Chicago Convention* to address aviation environmental issues. Annex 16, divided into three volumes, addresses aviation environmental issues. Volume I of Annex 16 deals exclusively with aircraft noise emissions, Volume II is devoted to addressing the issue of aircraft engine emissions, and Volume III provides for a new aircraft CO<sub>2</sub> emissions standard. Nevertheless, Annex 16 does not deal extensively with environmental issues mainly concerning engine emissions and further decisions will be forthcoming from the Council as it implements the decisions of the 39th ICAO Assembly.

In the absence of any global effective mechanism, contracting States can utilize their authority under Article 11 of the *Chicago Convention* to enact laws and regulations for the protection of environmental or social issues so long as those concern admission to or departure from its territory or concern operation and navigation while within its territory of aircraft engaged in international air navigation and so long as those are “applied to the aircraft of all contracting States without distinction as to nationality.” Foreign aircraft are obliged to comply with such laws and regulations “upon entering or departing from or while within the territory of that State.” Furthermore, under Article 12 of the Convention, every contracting State has an obligation to adopt measures to ensure that “every aircraft flying over or maneuvering within its territory and that every aircraft carrying its nationality mark, wherever such aircraft may be, shall comply with the rules and regulations relating to the flight and manoeuvre of aircraft there in force.” Although Article 12 further requires States to keep their regulations “uniform, to the greatest possible