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CIVIL AIRCRAFT EMISSIONS AND INTERNATIONAL TREATY LAW

HEATHER L. MILLER*

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I. INTRODUCTION

ALTHOUGH AIRCRAFT are small contributors to the problem of global warming, stricter limits on aircraft emissions will soon be in place. Prior to the Kyoto Protocol,¹ two United Nations organizations were vying for the right to regulate aircraft emissions: the United Nations' Framework Convention on Climate Change (FCCC) and the International Civil Aviation Organization (ICAO).

The Kyoto Protocol, the treaty arising from the FCCC's meeting in December 1997, makes clear that ICAO is, and will be, the principal forum to pursue the subject of greenhouse gas emissions from international civil aviation.² However, the question of whether ICAO is the forum for addressing greenhouse gas emissions from purely domestic flights remains open.

Successful global limitations of greenhouse gases will be best achieved through international agreements that are narrowly tailored to fix the problem they seek to address. A specific, prescriptive, and quantitative approach is necessary to limit aircraft emissions successfully.³ In theory, a comprehensive solution

¹ See *Report of the Conference of the Parties on its Third Session, Held at Kyoto From 1 to 11 December 1997*, U.N. Framework Convention on Climate Change, 3d Sess., 12th plen. mtg., Annex, at 7, U.N. Doc. FCCC/CP/1997/7/Add.1 [hereinafter *Kyoto Protocol*].

² The Kyoto Protocol expressly recognizes ICAO as the global organization responsible for the reduction or limitation of international aviation emissions. See *id.* art. 2(2), at 9.

³ "[T]he projected explosion in demand [for air travel] will create an inexorable upward pressure on emissions unless policies are specifically aimed at limiting them." *Emissions from Aircraft Could Become Significant in 50 Years, EDF Study Says*, [1994] Daily Env't Rep. (BNA) 1994 DEN 141, at D4 (July 26, 1994) (quoting ENVIRONMENTAL DEFENSE FUND, AIRCRAFT EMISSIONS AND THE GLOBAL ATMOSPHERE: LONG TERM SCENARIOS (1994)) [hereinafter *EDF Study*].

such as the FCCC's flexible and general approach, covering all emissions of greenhouse gases, is appealing. In practice, however, scientific uncertainty, informational problems, and difficulties with enforcement make the FCCC a sieve rather than a bar to emissions.

Control of aviation emissions is best conducted at the international level by an organization with technical expertise over both aviation and aircraft emissions. The United Nations' specialized agency that manages worldwide civil aviation issues, including emissions, is ICAO. The agency has a proven record of leadership in regulating aircraft emissions and has developed a substantial base of technical, safety, and operational knowledge.

In presenting the treaty framework that limits or reduces aircraft emissions, this Article first provides an overview of the science and policy surrounding global warming. It then examines the aviation sector, focusing in particular on the Chicago Convention, which created ICAO, and on ICAO's environmental activities. Next, it examines the FCCC's history and the recently adopted Kyoto Protocol. Finally, the Article argues that emissions of greenhouse gases from civil aviation are better handled by ICAO than by the FCCC.

II. GLOBAL WARMING

In recent years, global warming has drawn the world's attention. Science, albeit uncertain, suggests that dramatic changes to our climate may occur if greenhouse gas emissions are not curbed.⁴ In fact, scientists predict that rising global temperatures could affect agricultural activities worldwide; lead to Dust Bowl conditions; cause the sea level to rise and flood coastal areas; disrupt fisheries; alter some plant and animal species; and lead to record heat waves and other weather abnormalities that could harm people, crops, and forests.⁵

A. SCIENCE

Greenhouse gases occur naturally in the atmosphere, allowing sunlight to reach and warm the Earth's surface. But unlike

⁴ See OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, CHANGING BY DEGREES: STEPS TO REDUCE GREENHOUSE GASES, OTA-0-482, at 3 (1991) [hereinafter OTA REPORT].

⁵ See generally, ANDREW REVKIN, AMERICAN MUSEUM OF NATURAL HISTORY ENVIRONMENTAL DEFENSE FUND, GLOBAL WARMING: UNDERSTANDING THE FORECAST (1992).

other atmospheric gases, they trap heat in the atmosphere. This natural warming of the Earth's atmosphere and surface is called the "greenhouse effect." Burning fossil fuels, deforestation, and use of nitrogen fertilizers and chlorofluorocarbons (CFCs)⁶—all generate human-caused, or anthropogenic, emissions—increase substantially the natural concentrations of greenhouse gases, also increasing trapped heat.⁷ In 1995, the Intergovernmental Panel on Climate Change's *Second Assessment Report*, for the first time, supported the proposition that "[t]he balance of the evidence . . . suggests a discernible human influence on global climate."⁸

The key anthropogenic greenhouse gases are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons (CFCs), and tropospheric ozone (O₃).⁹ Carbon dioxide emissions, resulting from the consumption of fossil fuels, have been responsible for more than half of the enhanced greenhouse effect.¹⁰ Carbon monoxide (CO) and nitrogen oxide (NO_x) are not greenhouse gases, but these two gases indirectly affect the climate because they chemically interact with other gases.¹¹

Scientific and socioeconomic uncertainties make the effects of global warming difficult to predict. Scientists agree that increases in greenhouse gases will result in climate change, but they disagree about the magnitude, timing, and regional distribution of the warming.¹² In addition, lack of scientific understanding about some of the greenhouse gas sources and the processes that influence their atmospheric concentrations ren-

⁶ The production and use of CFCs are limited by the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol). Discussion of CFCs and the Montreal Protocol are not within the scope of this Article.

⁷ See OTA REPORT, *supra* note 4, at 3; *Climate Change: The IPCC Scientific Assessment*, Intergovernmental Panel On Climate Change, WMO/UNEP at xi (1990) [hereinafter *IPCC Scientific Assessment Report*].

⁸ *IPCC Second Assessment Synthesis of Scientific Technical Information Relevant to Interpreting Article 2 of the UN Framework Convention on Climate Change* (1995), Intergovernmental Panel on Climate Change, at 3 (1995) (visited Apr. 23, 1997) <<http://www.unep.ch/ipcc/syntrep.html>>.

⁹ See OFFICE OF POLICY, PLANNING, AND EVALUATION, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, 21P-2003.1, POLICY OPTIONS FOR STABILIZING GLOBAL CLIMATE CHANGE: REPORT TO CONGRESS, MAIN REPORT I-1 (1990) [hereinafter EPA REPORT].

¹⁰ See *id.* at V-7.

¹¹ See *id.* at IV-45.

¹² See *id.* at I-1.

ders projections of global warming incomplete.¹³ For instance, there is scientific uncertainty about the “uptake of heat and CO₂ by the ocean and any other sinks, geophysical and biogeochemical feedback mechanisms, and natural rates of emission of the greenhouse gases.”¹⁴ And, there is socioeconomic uncertainty about “population growth, GNP growth, structural changes in economic systems, rates of technological change, future reliance on fossil fuels, and future compliance with the Montreal Protocol.”¹⁵

Aircraft contribute approximately two to three percent of the total anthropogenic CO₂. Although the aviation sector thus seems responsible for only a small portion of total anthropogenic emissions, some scientists believe that because aircraft emissions take place at a high altitude they might have a disproportionate effect on the atmosphere.¹⁶ Further, the continuing rapid growth of air transport services makes aircraft emissions an important global issue. An Environmental Defense Fund study found that the combined effect of CO₂ and NO_x emissions from aircraft could account for up to ten percent of all human-induced climate change in the latter part of the twenty-first century.¹⁷

B. POLICY

Policy issues raised by global warming are just as complex and vexing as the scientific issues. For instance, limiting current greenhouse gas emissions would likely decrease the magnitude and speed of global warming; however, scientific uncertainties relating to global warming make it difficult for policymakers to determine the correct course. Given the long-lasting consequences of decisions made today, great care and attention need to be paid to how emissions’ abatement is structured.

Furthermore, taking action to limit global warming involves making tough political decisions. Emissions’ abatement forces policymakers to balance the long-term effects of altering the

¹³ See GENERAL ACCOUNTING OFFICE, GLOBAL WARMING: EMISSION REDUCTIONS POSSIBLE AS SCIENTIFIC UNCERTAINTIES ARE RESOLVED, GAO/RCED-90-58, 28 (Sept. 1990).

¹⁴ EPA REPORT, *supra* note 9, at I-12.

¹⁵ *Id.*

¹⁶ See ICAO, *Information Kit for ICAO's 50th Anniversary* (Dec. 7, 1994) (visited Apr. 14, 1997) <<http://www.cam.org/~icao/info50.htm>> [hereinafter *Information Kit*].

¹⁷ See *EDF Study*, *supra* note 3.

human environment against the exorbitant short-term costs of abating emissions. For instance, William Nordhaus, an economist from Yale University, estimates that limiting U.S. greenhouse gases could cost as much as \$7 trillion.¹⁸

Finally, policymakers need to take into consideration the problem's global scope, and seek international solutions to reduce greenhouse gases. Both developed and developing countries need to take action. Developing countries, as they continue to industrialize, are expected to increase their CO₂ emissions, further exacerbating global warming.

In response to these concerns and pressures, policymakers have been working to reduce global greenhouse gas emissions. It is good that they do so because they cannot afford to wait to see what the full impact of continued emissions will be, especially given that the time lag between emissions and their full impact may range from decades to centuries.¹⁹

III. AVIATION SECTOR

A. DISTINGUISHING CHARACTERISTICS OF THE SECTOR

International aviation plays a major role in the world economy and any reduction of, or restraints on, aviation would affect international trade, international business, and tourism.²⁰ Aviation is also critical to national defense. Air transport is singled out from other service sectors because it operates internationally and affects the international economy.

Unlike other sectors of the economy, aviation is highly sensitive to fuel price changes: fuel costs make up the largest percentage of total operating costs. Increases in fuel costs generally result in less service to remote communities, an increase in prices to consumers for air services, and a drop in demand for new aircraft. The significance of fuel prices has led to a great deal of research on opportunities for efficiency improvements.²¹

Aircraft travel is the safest mode of available transportation. The fatality rate in 1992 was 0.06 passenger fatalities per 100

¹⁸ See *Pollution Tax: Bad Idea to Remedy Global Warming*, TIMES-PICAYUNE, Mar. 18, 1997, at B6.

¹⁹ See OTA REPORT, *supra* note 4, at 3.

²⁰ See Laurie Michaelis, OECD, *Special Issues in Carbon/Energy Taxation: Carbon Charges on Aviation Fuels*, "Policies and Measures for Common Action" Working Paper 12, Annex I Expert Group on the UNFCCC, Supported by the Organization for Economic Cooperation and Development and the International Energy Agency, at 34 (Mar. 1997) [hereinafter OECD Report].

²¹ See EPA REPORT, *supra* note 9, at V-25.

million passenger kilometers.²² The international aviation community's remarkable safety record is in great part attributable to technological innovation and ICAO's role in setting corresponding international Standards and Recommended Practices.

The Intergovernmental Panel on Climate Change (IPCC), the international scientific body directing international atmospheric research on global warming, has recognized the aviation sector's unique nature. The IPCC has begun a study of the atmospheric effects of aviation, due in April 1999. This report is likely to be treated as the authoritative scientific research document on the aviation sector's effect on the climate.

B. GROWTH

Air transportation of passengers, freight, and mail has been growing rapidly. In 1945, 9 million people traveled on scheduled air services.²³ In 1993, 1.2 billion people were carried.²⁴ The ICAO projects that in 2001, 1.8 billion passengers will be carried.²⁵ In a March 1997 forecast, ICAO found that, between 1995 and 2005, world airline scheduled passenger traffic is expected to grow at an average annual rate of 5.5 percent, and total freight traffic is expected to grow at an average annual rate of 7 percent.²⁶

Air traffic grew about three times as fast as the gross national product in the early 1970s and twice as fast since the early 1980s.²⁷ Since the 1960s, air traffic has declined only once, in 1991 as a result of the Gulf War and travelers' fears about terrorism.²⁸ From 1990 to 1995 air traffic grew at an average of 6.5 percent per year.²⁹ Air traffic is expected to continue to grow as a result of deregulation in developed countries and industrialization in developing countries.³⁰ Assuming these growth rates continue, countries' decisions that affect aviation in the next five to ten years will influence emission levels for decades to come.

²² See *Information Kit*, *supra* note 16, at 22.

²³ See *id.*

²⁴ See *id.*

²⁵ See *id.*

²⁶ See ICAO, *Growth in Air Traffic To Continue: ICAO Releases Long-Term Forecasts* (Mar. 1997) (visited Apr. 5, 1997) <http://www.cam.org/home/icao/public_html/nr/pio9704.htm>.

²⁷ See OECD Report, *supra* note 20, at 15.

²⁸ See *id.*

²⁹ See *id.* at 5.

³⁰ See *id.*

C. EMISSIONS

Emissions from aircraft include smoke, CO₂, water vapor, CO, and NO_x. Aircraft contribute two to three percent of the world's anthropogenic CO₂ emissions. In 1990, world civil aviation was responsible for approximately 420 million tonnes of CO₂, of which about half was due to international traffic.³¹ By 1995 those emissions grew to approximately 550 million tonnes.³² The United States has no domestic or international obligations to regulate or set standards for aircraft emissions of carbon dioxide.

It is unclear what effect aircraft emissions of CO and NO_x have on the environment. Some researchers believe that NO_x emissions act as a significant greenhouse gas precursor and that its radiative impact may be as large as that of CO₂ emissions.³³ It is also unclear what effect reducing aircraft NO_x emissions will have on greenhouse gases. For instance, reducing aircraft emissions of NO_x may increase CO₂.³⁴

There are several ways of limiting aviation emissions, but each carries a heavy price: mandatory phase-out of older aircraft; technology-forcing engine certification requirements;³⁵ operational restrictions on aircraft; or an emissions budget—similar to the emissions budget proposed by the United States for the Third Conference of the Parties to the FCCC—for civil aviation.³⁶ The most frequently suggested proposal is to levy fuel or emissions taxes. Each proposal, if implemented, may well lead to some increase in airline fares and air cargo rates, diminished airline service to smaller cities, and job losses in the airline, aerospace manufacturing, and travel and tourism sectors. Furthermore, at least some of the proposals are likely to violate international treaty obligations.

Aircraft emissions and noise are the two major environmental problems associated with civil aviation. Engine designs are bal-

³¹ See *id.*

³² See *id.*

³³ See *id.* at 12.

³⁴ See Paul Page, *U.S. Wants Airline Emissions Studied by Global Panel on Aviation Environment*, TRAFFIC WORLD, Dec. 11, 1995, at 39; Kristin S. Krause, *Aviation's Impact, Los Angeles Airport Air, Jet Engine Emissions Among Concerns of Industry Policymakers for 1997*, TRAFFIC WORLD, Dec. 2, 1996, at 34.

³⁵ See *infra* notes 81-96 and accompanying text.

³⁶ The Environmental Defense Fund has recommended that an emissions budget for civil aviation be created. See OECD Report, *supra* note 20, app. F, at 58 (suggested language to address emissions budgets for civil aviation put forward by Environmental Defense Fund).

anced to optimize performance in meeting a wide range of objectives: safety, reliability, noise, emissions, and fuel efficiency. Unfortunately, the operational performance requirements of a jet turbine engine are many, varied, and sometimes in conflict. Emission stringency must be considered within this broad context of total engine performance objectives because reducing one objective may increase another, *e.g.*, reducing noise increases fuel burn, which results in greater emissions.³⁷

IV. CHICAGO CONVENTION

The basic instrument governing international civil aviation is the Convention on International Civil Aviation (Chicago Convention), a multilateral treaty negotiated in November 1944 at the International Civil Aviation Conference in Chicago. The conference, an outgrowth of World War II when some commercial aircraft previously used for carrying passengers and mail³⁸ were put to military use,³⁹ reflected international concern over whether development of aviation could "serve peace as efficiently as it had served war."⁴⁰ The conference set out to formulate international technical and economic standards and to establish institutions to effect and maintain the agreed upon standards.⁴¹

³⁷ See Page, *supra* note 34, at 39.

³⁸ See PAUL STEPHEN DEMPSEY, LAW & FOREIGN POLICY IN INTERNATIONAL AVIATION 9 (1987).

³⁹ See BETSY GIDWITZ, THE POLITICS OF INTERNATIONAL AIR TRANSPORT 43-44 (1980).

⁴⁰ JACQUES NAVEAU, INTERNATIONAL AIR TRANSPORT IN A CHANGING WORLD 26 (1989). Interestingly, the Chicago Convention's first words bespeak this concern: "the future development of international civil aviation can greatly help to create and preserve friendship among the nations and peoples of the world, yet its abuse can become a threat to general security." Convention On International Civil Aviation, Dec. 7, 1944, Preamble, 61 Stat. 1180, 15 U.N.T.S. 295, 296 [hereinafter Chicago Convention].

⁴¹ The technical aims concerned setting up international arrangements for licensing pilots and mechanics, registering and certifying the airworthiness of aircraft, standardization and planning for the development of navigational aids, collecting statistics, exchanging technical information, and similar essential technical tasks and procedures. The economic objectives included: the assignment of air routes to nations and to airlines; the arrangement for setting air fares, frequencies, schedules, and capacities; and methods of facilitating interairline fare transfers, customs arrangements, cooperation in servicing and coordination of schedules. An extremely important subgroup of aims at the conference concerned the arrangements for obtaining authority to overfly an-

Ultimately, the Chicago Convention established guidelines for flight over signatory states' territory, aircraft nationality, air navigation rules, conditions of individual aircraft, and international Standards and Recommended Practices. The Chicago Convention also established ICAO.

The Chicago Convention set the principles for the postwar operation of international civil aircraft. The Convention recognizes that every state "has complete and exclusive sovereignty over the airspace above its territory"⁴² and that no national sovereignty exists over the high seas. The principle of sovereignty, however, is limited by each state's obligation to observe the general interests of international civil aviation. For instance, a contracting state has the right of non-scheduled flight over another contracting state.⁴³

The Chicago Convention's goal was to achieve a system of uniform regulation of matters affecting international aviation. In terms of adopting international standards and procedures, the Convention calls on contracting states to "collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation."⁴⁴

The Chicago Convention vests ICAO with the authority to adopt and amend international Standards and Recommended Practices dealing with, among other things, "safety, regularity, and efficiency of air navigation," and airworthiness of aircraft.⁴⁵ Departing from international standards and procedures requires a contracting state to notify ICAO immediately and ICAO to immediately notify all other contracting states of the difference existing between the international standard and practice of the non-compliant state.⁴⁶

other nation's sovereign territory and to make stops in foreign territory for technical reasons, that is, for fuel and maintenance.

ROBERT L. THORNTON, *INTERNATIONAL AIRLINES AND POLITICS* 20 (1970), *quoted in* GIDWITZ, *supra* note 39, at 46 (1980).

⁴² Chicago Convention, *supra* note 40, art. 1, 61 Stat. at 1180, 15 U.N.T.S. at 296.

⁴³ *See id.* art. 5, 61 Stat. at 1181, 15 U.N.T.S. at 298.

⁴⁴ *Id.* art. 37, 61 Stat. at 1190-91, 15 U.N.T.S. at 320.

⁴⁵ *Id.*

⁴⁶ *See id.* art. 38, 61 Stat. at 1191, 15 U.N.T.S. at 322. The Chicago Convention sets forth a dispute settlement mechanism for instances where there is disagreement as to how to interpret or apply the Convention. *See id.* ch. XVIII, 61 Stat. at 1204-05, 15 U.N.T.S. at 352. It is infrequently used. In the case of failed negotia-

The Chicago Convention is supplemented by a set of "technical annexes" dealing with specific matters of international standards.⁴⁷ Upon a two-third majority vote,⁴⁸ the Council adopts international Standards and Recommended Practices and designates them as Annexes.⁴⁹ An Annex becomes mandatory for all states that do not within sixty days notify the Council of their intention to apply different national rules⁵⁰ and for all traffic over the high seas.⁵¹ The advantage of this system, as noted by Peter Sand, is that "[t]his flexible 'tacit consent' procedure, designed specifically to reconcile the divergent requirements of developed and developing nations, makes it comparatively easy to adjust technical standards by majority decision without forcing complete uniformity."⁵²

A. BILATERAL AIR TRANSPORT AGREEMENTS

International civil aviation is also governed by a complex web of bilateral air transport agreements. Although the Chicago Convention established multilateral agreement in some areas

tions and an application of one of the concerned parties, the dispute shall be resolved by the ICAO Council. *See id.* art. 84, 61 Stat. at 1204, 15 U.N.T.S. at 352. A party may appeal the Council's decision to an *ad hoc* arbitral tribunal or the International Court of Justice. *See id.* Where the parties to a dispute cannot agree on the International Court of Justice or on the choice of an arbitral tribunal, the Convention sets forth an arbitration procedure. *See id.* art. 85, 61 Stat. at 1204, 15 U.N.T.S. at 352. If an airline fails to conform to a decision rendered in a dispute, each contracting state is to forbid that airline's operation in its airspace. *See id.* art. 87, 61 Stat. at 1205, 15 U.N.T.S. at 354. The penalty for a state's non-conformity to a decision is suspension of its voting power in the Assembly. *See id.* art. 88, 61 Stat. at 1205, 15 U.N.T.S. at 354.

⁴⁷ The Annexes deal with the following subjects: Personnel Licensing (Annex 1); Rules of the Air (Annex 2); Meteorological Service for International Air Navigation (Annex 3); Aeronautical Charts (Annex 4); Units of Measurement to be used in Air and Ground Operations (Annex 5); Operation of Aircraft (Annex 6); Aircraft Nationality and Registration Marks (Annex 7); Airworthiness of Aircraft (Annex 8); Facilitation (Annex 9); Aeronautical Telecommunications (Annex 10); Air Traffic Services (Annex 11); Search and Rescue (Annex 12); Aircraft Accident Investigation (Annex 13); Aerodromes (Annex 14); Aeronautical Information Services (Annex 15); Environmental Protection (Annex 16); Safeguarding International Civil Aviation against Unlawful Acts (Annex 17); and The Safe Transport of Dangerous Goods by Air (Annex 18).

⁴⁸ *See* Chicago Convention, *supra* note 40, art. 90, 61 Stat. at 1205, 15 U.N.T.S. at 356.

⁴⁹ *See id.* art. 54(d), 61 Stat. at 1197, 15 U.N.T.S. at 334.

⁵⁰ *See id.* art. 38, 61 Stat. at 1191, 15 U.N.T.S. at 322.

⁵¹ *See id.* art. 12, 61 Stat. at 1183, 15 U.N.T.S. at 304.

⁵² Peter H. Sand, *Lessons Learned in Global Environmental Governance*, 18 B.C. ENVTL. AFF. L. REV. 213, 245 (1991) (citations omitted).

(e.g., safety standards), it did not formulate an acceptable set of multilateral rules relating to economic rights. The exchange of economic rights between nations is effected through bilateral negotiations that take place more or less under the umbrella of Article 6⁵³ of the Chicago Convention. On a reciprocal basis, states negotiate bilateral air transport agreements that deal with issues of market access, airline tariffs, and capacity.⁵⁴ In addition, the bilateral agreements address "the designation and licensing of airlines, their ownership and control, customs and tax exemptions . . . as well as the bilateral processes necessary for agreement implementation, review, amendment and dispute resolution."⁵⁵ There are over 2500 bilateral air transport agreements worldwide.

Bilateral air transport agreements limit signatory states from unilaterally restricting or taxing air services. For instance, neither the Chicago Convention nor any general treaty prevents countries from imposing tax on international aviation fuel sold within their borders.⁵⁶ However, nearly all of the bilateral air transport agreements provide an exemption from fuel taxes on a reciprocal basis for fuel sold to a foreign airline.⁵⁷ Any imposition of fuel tax by one bilateral partner on the airlines of another bilateral partner would require a review of, and amendment to, the bilateral treaty obligations between the two partners. Failing to do so would be a violation of the agreement.

B. INTERNATIONAL CIVIL AVIATION ORGANIZATION

The Chicago Convention created the permanent ICAO. One month after ICAO was established, the United Nations and ICAO concluded an agreement whereby ICAO became a United Nations' specialized agency with exclusive responsibility for all

⁵³ Article 6 provides that scheduled international service may not be operated over another contracting state unless there is "special permission or other authorization" by that state and "in accordance with the terms of such permission or authorization." Chicago Convention, *supra* note 40, art. 6, 61 Stat. at 1182, 15 U.N.T.S. at 300.

⁵⁴ See Public Information Office of ICAO, *Memorandum on ICAO: The Story of the International Civil Aviation Organization* (visited Apr. 9, 1997) <<http://www.cam.org/~icao/memo.txt>>.

⁵⁵ *Id.*

⁵⁶ See OECD Report, *supra* note 20, at 19.

⁵⁷ See *id.*

aspects of international aviation.⁵⁸ The Chicago Convention provides:

the aims and objectives of the Organization are to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport so as to:

- a) Insure the safe and orderly growth of international civil aviation throughout the world;
- b) Encourage the arts of aircraft design and operation for peaceful purposes;
- c) Encourage the development of airways, airports, and air navigation facilities for international civil aviation;
- d) Meet the needs of peoples of the world for safe, regular, efficient and economical air transport;
- e) Prevent economic waste caused by unreasonable competition;
- f) Insure that the rights of contracting States are fully respected and that every contracting State has a fair opportunity to operate international airlines;
- g) Avoid discrimination between contracting States;
- h) Promote safety of flight in international air navigation;
- i) Promote generally the development of all aspects of international civil aeronautics.⁵⁹

ICAO's structure is set up to deal with a wide range of matters affecting international air navigation and transport. ICAO is made up of the Assembly, Council, and subsidiary bodies, with ultimate control and authority vested in the Assembly, which meets at least once every three years and is composed of representatives from the contracting states.⁶⁰ Each state has the right to be represented at the Assembly's meetings, and each state is entitled to one vote, resulting in smaller, less powerful states having as much voting power as larger, more powerful ones.⁶¹ Unless otherwise provided for by the Convention, a majority of

⁵⁸ See ICAO, AGREEMENT BETWEEN THE UNITED NATIONS AND THE INTERNATIONAL CIVIL AVIATION ORGANIZATION, ICAO Doc. 7970, art. 1 (May 10, 1948).

⁵⁹ Chicago Convention, *supra* note 40, art. 44, 61 Stat. at 1192, 15 U.N.T.S. at 326.

⁶⁰ See *id.* art. 48(a), as amended in *Amendments to Articles 48(a) 49(e) and 61 of the Convention*, Ass. Res. A 8-1 (1954) *compiled in Assembly Resolutions in Force*, at I-16, IACO Doc. 9662 (Oct. 4, 1995). Prior to its amendment, article 48(a) envisaged an annual meeting of the Assembly. See Chicago Convention, *supra* note 40, art. 48(a), as originally written, 61 Stat. at 1193, 15 U.N.T.S. at 328.

⁶¹ See Chicago Convention, *supra* note 40, art. 48(b), 61 Stat. at 1194, 15 U.N.T.S. at 328.

votes is required for the Assembly to make decisions.⁶² The primary powers and duties of the Assembly are to elect the Council; take action on the Council's reports; determine ICAO's financial arrangements and review its expenditures; delegate matters to the Council or the appropriate subsidiary body; decide whether agreements should be made with other international bodies; amend the Convention;⁶³ and deal with any matter not specifically delegated to the Council.⁶⁴

The Council is the permanent body of ICAO. The Assembly selects the thirty-three member Council for a three-year term.⁶⁵ In contrast with the strictly one-state-one-vote of the Assembly, the Council is composed of states that are of chief importance in air transport, the largest contributors to the provision of facilities for international air navigation, and representative of all major geographical areas.⁶⁶ Council representatives may not be associated with the operation of international air service or have financial interests in the sector.⁶⁷ This ensures the non-biased representation of the contracting state, and that its representatives consider interests of aviation generally.⁶⁸

The Council's duties are divided into mandatory and permissive functions. The Council's principal mandatory functions are to submit annual reports to the Assembly, carry out Assembly delegated matters, appoint the Secretary General and members of permanent commissions, report infringements to the Assembly, adopt and modify the Convention's Annexes, and publish information relating to air navigation and operation of international air services.⁶⁹

The permissive functions, those which the Council may undertake by choice, are to create commissions to facilitate the Convention's aims, research aspects of air transport and navigation of international importance, and investigate situations that present possible obstacles to the development of international

⁶² See *id.* art. 48(c), 61 Stat. at 1194, 15 U.N.T.S. at 328.

⁶³ An amendment to the Convention requires both a two-thirds vote by the Assembly and ratification by two-thirds of the contracting states to enter into force. See *id.* art. 94(a), 61 Stat. at 1206-07, 15 U.N.T.S. at 358.

⁶⁴ See *id.* art. 49(k), 61 Stat. at 1194, 15 U.N.T.S. at 330.

⁶⁵ See *id.* art. 50(a), as amended, 61 Stat. at 1195, 15 U.N.T.S. at 330.

⁶⁶ See *id.* art. 50(b), 61 Stat. at 1195, 15 U.N.T.S. at 330, 332.

⁶⁷ See *id.* art. 50(c), 61 Stat. at 1195, 15 U.N.T.S. at 332.

⁶⁸ See CAROLE BLACKSHAW, *AVIATION LAW & REGULATION: A FRAMEWORK FOR THE CIVIL AVIATION INDUSTRY* 6 (1992).

⁶⁹ See Chicago Convention, *supra* note 40, art. 54, 61 Stat. at 1196, 15 U.N.T.S. at 334.

aviation.⁷⁰ The Council is also responsible for submitting annual budgets to the Assembly, detailing receipts and expenditures.⁷¹ In addition, the Council adopts International Standards and Recommended Practices, and incorporates them as Annexes to the Chicago Convention.⁷²

There are several subsidiary bodies that are established under the Convention or have been set up by the Assembly: Air Navigation Commission, which deals with technical matters; Air Transport Committee, which deals with economic matters; Legal Committee; Committee on Joint Support of Air Navigation Services; Committee on the Unlawful Interference of Aircraft; and Committee on Finance.⁷³ These subsidiary bodies do much of the research and planning for the Council.

C. CHICAGO CONVENTION TODAY

The Chicago Convention has achieved outstanding success in creating an international institution that has developed a comprehensive body of international civil aviation rules. With 185⁷⁴ member states, ICAO is considered one of the United Nations' largest and most successful specialized agencies.⁷⁵

Much of ICAO's work has focused on the technical aspects of civil aviation. In particular ICAO has aided developing states through its technical assistance programs. The work in developing countries has primarily focused on "the development of the ground services required for civil aviation and, in particular, toward aerodromes, air traffic control, communications and meteorological services . . . assistance to States in order to improve their aviation security facilities and procedures."⁷⁶

⁷⁰ See *id.* art. 55, 61 Stat. at 1197, 15 U.N.T.S. at 336.

⁷¹ See *id.* art. 61, 61 Stat. at 1199, 15 U.N.T.S. at 340. Each contracting state is responsible for its share of ICAO's expenses. Failure of a state to pay its financial obligation may result in the Assembly suspending that state's voting power. See *id.* art. 62, 61 Stat. 1199, 15 U.N.T.S. at 340. The result being that ICAO is essentially self-financed by its members. See BLACKSHAW, *supra* note 68, at 9.

⁷² See Chicago Convention, *supra* note 40, art. 54(l), 61 Stat. at 1196, 15 U.N.T.S. at 334.

⁷³ See MAREK ZYLICZ, INTERNATIONAL AIR TRANSPORT LAW 84 (1992); GIDWITZ, *supra* note 39, at 9-11.

⁷⁴ On December 21, 1996, Western Samoa became a contracting state of ICAO thereby increasing membership to 185 states. See *ICAO Membership*, 52 ICAO J. 23 (Jan.-Feb. 1997).

⁷⁵ See DEMPSEY, *supra* note 38, at 13.

⁷⁶ ICAO, *Facts About ICAO*, (visited Apr. 4, 1997) <<http://www.cam.org/~icao/facts.htm>>.

The Chicago Convention did not attempt to deal comprehensively with tax matters. Contracting states agreed to refrain from imposing taxes or customs duties on aircraft engaged in international aviation or on the fuel and oil on-board the aircraft.⁷⁷ This provision effectively prevents aircraft from being taxed on its on-board fuel as it enters and leaves different countries. In response to changes in international civil aviation, the ICAO Assembly sought to reaffirm and strengthen the principles of non-taxation. In 1993, the Council adopted a resolution, endorsing a policy of reciprocal exemption from customs and duties for fuel taken aboard for consumption by an aircraft engaged in international air transport.⁷⁸

V. ICAO AND THE ENVIRONMENT

A. HISTORY OF INVOLVEMENT

ICAO has a history of interest and involvement in international environmental issues. In 1972, ICAO's position at the United Nations Conference on the Human Environment was set in Assembly Resolution A18-11, which provided: "in fulfilling this role ICAO is conscious of the adverse environmental impact that may be related to aircraft activity and its responsibility and that of its member states to achieve maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment."⁷⁹

In the same year, the Assembly also adopted Resolution A18-12, which instructed the Council "to continue with vigour the work related to the development of Standards, Recommended Practices and Procedures and/or guidance material dealing with the quality of the human environment" with the assistance of other parts of ICAO and other international organizations.⁸⁰ This resolution led to the establishment of an "ICAO Action Programme Regarding the Environment."⁸¹ In 1977, an outgrowth of the programme was an ICAO Circular, entitled "Con-

⁷⁷ See Chicago Convention, *supra* note 40, art. 24, 61 Stat. at 1186, 15 U.N.T.S. at 310.

⁷⁸ See ICAO, ICAO'S POLICIES ON TAXATION IN THE FIELD OF INTERNATIONAL AIR TRANSPORT 3-4, Doc. No. 8632-C/968 (2d ed. Jan. 1994) (approved by the Council on Dec. 14, 1993).

⁷⁹ ICAO, Assembly Resolution A18-11 (1972).

⁸⁰ ICAO, Assembly Resolution A18-12 (1972).

⁸¹ ICAO, INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES, ENVIRONMENTAL PROTECTION, ANNEX 16 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION, v, Vol. II (2d ed. Nov. 1993) [hereinafter ANNEX 16].

trol of Aircraft Engine Emissions.”⁸² The Circular contained a certification procedure for the “control of vented fuel, smoke and certain gaseous emissions for new turbo-jet and turbofan engines intended for propulsion at subsonic speeds.”⁸³ Recognizing that the subject of aircraft engine emissions was not purely technical, the Council established the Committee on Aircraft Engine Emissions in 1977 to address a number of aspects of aircraft emissions.⁸⁴ In 1981, this committee’s work led to the development of environmental protection standards relating to emissions.⁸⁵ These standards were guided by the philosophy of achieving “maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment.”⁸⁶

B. ANNEX 16

Annex 16 to the Chicago Convention sets the international Standards and Recommended Practices for the environmental aspects of aviation and is aptly named “Environmental Protection.”⁸⁷ Volume I of Annex 16 addresses aircraft noise and Volume II addresses aircraft engine emissions. Volume II calls for the prevention of intentional fuel venting and establishes standards for aircraft emissions control through an engine certification scheme. Fuel venting occurs when a plane has been designed in such a manner that the fuel nozzle manifolds discharge liquid fuel during normal flight or ground operations.⁸⁸ Annex 16 requires that “all turbine engine powered aircraft intended for operation in international operation manufactured after 18 February 1982” be designed and constructed to prevent such an intentional discharge.⁸⁹ In addition, Volume II limits certain aircraft emissions through an engine certification process, depending on the age and type of the aircraft and establishes a highly technical process for measuring emissions.⁹⁰ The

⁸² *Id.*

⁸³ *Id.*

⁸⁴ *See id.*

⁸⁵ *See id.* at vii.

⁸⁶ ICAO, Assembly Resolution A18-11 (1972).

⁸⁷ ANNEX 16, *supra* note 81; *see also* ICAO, INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES, ENVIRONMENTAL PROTECTION, SUPPLEMENT TO ANNEX 16—ENVIRONMENTAL PROTECTION, Vol. II (2d ed. Dec. 1994) [hereinafter ANNEX 16 SUPPLEMENT].

⁸⁸ *See* ANNEX 16, *supra* note 81, at 4.

⁸⁹ *Id.* at 3.

⁹⁰ *See id.* at 6.

emissions controlled and kept under review by ICAO are smoke, hydrocarbons, CO and NO_x from new engines.⁹¹ Because aircraft engines are an international commodity, manufacturers build aircraft to meet Annex 16 standards. Manufacturers of aircraft or engines must show that their product meets Annex 16 noise and emission standards before it can enter commercial service.

Parties to ICAO have effectively undertaken a commitment through Annex 16 to adhere to acceptable ceilings for aircraft emissions.⁹² Under the Chicago Convention, countries that are unable to abide by Annex 16 are required to notify ICAO of any differences between their national regulations and practices and the Annex's international Standards and Recommended Practices.⁹³ In addition, contracting states are required to publish their differences through the Aeronautical Information Service as required by Annex 15.⁹⁴ Eleven of the 185 contracting states have notified ICAO of differences between their own practices and those established by Annex 16 relating to NO_x and CO emissions stringency.⁹⁵ The United States, despite its international obligations and active participation in ICAO, until 1997 was not in compliance with Annex 16's NO_x and CO provisions and had failed to notify ICAO of its differences. However, U.S. air carriers purchasing new aircraft were in compliance with Annex 16 because aircraft engine manufacturers design and build engines that adhere to ICAO standards.

The ICAO's Committee on Aviation Environmental Protection (CAEP), established in 1983, is charged with making recommendations regarding international noise and emission standards to the decision-making bodies of ICAO. The CAEP's members are experts in the field of aviation and the environment.⁹⁶ The CAEP handles the majority of ICAO's environment-related activities. In December 1995, the CAEP recommended a 16 percent increase in stringency for the NO_x standard applicable to medium and large engines to be

⁹¹ See *id.*

⁹² See *id.* at v.

⁹³ See Chicago Convention, *supra* note 40, art. 38, 61 Stat. at 1191, 15 U.N.T.S. at 322.

⁹⁴ See ANNEX 16, *supra* note 81, at v.

⁹⁵ See PHILIPPE SANDS, PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW I: FRAMEWORKS, STANDARDS AND IMPLEMENTATION 258 (1995). For more information on the types of differences, see ANNEX 16 SUPPLEMENT, *supra* note 87, at iii.

⁹⁶ See R.I.R. Abeyratne, Legal and Regulatory Issues in International Aviation, 287 (1996) [hereinafter Legal and Regulatory Issues].

designed for the first time in the year 2000 and manufactured for the first time in the year 2008.⁹⁷ In April 1997, the Council decided not to adopt this standard. As a result, the Emissions Planning Group was established to formulate a proposal on aircraft emissions to be presented at the CAEP conference in April 1998.

C. RECENT ACTIVITY OF THE ASSEMBLY

In 1995, the thirty-first session of the Assembly adopted a consolidated statement of ICAO's policies and practices relating to environmental protection.⁹⁸ Assembly Resolution A31-11 reiterates both ICAO's general principle laid out in Assembly Resolution A18-11 and the Council's need to maintain the lead in developing guidance on aviation matters related to the environment, so as to not leave such initiatives to other organizations.⁹⁹ In addition, the resolution urges states to ensure that any local operating restriction based on engine characteristics "be adopted only where such action is supported by a prior assessment of all possible adverse impacts"¹⁰⁰ and discourages states from "unilateral environmental measures that would be harmful to the development of international civil aviation."¹⁰¹

Due to increasing international concern over global warming and ozone depletion, ICAO has become an active participant in these areas.¹⁰² ICAO is working with other international bodies to determine the extent of the aviation sector's contribution to these environmental problems.¹⁰³ Assembly Resolution A31-11, Appendix F, deals expressly with the environmental impact of civil aviation on the upper atmosphere. The Resolution directs the Council to expand both its and CAEP's involvement in the international global warming discussions by working closely with the United Nations Environment Programme, the World Meteorological Organization, the IPCC and the FCCC's Conference to the Parties.¹⁰⁴

⁹⁷ See Arthur Reed, *The Green Menace*, 33 AIR TRANSPORT WORLD, 57, 57-59 (1996).

⁹⁸ See ICAO, Assembly Resolution A31-11 (1995).

⁹⁹ See *id.* at app. B.

¹⁰⁰ *Id.* at app. E.

¹⁰¹ *Id.* at app. A, ¶ 5.

¹⁰² See Public Information Office of ICAO, *supra* note 54.

¹⁰³ See *id.*

¹⁰⁴ See ICAO, Assembly Resolution A31-11, app. F (1995).

VI. 1992 U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE

A. HISTORY OF NEGOTIATIONS

Concern about climate change intensified in 1988, when unusual weather and significant drought occurred in various parts of the world. In response to these events, the international community established the Intergovernmental Panel on Climate Change (IPCC) in 1988, under the auspices of the United Nations Environment Programme and the World Meteorological Organization. The IPCC is a U.N. scientific body directing international atmospheric research on global warming; its mission is to provide policymakers with the best possible scientific assessment of global warming. The IPCC's goals are to (1) review and assess the science relevant to climate change, (2) assess the possible environmental and socioeconomic impacts of climate change, and (3) identify potential response strategies. In 1990, the IPCC submitted its findings in the *First Assessment Report* to the U.N. General Assembly and the second U.N. World Climate Conference.¹⁰⁵ The U.N. General Assembly adopted the report, which became the basis for the Framework Convention on Climate Change.¹⁰⁶

The FCCC was opened for signature at the 1992 U.N. Conference on Environment and Development in Rio de Janeiro. Over 150 nations signed the FCCC at the so-called "Earth Summit." The FCCC commits contracting countries to a voluntary reduction of greenhouse gases with the aim of stabilizing emissions at 1990 levels by the year 2000. The framework has provided the foundation for subsequent U.N. conferences on global warming.

B. OBJECTIVE AND GENERAL COMMITMENTS

The FCCC's ultimate objective is to:

[A]chieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food produc-

¹⁰⁵ See CONGRESSIONAL RESEARCH SERVICE, U.S. CONGRESS, GLOBAL CLIMATE CHANGE 7, IB89005 (Feb. 25, 1997).

¹⁰⁶ See *id.* at 8.

tion is not threatened and to enable economic development to proceed in a sustainable manner.¹⁰⁷

To accomplish this objective, the framework sets forth a series of commitments in Article 4. Unlike the Chicago Convention, the FCCC distinguishes between developed and developing nations, committing all to certain common obligations, but requiring stronger actions on the part of developed countries. All countries are required to inventory their emissions and sinks of greenhouse gases and to “[f]ormulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change”¹⁰⁸ These obligations are qualified explicitly by the acknowledgment that nations “have specific national and regional development priorities, objectives, and circumstances;”¹⁰⁹ this qualification may be to justify differing levels of achievement of even these common duties.

The Framework language addressing the commitments for developed countries—twenty-seven members of the OECD plus the former Communist block countries, referred to as Annex I countries¹¹⁰—is confusing and convoluted.¹¹¹ It neither re-

¹⁰⁷ United Nations Framework Convention on Climate Change, May 9, 1992, art. 2, 31 I.L.M. 848, 854 [hereinafter *Climate Change Convention*].

¹⁰⁸ *Id.* art. 4(1)(b), 31 I.L.M. at 855.

¹⁰⁹ *Id.* art. 4(1), 31 I.L.M. at 855.

¹¹⁰ The 36 Annex I countries are as follows: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, Estonia, European Community, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and United States of America. Any country not classified as an Annex I country is considered a developing country.

¹¹¹ The binding commitments for Annex I countries are set out in Article 4(2), which provides:

- a) Each of these Parties shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs. These policies and measures will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention, recognizing that the return by the end of the present decade to earlier levels of anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol would contribute to such modification, and taking into account the differences in these Parties' starting points and approaches, economic structures and resource bases,

quires that greenhouse gas emissions be stabilized by the year 2000 at 1990 levels nor requires a return to 1990 levels by the year 2000, as has been widely reported.¹¹² The framework language merely commits Annex I countries to communicate to other parties information on their policies and measures to reduce “their” net greenhouse gas emissions with the “aim” of returning greenhouse gas emissions to 1990 levels by the year 2000.¹¹³ The FCCC does not contain any mechanism to enforce these aims.

Annex II countries,¹¹⁴ a subset of the Annex I countries, have the additional responsibility of specific financial commitments. They are to “provide new and additional financial resources” to help developing countries comply with the reporting requirements.¹¹⁵ In addition, Annex II countries must assist financially those developing countries made vulnerable by global climate change.¹¹⁶ Furthermore, Annex II countries are to promote, fa-

the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances, as well as the need for equitable and appropriate contributions by each of these Parties to the global effort regarding that objective. These Parties may implement such policies and measures jointly with other Parties and may assist other Parties in contributing to the achievement of the objective of the Convention and, in particular, that of this subparagraph;

- b) In order to promote progress to this end, each of these Parties shall communicate, within six months of entry into force of the Convention for it and periodically thereafter, and in accordance with Article 12, detailed information on its policies and measures referred to in subparagraph (a) above, as well as on its resulting projected anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for the period referred to in subparagraph (a), with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol

Id. art. 4(2)(a) & (b), 31 I.L.M. at 857 (internal footnote omitted).

¹¹² See *id.* art. 4(2)(b), 31 I.L.M. at 857.

¹¹³ The use of the word “their” is problematic for aircraft emissions since it is not clear who is responsible for emissions over the high seas. See *infra* notes 134-145 and accompanying text.

¹¹⁴ Annex II parties include: Australia, Austria, Belgium, Canada, Denmark, European Community, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom of Great Britain and Northern Ireland, and United States of America.

¹¹⁵ *Id.* art. 4(3), 31 I.L.M. at 858.

¹¹⁶ See *id.* art. 4(4), 31 I.L.M. at 858.

cilitate, and finance technology transfers to developing countries.¹¹⁷

C. FCCC INSTITUTIONS

The FCCC establishes a Conference of the Parties to review and promote the implementation of the Framework.¹¹⁸ The parties agreed that the adequacy of Annex I countries' commitments would be reviewed at the Conference of the Parties' first meeting, and periodically thereafter, to determine whether additional action might be needed to move toward the FCCC's ultimate objective—the stabilization of greenhouse gas concentrations.¹¹⁹

The FCCC establishes a scientific body, the Subsidiary Body for Scientific and Technological Advice (SBSTA), to assess the state of global climate change research, determine the feasibility of technology research, assess the effect of measures taken under the Framework, work with other scientific and international bodies, and answer questions posed by the Conference of the Parties.¹²⁰ The Framework also seeks to establish a financial mechanism for the administration of financial resources, but fails to establish anything permanent. At the Earth Summit, there was tremendous disagreement among countries as to how the financial mechanism should work.¹²¹ The Global Environment Facility is temporarily administering the FCCC's financial mechanism.¹²²

D. CONFERENCE OF THE PARTIES

At the First Conference of the Parties in March 1995, the parties acknowledged that existing commitments under the FCCC would not meet the objective of stabilizing greenhouse gas emissions.¹²³ The Annex I countries launched a new process (the "Berlin Mandate") with a 1997 deadline for strengthening devel-

¹¹⁷ See *id.* art. 4(5), 31 I.L.M. at 858.

¹¹⁸ See *id.* art. 4(2)(d), 31 I.L.M. at 857.

¹¹⁹ See *id.*

¹²⁰ See *id.* art. 9, 31 I.L.M. at 863.

¹²¹ SANDS, *supra* note 95, at 280.

¹²² CONGRESSIONAL RESEARCH SERVICE, U.S. CONGRESS, CONGRESS AND INTERNATIONAL ENVIRONMENTAL POLICY 14, 93-695 ENR (May 1993).

¹²³ GENERAL ACCOUNTING OFFICE, GLOBAL WARMING: DIFFICULTIES ASSESSING COUNTRIES' PROGRESS STABILIZING EMISSIONS OF GREENHOUSE GASES, H.R. DOC. No. GAO/RCED-96-188, at 2 (1996), *available in* 1996 WL 546171 (F.D.C.H.) [hereinafter *ASSESSING PROGRESS*].

oped countries' commitments. The parties hoped to "negotiate a 'comprehensive menu of actions' from which countries may pick and choose options to address climate change which, individually, make the best economic and environmental sense, as well as a uniform approach to reporting emissions and measures."¹²⁴ In addition, parties agreed to begin discussing post-2000 options, focusing on strengthening the commitments of the parties by elaborating policies and measures, as well as setting quantifiable objectives.¹²⁵

At the Second Conference of the Parties in July 1996, the countries endorsed IPCC's *Second Assessment Report*, agreed on the contents of the first national communications that developing countries were to submit, and approved the "activities implemented jointly" pilot program for reducing global greenhouse gases.¹²⁶ In a major policy reversal, the Clinton Administration committed U.S. support for binding targets¹²⁷ and rejected the imposition of "harmonized policies and measures" at this conference.¹²⁸ The United States later proposed a protocol¹²⁹ that established a budget for emissions "that retains each party's flexibility with respect to the choice of domestic policies and measures to implement the target."¹³⁰

At the Third Conference of the Parties in Kyoto, Japan, the parties agreed to the Kyoto Protocol. The agreement reached in the Kyoto Protocol provides for developed countries to agree to binding national targets for greenhouse gas emissions of CO₂, methane, NO_x, and three halocarbons used as substitutes for ozone-damaging chlorofluorocarbons. Under the Protocol, in the commitment period 2008-2012 the European Community's members would be collectively bound to an eight percent reduc-

¹²⁴ CONGRESSIONAL RESEARCH SERVICE, *supra* note 105, at 9.

¹²⁵ See ASSESSING PROGRESS, *supra* note 123, at 4-5.

¹²⁶ See *Ministerial Declaration Released at Conference of Parties to United Nations Framework Convention on Climate Change Dated July 18, 1996*, [1996] Daily Env't Rep. (BNA) 1996 DEN 139, at D26 (July 19, 1996).

¹²⁷ The Clinton Administration issued the Climate Change Action Plan of 1993, a voluntary initiative designed to return emissions of greenhouse gases to 1990 levels by 2000, in response to the FCCC. See ASSESSING PROGRESS, *supra* note 123, at 9.

¹²⁸ CONGRESSIONAL RESEARCH SERVICE, *supra* note 105, at 12.

¹²⁹ Dept. of State, Bureau of Oceans and Int'l Envtl. and Sci. Aff., *Draft Protocol to the Framework Convention on Climate Change*, released Jan. 28, 1997 (visited Mar. 16, 1997) <<http://www.state.gov/www/global/oes/protocol.html>>.

¹³⁰ *U.S. Proposal for Binding Controls on Greenhouse Gas Emissions Offered at U.N. Negotiations on Climate Change Released by the State Department*, [1996] Daily Env't Rep. (BNA) 1996 DEN 236, at D32 (Dec. 9, 1996).

tion below 1990 levels; the United States, a seven percent reduction; and Japan, Canada, Hungary, and Poland, a six percent reduction. Also, Russia, New Zealand, and Ukraine are to stabilize emissions at 1990 levels. Some countries would be permitted to increase their emissions: Norway by one percent, Australia by eight percent, and Iceland by ten percent.¹³¹ Developing countries, such as India and China, were asked to set voluntary reduction targets, but refused.

The Clinton Administration's commitment to emission reductions has ignited a firestorm of criticism from industry leaders, labor unions, and many members of Congress. As a result, the Administration is not expected to seek ratification of the protocol in the Senate, where a two-thirds majority of support would be needed, until at least 1999. The Fourth Conference of the Parties is scheduled to be held in Buenos Aires, Argentina in November 1998.

E. KYOTO PROTOCOL: INTERNATIONAL RECOGNITION OF THE UNIQUE NATURE OF AVIATION

While the Kyoto Protocol's national targets apply to emissions from almost all industrial sectors, they exclude emissions from the international aviation sector. The Kyoto Protocol expressly recognizes ICAO as the global organization responsible for the reduction or limitation of international aviation emissions: "The Parties included in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively."¹³² In protocol language, emissions of greenhouse gases from aviation bunker fuels refers to aviation emissions. This provision makes clear that ICAO is the principal forum for regulating international aircraft emissions. The question of whether ICAO is the forum for addressing purely domestic aircraft emissions remains open.

The Third Conference of the Parties also issued a "Decision Statement" that states the following:

The Conference of the Parties, Recalling its decisions 4/CP.1 and 9/CP.2, Endorsing the relevant conclusions of the Subsidiary Body for Scientific and Technological Advice at its fourth session, . . .

¹³¹ See Kyoto Protocol, *supra* note 1, at 30.

¹³² *Id.* art. 2(2), at 9.

(4) *Recalls* that, under the Revised 1996 Guidelines for National Greenhouse Gas Inventories of the Intergovernmental Panel on Climate Change, emissions based upon fuel sold to ships or aircraft engaged in international transport should not be included in national totals, but reported separately; and *urges* the Subsidiary Body for Scientific and Technological Advice to further elaborate on the inclusion of these emissions in the overall greenhouse gas inventories of Parties.¹³³

This Decision demonstrates the need to treat aviation differently than other sectors.

VII. WHY ICAO INSTEAD OF THE FCCC?

The Kyoto Protocol and its Decisions ensure that ICAO continues to retain exclusive jurisdiction for global aviation policy, thereby avoiding fragmentation of global aviation environmental policy. ICAO's role as the organization responsible for providing information on international civil aviation operations and developing policy guidance on possible means of reducing international civil aviation's undesirable effects on the environment has been reaffirmed.

Prior to Kyoto, ICAO's technical expertise and ability to achieve greater compliance with limiting emissions bolstered the argument for the removal of aircraft emissions from the FCCC's purview and the delegation of that responsibility to ICAO. The Third Conference of the Parties recognized this, and as a result, made ICAO the sole international forum responsible for regulating aircraft emissions. Described below are some of the advantages of having international emissions handled by ICAO rather than the FCCC.

A. AMBIGUITY UNDER THE FCCC

Prior to the Kyoto Protocol, the U.N. climate change negotiations had failed to recognize the uniqueness of the global civil aviation sector. In particular, the FCCC's treatment of aircraft emissions is ambiguous because it is unclear how international aviation emissions are to be allocated. The FCCC calls on countries to "aim" to limit "their" emissions.¹³⁴ Traditionally, there has been a strong connection between airlines and countries. Commercial air transport since its inception has relied on the

¹³³ *Id.* at 31.

¹³⁴ See Climate Change Convention, *supra* note 107, art. 4(2)(b), 31 I.L.M. at 857.

support of national governments.¹³⁵ This connection may not be maintained in the future given the trend towards privatization and the merging of airlines.¹³⁶ In addition, aircraft may for economic reasons be registered in one country, but may actually be leased or chartered for operation elsewhere.¹³⁷ There is also the added complication of where bunker fuel¹³⁸ intake occurs because the fuel intake does not necessarily take place in the country of original departure. Also, a considerable percentage of aviation operations is conducted over the high seas, outside any countries jurisdiction.

The effect of the Framework's language is that domestic aviation emissions are included in a country's aim, whereas the treatment of international aircraft emissions remains unclear.¹³⁹ The FCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA) is currently discussing aircraft emission allocations options for Annex I parties.¹⁴⁰ The options being discussed include:

- 1) No allocation;
- 2) Allocation of global emissions from bunker fuels to parties in proportion to their national emissions;
- 3) Allocation to parties according to the country where the bunker fuel is sold;
- 4) Allocation to parties according to the nationality of the transporting company, the country where the aircraft is registered, or the country of the operator;
- 5) Allocation to parties according to the country of departure or destination of an aircraft. Alternatively the emissions related to the journey of an aircraft could be shared between the country of departure and the country of arrival;
- 6) Allocation to parties according to the country of departure or destination of passenger or cargo. Alternatively, the emis-

¹³⁵ See DEMPSEY, *supra* note 38, at 7.

¹³⁶ See *National Communications: Communications from Parties Included in Annex I to the Convention: Guidelines, Schedule and Process for Consideration: Addendum: Detailed Information on Electricity Trade and International Bunker Fuels* (Subsidiary Body for Scientific and Technological Advice) FCCC/SBSTA/1996/9/Add.2 (1996) [hereinafter *SBSTA Guidelines*].

¹³⁷ See *id.*

¹³⁸ Bunker fuel is defined as fuels sold to any aircraft engaged in international transport. See *id.* at 14 n.18.

¹³⁹ See OECD Report, *supra* note 20, at 20. Under the Kyoto Protocol, however, it is no longer clear whether domestic Aviation emissions are included in a country's aim.

¹⁴⁰ See *id.*

- sions related to the journey of a passenger or cargo could be shared by the country of departure and the country of arrival;
- 7) Allocation to parties according to the country of origin of the passenger or the owner of cargo; and
 - 8) Allocation to the party of emissions generated in its national space.¹⁴¹

SBSTA is studying options 1, 3, 4, 5, and 6 to determine the best option for dealing with international aviation emissions.¹⁴² Option 1, the "reporting of emissions by Parties in a separate category,"¹⁴³ would allow the FCCC countries to work through ICAO to achieve emission reduction.¹⁴⁴ The Third Conference of the Parties in the Kyoto Protocol's Decisions chose Option 1 pending further study by SBSTA. The primary problem with Options 3 through 6 is that they each lead to a disruption of the bilateral air transport regime because countries are unlikely to implement the same policies and measures to manage aviation emissions.¹⁴⁵

B. TECHNICAL EXPERTISE

ICAO is the technical agency that establishes international Standards and Recommended Practices for aircraft operations, maintenance, and emissions. One example of ICAO's technical expertise is the satellite-based system it has developed to address the future Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) needs of civil aviation.¹⁴⁶ ICAO, more importantly, is an experienced regulator of aircraft emissions, having played a leadership role in regulating aircraft emissions since 1977. Through Annex 16, ICAO sets and adjusts rigorous international pre-certification standards for aircraft emissions.

ICAO is the only technical U.N. agency with the background and expertise necessary to develop an international consensus on a fair and effective aircraft emissions policy for greenhouse gases. Any regulator of aircraft emissions must consider a complex set of issues, including the safety of aircraft modifications required by new emissions requirements and the economic impact of technical and operational changes. ICAO has an appre-

¹⁴¹ *SBSTA Guidelines*, *supra* note 136, at 20-22 (explanatory materials omitted).

¹⁴² *See* OECD Report, *supra* note 20, at 20.

¹⁴³ *SBSTA Guidelines*, *supra* note 136, at 20.

¹⁴⁴ *See* OECD Report, *supra* note 20, at 20.

¹⁴⁵ *See infra* notes 155-158 and accompanying text.

¹⁴⁶ *See Information Kit*, *supra* note 16.

cialable understanding of this unique sector's needs and is well equipped to develop an effective emissions abatement program. For instance, the organization understands and appreciates the balance that has to be reached between noise and emissions.¹⁴⁷ ICAO understands that it has only one engine to regulate, and that regulating one component of the engine may affect how another component works. It is this understanding that is so crucial to ensuring the continued safety of the air transport system.

C. GREATER COMPLIANCE

The technological, political, and economic requirements of verifying that parties are in compliance with the FCCC is difficult. A study by the General Accounting Office found that:

[FCCC's] goal to reduce greenhouse gas emissions cannot be fully assessed because the emissions data are incomplete, unreliable, and inconsistent Although the emissions data for carbon dioxide are considered to have a high level of certainty, the data for other greenhouse gases are much less reliable. For example, the range of uncertainty for Canada's reported emissions data on methane was plus or minus 30 percent at a 90-percent confidence level and for nitrous oxide emissions, plus or minus 40-percent at an 85-percent confidence level. Such problems limit the completeness and comparability of the inventories and projections and therefore the ability to assess progress against the [C]onvention's goal. The problems generally result from lack of specific reporting requirements by the Convention and from limitations in the ability to quantify certain greenhouse gas emissions.¹⁴⁸

Aircraft emissions are relatively easy to monitor and document. ICAO has experience with measurement and verification of aircraft emissions. Delegating the monitoring of aircraft emissions to ICAO results in better accountability.

D. PREVENTS DUPLICATION OF EFFORTS

The inclusion of international aviation emissions under the FCCC would have duplicated the work of ICAO. After all, ICAO is a permanent executive body with a history of establishing international Standards and Recommended Practices for aircraft operations, maintenance, and emissions. Elimination of waste

¹⁴⁷ See *supra* note 36 and accompanying text.

¹⁴⁸ ASSESSING PROGRESS, *supra* note 123, at 2 (footnote omitted).

and duplication of work within the United Nations has been a primary goal of the Clinton Administration. As Secretary of State Madeleine Albright put it so eloquently:

We do think there is too much duplication. Every time there is a need for a program it doesn't mean that there has to be a new group formed that has to have its own stationery and its own organization and its director general. We are downsizing, the U.S. government is downsizing, the U.N. has to downsize and become leaner and more flexible for the duties that it has to perform, not only at the end of this century but the beginning of the next one.¹⁴⁹

In this era of fiscal conservatism, it is duplicative and wasteful to have two U.N. organizations responsible for aircraft emissions. The FCCC parties properly delegated responsibility for aircraft emissions to ICAO.

E. MINIMIZATION OF MARKET DISRUPTION

Tackling aircraft emissions is best done on a global level through a comprehensive approach. Global measures are likely to be more cost effective than national initiatives.¹⁵⁰ Failure to pursue a comprehensive approach to international civil aviation emissions results in market distortions. Adoption of the Kyoto Protocol minimizes these distortions.

There are at least three ways in which a non-uniform approach to international aircraft emissions would have resulted in greater emissions. First, if CO₂ charges on aviation fuel were not internationally uniform, airlines would tend to buy more of their fuel in countries that have no charge or those that impose the lowest charge. Non-uniform charges would encourage airlines to "tanker," which reduces the amount of cargo that can be carried, increases fuel consumption used in transporting the tankered fuel, and causes higher greenhouse gas emissions.¹⁵¹

Second, on long-haul flights that are required to make a stop, incentive to travel via countries without restrictions on emissions would increase.¹⁵² Passengers seeking the lowest airfares would likely avoid those countries with emissions restrictions and

¹⁴⁹ *United Nations Ready for an Overhaul* (Morning Edition, Nat'l Pub. Radio, Sept. 19, 1995).

¹⁵⁰ See OECD Report, *supra* note 20, at 35.

¹⁵¹ See *id.* Tankering is where an airline takes "on more fuel than is needed for a flight to avoid taking on expensive or lower quality fuel at the next port of call." *Id.* at 30.

¹⁵² See *id.* at 31.

would instead fly via neighboring countries not imposing restrictions. If this resulted in passengers taking additional short-haul flights to and from the long-haul departure point, the non-uniformity would again result in greater fuel use and a net increase in greenhouse gas emissions.¹⁵³

Third, a non-uniform approach would create an inadequate incentive for all airlines to adopt energy efficient technology. On the other hand, the Kyoto Protocol's uniform approach to aircraft emissions should encourage manufacturers to develop energy-efficient aircraft and should also work to increase the costs for those manufacturers that do not adopt such technology.¹⁵⁴

F. DISRUPTION OF BILATERAL AIR TRANSPORT AGREEMENTS

Without the Protocol's allocation of authority to ICAO, national emission targets would have upset the vast web of bilateral air transport agreements. For instance, some countries may have sought to reach their target by taxing aviation fuel. The problem is that most of the bilateral air transport agreements exclude the taxation of fuel used by each other's airlines.¹⁵⁵ Implementation of a fuel charge or tax by one state as a means of addressing greenhouse gases reduction goals would either entitle another state to take retaliatory action or would require renegotiation of the country's bilateral air transport agreements.¹⁵⁶

Delegation of formulating the policy for aircraft emissions of greenhouse gases to ICAO minimizes the likelihood of disruption to bilateral air transport agreements. ICAO accepts the principle that countries can impose environmental charges on airlines to recover specific air transport related costs.¹⁵⁷ However, ICAO does not accept environmental taxes that are not earmarked.¹⁵⁸ By utilizing ICAO, the FCCC countries can be assured that steps taken to limit or reduce aircraft emissions will not upset bilateral air transport agreements.

¹⁵³ See *id.*

¹⁵⁴ See *id.* at 35.

¹⁵⁵ See *id.* at 19.

¹⁵⁶ See *id.* at 9.

¹⁵⁷ See *id.* at 19.

¹⁵⁸ See *id.*

G. INCLUSION OF DEVELOPING COUNTRIES

A comprehensive, long-term solution to global warming requires the cooperation of many countries and reductions in emissions from many sources. Every country emits greenhouse gases and shares responsibility for increases in emissions. In 1992, about eighty percent of the world's scheduled air traffic was done by Annex I countries, with non-OECD Asia/Pacific countries accounting for the majority of the remainder.¹⁵⁹ The demand for aviation services is expected to increase as developing countries' economies grow, thereby leading to an increased use of fossil fuels and greater emissions of greenhouse gases.¹⁶⁰ An international agreement's failure to include abatement by developing countries limits the effectiveness of measures to contain global warming.

Neither the FCCC nor the Kyoto Protocol commit developing countries to reductions in their emissions of greenhouse gases. This means that developing countries, like China, are free to burn as much fossil fuel as they want with no consequence except the slow destruction of the global commons. By addressing aviation emissions within ICAO, the prospect of developing countries taking corrective action is higher.

Effective limitation of greenhouse gases requires that developing countries participate in international agreements requiring emissions abatement. ICAO has a long history of successfully including developing countries in its programs.

[B]ilateralism has allowed some developing countries to negotiate access to developed country airline markets on a reciprocal basis. In addition, extensive technical and other forms of assistance through ICAO as well as other assistance [programs] have helped developing countries to achieve and upgrade technical and safety standards and the development of their airport and airspace for international operations, as well as to minimize their disadvantages in both human and financial resources in the air transport sector.¹⁶¹

¹⁵⁹ See *id.* at 13. The Asia/Pacific region is projected to have the fastest annual growth in passenger and freight traffic, nine and ten percent, respectively, from 1995 to 2005. See *id.*

¹⁶⁰ See EPA REPORT, *supra* note 9, at IV-15.

¹⁶¹ *Whether International Airline Services Should be Excluded in the General Agreement on Tariffs and Trade (GATT)*, Hearing Before the Subcomm. on Aviation of the House of Representatives Comm. on Pub. Works and Transp., 101st Cong. 23 (1989).

In an average year, the ICAO Technical Co-operation Bureau is involved in more than 200 projects in about 100 countries.¹⁶² Perhaps ICAO could help developing countries secure financing for additional emission-efficient investment, such as implementations of CNS/ATM. The Kyoto Protocol's allocation of international aircraft emissions to ICAO means that developing countries are more likely to be engaged in abatement of aircraft emissions.

H. A BETTER WAY TO MAKE LAW¹⁶³

ICAO, unlike the FCCC, has the background and expertise necessary to develop international consensus on a fair and effective aircraft emissions policy. International consensus is important for any action that affects the operations of, or imposes costs on, international air transport. Several international lawyers have held up ICAO as a model to be followed for reaching consensus on international environmental law. Peter Sand argues that ICAO

cope successfully both with the "bottomline" syndrome (by facilitating upward revision) and with the "slowest-boat" syndrome (by dispensing with ratification). The net result is . . . a pattern of procedures for improving the chances of a decision of the majority (be it simple or two-thirds) of a "legislative" character securing general consent.¹⁶⁴

ICAO, through the use of tacit consent, creates evolving norms. For example, ICAO's standards are adopted unless a percentage of the membership blocks them. If ICAO adopts standards, states that find compliance impracticable may opt out. However, the pressure to comply is great, and as a result ICAO's standards enjoy widespread compliance.¹⁶⁵

¹⁶² The projects range from developing airports to installing communication systems that cost anywhere from \$100,000 to \$12 million. The funds for these systems come from the U.N. Development Programme or from trust funds established by the states. See *Information Kit*, *supra* note 16.

¹⁶³ For more information on ICAO's legislative powers see ABERYRATNE, *supra* note 96, at 14-20.

¹⁶⁴ Sand, *supra* note 52, at 245 (quoting DEREK BOWETT, *THE LAW OF INTERNATIONAL INSTITUTIONS* 146 (4th ed. 1982)).

¹⁶⁵ See Geoffrey Palmer, *New Ways to Make International Environmental Law*, 86 AM. J. INT'L L. 259, 273 (1992).

VIII. CONCLUSION

Even though civil aircraft generate a lower percentage of emissions relative to other sectors, the increasing number of aircraft in the sky, as well as the lack of knowledge pertaining to NO_x, requires that action be taken to limit aircraft emissions. As the parties to the FCCC recognized in the Kyoto Protocol, ICAO is the proper forum to take such action. Concern, however, remains that the parties to the FCCC may in the future make decisions regarding aviation—and in particular domestic aircraft emissions—without consideration of the sector's particular characteristics and the expertise of, and work done by, ICAO.