



DISCUSSION PAPER ON CLIMATE CHANGE MITIGATION MEASURES FOR INTERNATIONAL AIR TRANSPORT

International aviation is critical to tourism around the globe. At the same time, air transport is the dominant contributor to greenhouse gas (GHG) emissions from travel and tourism. States are involved in negotiations to address these emissions as part of a new global deal on mitigation of climate change. It is essential that the tourism community is fully engaged in the process and, because of tourism's symbiotic relationship with international aviation, that the tourism perspective is taken into account in the development of measures relating to international air transport, particularly where market-based instruments are concerned.

This Discussion Paper prepared for the World Tourism Organization (UNWTO) explains the context for participation by the Organization in the climate change mitigation process for air transport, describes efforts already under way to address air transport emissions, sets out what a future regulatory framework for these emissions might look like, and suggests possible policy mechanisms that could effectively deal with aviation emissions while ensuring the continued responsible evolution of the tourism sector, on the basis of:

- Application of the UNFCCC principle of Common But Differentiated Responsibilities (CBDR) amongst countries (and reconciliation of the divergence between CBDR and principles in the Chicago Convention of non-discrimination amongst operators), perhaps through some form of air route classification
- Open access for air transport to global carbon markets, to be counted as compliance against any target for the sector
- Earmarking of all revenues from levies and trading of emissions permits to GHG mitigation activities yielding measurable, reportable and verifiable mitigation results, including specified allotments to related aviation and tourism projects, and financial and other incentives for the earliest possible global introduction of sustainable aviation biofuels
- Avoidance of air transport and tourism market distortion, and minimization of “carbon leakage” through rerouting of air services
- Coherence with strategies to reduce emissions in tourism destinations, to reduce poverty and to promote development in developing, and particularly in least developed, countries
- Continued recognition of the key role of ICAO, with full support for its extensive activities in the fields of airframe and engine technology, air traffic management and operational approaches, and endorsement of the parallel IATA strategy
- Address of economic instruments in partnership by all intergovernmental parties representing directly affected sectors, in close consultation with NGOs and both public and private enterprise.

This Discussion Paper, first issued in May 2009 and subsequently updated and revised in August 2009, was developed from drafts which were distributed for informal comment and input to a number of people in organizations around the world involved in climate change mitigation in air transport and tourism. Their contribution is greatly appreciated – it has undoubtedly added value to the current product and made its conclusions more robust. Acknowledgements, along with a contact point for correspondence, may be found in the text box at the end of the main Paper.

1. INTRODUCTION

1.1 Tourism – which includes both business and leisure travel – is a significant global industry making positive contributions to growth, trade and development, with particular potential for developing and least developed countries¹.

1.2 Tourism is both affected fundamentally by climate change and a significant contributor to the global emissions of greenhouse gases (GHGs). Domestic and international tourism together contribute about 5 per cent of global anthropogenic carbon dioxide (CO₂) emissions².

1.3 Tourism and air transport have a close symbiotic relationship, notably in the international context. Over 40 per cent of international tourist arrivals are by air (with much higher proportions for long-haul destinations); and virtually all international air passengers are by definition tourists (business or leisure).

1.4 Air transport is the primary contributor to travel and tourism GHG emissions:

- a) air transport accounts for an estimated 40 per cent of the travel and tourism contribution of CO₂ (and about two-thirds of the total GHG impact, taking into account other GHGs);
- b) air transport accounts for an estimated 60 per cent of the *international* travel and tourism contribution of CO₂, and is overwhelmingly dominant for medium- and long-haul trips.

A “business as usual” forecast for travel and tourism for 2035 is for an increase over 2005 of 160 per cent in CO₂, with the share of air transport emissions rising from 40 to just over 50 per cent (and to over 80 per cent of the total GHG impact).

1.5 The *Davos Declaration*, adopted by the global *Conference on Climate Change and Tourism* in October 2007³, specifies that “the tourism sector must rapidly respond to climate change, within the evolving UN framework, and progressively reduce its GHG contribution if it is to grow in a sustainable manner; this will require action to:

- mitigate its GHG emissions, derived especially from transport and accommodation activities;

¹ Tourism is defined by the United Nations as “the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited”. Its economic contribution is assessed *inter alia* through application of a *Tourism Satellite Account* in national accounting.

² Source: UNWTO-UNEP-WMO, *Climate Change and Tourism: Responding to Global Challenges*, June 2008. This figure, along with those quoted from the same source in paragraph 1.4, has been reconciled with the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Aviation and the Global Atmosphere* in 1999 and *Fourth Assessment Report* in 2007. The contributions to GHG emissions quoted are based on transport plus accommodation and activities at destination, whether for business or for leisure travel.

³ Convened by UNWTO jointly with the United Nations Environment Programme and the World Meteorological Organization, with the support of the World Economic Forum and the Swiss Government. In addition to a preliminary version of the UNWTO-WMO-UNEP study referred to in Footnote 2 above, the Conference had access to a UNWTO Discussion Paper on *Tourism, Air Transport and Climate Change* issued in September 2007; that Paper, available at <http://www.unwto.org/climate/support/en/support.php>, includes material which serves as background to the present Paper, notably regarding climate change mitigation measures for air transport including technology and operational practices, use of alternative modes of transport and communication, operating restrictions, levies, emissions trading and carbon offset.

- adapt tourism businesses and destinations to changing climate conditions;
- apply existing and new technology to improve energy efficiency; and
- secure financial resources to help poor regions and countries”.

The Davos Declaration calls for a range of actions, including for governments and international organizations to “collaborate in international strategies in the transport (in cooperation with the International Civil Aviation Organization and other aviation organizations), accommodation and related tourism activities”.

1.6 The General Assembly of UNWTO in November 2007 endorsed a framework for implementation of the Davos Declaration within the broader framework of the UN Millennium Development Goals. Following presentation to the United Nations Framework Convention on Climate Change (UNFCCC) meeting of the Conference of the Parties in Bali the following month, implementation is being vigorously pursued, consistent with the *Bali Road Map* and *Bali Action Plan*. Given the critical importance of air transport to tourism and its related contribution to GHG emissions, this has included specific attention to and analysis of air transport aspects, in liaison with ICAO where permissible, leading to the outline and conclusions suggested in this Discussion Paper for moving forward.

1.7 Tourism demand has slowed significantly over the past eighteen months as a consequence of the slumping global economy, but tourism is a highly resilient sector, and one that is a potential driver of economic resurgence. In advancing a *Roadmap for Recovery* for the sector, UNWTO is propounding measures around this resilience, along with stimulus and the move towards the green economy to be taken coherently with long-term commitments to development, and to both poverty and climate change alleviation. If short-term crisis response is aligned with the long-term issues the overall industry structure will be strengthened. As far as air transport is concerned, while the climate change challenge is independent of the investment cycle, the incentive to reduce GHG emissions will remain throughout and beyond the economic downturn because the emissions are directly linked with fuel consumption, fuel is a major contributor to air carrier costs, and current fuel sources raise concerns regarding security of supply.

2. GLOBAL MITIGATION NEEDS

2.1 Over the last four decades aircraft fuel efficiency – and consequently environmental performance – has improved significantly. But since 1990, the Kyoto Protocol base year from which industrialized countries have been working towards targets of GHG reduction, air transport’s CO₂ emissions have risen substantially as a result of traffic growth, both domestically and particularly internationally. Despite ongoing improvements in technology, operations and infrastructure, growth in air traffic is likely to continue to exceed improvements in GHG emissions for the foreseeable future (*inter alia* because of the long service life of aircraft and the time-frame needed to put innovative concepts, such as next-generation biofuels, into widespread practice⁴). In its comprehensive *Special Report on Aviation and the Global Atmosphere* in 1999, the Intergovernmental Panel on Climate Change estimated a long-

⁴ While research and testing of sustainable aviation biofuels (based on full life cycle assessment) has been impressive and encouraging in the past couple of years, the industry’s best estimate at present is for an additional CO₂ saving of 3 per cent by 2020. IATA has a goal of commercial air carriers using 10 per cent alternative fuels by 2017 and assumes a 6 per cent mix of second generation biofuels by 2020 (these biofuels are anticipated to reduce GHGs by some 80 per cent compared with carbon-based fuel based on full life cycle assessment); IATA speculates that beyond 2050 biofuels could drive aviation emissions well below today’s levels.

term net increase in aviation's global GHG emissions of about 3.5 per cent per annum. Recent studies⁵ suggest that this figure may have been attenuated slightly by developments in the past few years.

3. GLOBAL MITIGATION GOVERNANCE

3.1 The International Civil Aviation Organization (ICAO), a sister agency of UNWTO in the United Nations system, has long been involved in environmental protection from civil aviation and has been addressing climate change aspects since 1997 under the Kyoto Protocol. International aviation emissions are excluded from the Kyoto targets. However, under Article 2, paragraph 2 of the Protocol, Annex I Parties (industrialized countries) are committed to pursue limitation or reduction of GHGs from international aviation, working through ICAO. In pursuing its mandate ICAO has placed emphasis on airframe and engine technology, air traffic management and operational approaches, the latter leading to some shortening of air routes and improved traffic flow. Recognizing that technological and operational advances will prove inadequate on their own to counter the impact of continuing growth of air traffic, ICAO has also addressed economic instruments such as taxes, charges and emissions trading. However, ICAO has not been able to reach agreement on these market-based measures, despite intensive examination over a number of years.

3.2 In the meantime, States in various regions are developing economic instruments to mitigate GHG emissions generally, through "cap-and-trade" Emissions Trading Schemes (ETS), carbon taxes, etc. A European-wide ETS has been in effect since 2005, and from 2012 will encompass air carrier operations to, from and within Europe (by both European and other air carriers); several national or regional ETS are in evolution or mooted in North America and Asia/Pacific. The United Kingdom has imposed an Air Passenger Duty, ostensibly for environmental reasons, since 1994. A number of other States around the world are considering or proposing various types of levy on air transport with a view to mitigation of emissions.

3.3 The prospect of a potentially duplicative and conflicting patchwork of taxes, duties and ETS, including some elements without demonstrated environmental benefit, is of considerable concern. In addition to the direct economic impact on air transport, this may lead to discrimination⁶. Also, in the absence of a global solution, traffic flow may be diverted to or via less costly carbon-levied points - such "carbon leakage" distortions are environmentally unhelpful. Concerns regarding fragmentation have recently led some airline groups and others to look beyond ICAO towards integration of international aviation emissions, at a sectoral level, into a post-Kyoto agreement to be reached by the UNFCCC at its annual Conference of the Parties meeting in Copenhagen in December 2009 (COP/15).

3.4 In parallel to the work of ICAO, the International Air Transport Association (IATA) has pursued a policy based on a four pillar strategy of technology, operations, infrastructure and economic instruments (the latter conditioned upon their perceived cost-effective environmental benefit to society as

⁵ For example, *CONSAVE 2050 – Constrained Scenarios on Aviation and Emissions* (funded by the European Commission, available through <http://www.dlr.de/consave>) in 2006 generated a number of scenarios for aviation emissions showing average growth 2000-2050 in CO₂ between 0.6 per cent and 3.0 per cent annually; the World Economic Forum *Travel and Tourism Climate Change Report* in May 2009 estimated an annual growth rate in air transport CO₂ emissions of 2.7 per cent per year between 2005 and 2035.

⁶ For example, the European ETS relates to flights to European territory from the last non-European airport en route; thus a Hong Kong-London flight would be assessed for the whole route, while a Hong Kong-Dubai-London flight would be assessed only for the Dubai-London segment. This could be considered as discriminatory if the bulk of the passengers arriving in European territory on the Hong Kong-Dubai-London routing originate in Hong Kong and not Dubai. On the other hand very long-haul sectors use more fuel per kilometre than intermediate haul because of the fuel uplift (for example, an aircraft actually uses less fuel per kilometre for a 15 000 kilometre flight if it takes it in three 5 000 kilometre stages rather than non-stop).

a whole). IATA is calling for an approach under which aviation's emissions would be capped and accounted for globally, not by States. The primary focus of this global approach would be on international aviation but any proposals would be adaptable to include domestic aviation through an opt-in system for States. Aviation emissions would be treated as an indivisible sector total and not apportioned to individual States, although the concept might be crafted specific to the various types of aviation markets, where the same requirements apply to all operators competing in the same market, but different requirements apply to different markets. Recognizing that it may be somewhat speculative to assume today that technology, operations and infrastructure will produce the necessary mid- to long-term improvements in fuel efficiency, IATA has a goal of carbon-neutral growth from 2020, assuming the purchase of carbon credits as may be required (these would, of course, become scarcer and more expensive as time goes on).

3.5 The Association of European Airlines (AEA, which feels its carriers will bear the brunt of the application of the European ETS to airlines, and hence potential disadvantage) has also called for a global sectoral approach. Under the AEA proposal countries would be grouped into three "Blocs" according to the maturity of their aviation markets (a number of criteria being put forward to determine the level of maturity). There would be differentiated target setting for the three "Blocs", but equal treatment of all air carriers operating within the same Bloc. For "Bloc A" there would be a fixed emissions reduction target for carbon neutral growth, namely stabilization of aviation emissions at 2005 levels by 2020. For "Bloc B" there would be a relative target of energy intensity, namely fuel efficiency. For "Bloc C" there would be neither absolute nor relative targets but an obligation to monitor, report and verify operators' emissions. For traffic between two Blocs there would be application of the lower target to all carriers, regardless of nationality.

3.6 A specially formed "Aviation Global Deal Group" (AGD Group: Air France-KLM, BAA, British Airways, Cathay Pacific, Finnair, Qatar Airways, Virgin Atlantic, Virgin Blue and The Climate Group) is another entity calling for a global sectoral approach. There would be global emissions reduction targets (with indicative scenarios ranging from 0 to 20 per cent by 2020 and 50 to 80 per cent by 2050, compared with 2005). The aviation sector would be integrated within the overall climate framework with open access to global carbon markets from 2012, with a UN body administering the system. Individual carriers would be given, and/or would purchase through auction, allowances (as in the case of the European ETS) and would surrender these in proportion to the annual carbon content of their annual fuel purchases. Revenues generated from the auctioning of allowances would be used for climate change initiatives in developing countries. Like IATA, the AGD Group suggests that, should they so wish, countries could choose to transfer their domestic aviation emission allowances into the international inventory.

3.7 The group of Least Developed Countries in the UNFCCC has taken a different (or complementary) tack in proposing an *International Air Passenger Adaptation Levy*. Collection would be universal, by airlines at the point of ticket sale, and all revenues, except for administrative costs incurred by the airlines, would be directed to the Adaptation Fund for developing countries set up by the Kyoto Protocol.

3.8 A number of other bodies have made contributions to the evolution of global policy regarding reduction of GHG emissions from international aviation. A group of aviation environmental NGOs – under the umbrella of the International Council for Sustainable Aviation, ICSA – is calling for a reduction in bunker GHG emissions (that is from international aviation and international shipping) of at least 40 per cent below 1990 levels by 2020 and at least 80 per cent below 1990 levels by 2050. Aviation and shipping would have access to the global carbon markets, but the right to buy permits from outside the sector(s) would be conditional on a given quantity of reductions having been achieved within the sector(s). There would be exemptions for routes to and from least developed countries that altogether do

not exceed 2 per cent of the relevant emissions, and differentiated allocation of revenues amongst countries.

3.9 There is a plethora of studies by other bodies regarding the reduction of GHGs which give specific treatment to aviation. Those by the World Economic Forum, the World Travel and Tourism Council as well as the World Tourism Organization are of particular interest because, in addition to considering the transport sector as a ‘cluster’, they treat travel and tourism in an integrated manner, illustrating the symbiosis between the two sectors and the need for each to be reflected in policy regarding the other.

3.10 Whatever the outcome of the Copenhagen meeting, market-based emissions mitigation measures affecting aviation are likely to come into play for an increasing number of countries. The aviation sector is opposed to some of such measures on grounds of unfounded cost-environmental benefit but has accepted that international aviation might be included in well-designed ETS, preferably globally agreed. With the application of emissions trading, aviation would not be singled out for special treatment but would nevertheless be able to continue to grow without an overly punitive impact. A likely scenario is for the various regional and local ETS to develop reciprocal linkages which would at some point include aviation in a non-duplicative and non-market distorting manner. However, given that ETS schemes vary in their details, often disguising significant differences in effective carbon prices between schemes and sectors, this is likely to be somewhat unsatisfactory. At the same time, a global ETS covering multiple sectors is an unlikely prospect and ICAO has decided not to proceed to develop a global ETS for the aviation sector; ICAO calls for States not to implement ETS on other States’ aircraft operators except on the basis of mutual agreement with those States⁷. ICAO’s decision in practice reflects the fact that economic instruments can have needs and consequences reaching well beyond air transport and need to be addressed in partnership by all the international governmental parties directly concerned, and in close consultation with the private sector and NGOs.

3.11 Including aviation under a post-Kyoto umbrella should help to ensure consistency in approach, although there is no guarantee that this would be the case since ETS (and other economic instruments) can evolve outside as well as under such an umbrella. Ultimately, air transport will have to cover not only the costs for the use of infrastructure, but also ones for the environmental impact, the question being how this concept is introduced. In this regard, a global solution would be an optimal approach from the start and would be much easier than linking regional or national schemes when that becomes necessary at some point in the future.

3.12 Whatever policy approach is ultimately adopted, it should be based on effective performance monitoring, appropriate indicators, targets, reporting methods and auditing processes. Furthermore, aviation and climate policy should be integrated to the extent possible with other policies, including transport, tourism, trade, energy, technology (innovation) and broader environmental policies.

4. REGULATORY FRAMEWORK UNDER A POST-KYOTO AGREEMENT

4.1 Under the Kyoto Protocol GHG reduction targets apply only to industrialized countries and only to their emissions from domestic aviation. Thus only emissions from some 22 per cent of world air transport (in terms of revenue tonne-kilometres) are covered by Kyoto targets – further reduced to less

⁷ 42 European States placed a reservation on this decision at the ICAO Assembly Session in 2007.

than 5 per cent in practice since the Protocol was not ratified by the United States. Inclusion of international aviation for industrialized countries would raise the 22% to 64%.

4.2 The particular treatment of international aviation in the Kyoto Protocol produces substantial constraints, particularly as far as market-based measures are concerned, because:

- a) ICAO's geographic and policy ambit reflects its membership of 190 States, well beyond the 39 ratifying Annex I countries;
- b) there are significant barriers to applying a Kyoto Annex I/non-Annex I industrialized/other country type concept in relation to equality of treatment and certain other provisions in aviation's Chicago Convention (notably Articles 11 and 15);
- c) international aviation is unable to benefit from application of the Kyoto provisions regarding Joint Implementation (JI, Article 6), the Clean Development Mechanism (CDM, Article 12) and Emissions Trading (ET, Article 17).

Furthermore, the exclusion of targets for aviation has enabled substantial public protest against air transport growth, particularly as international aviation is exempt from taxes on fuel⁸ or, generally, Value Added Tax.

4.3 A post-Kyoto agreement, as with the Kyoto Protocol, is likely to be premised upon the UNFCCC principle of Common But Differentiated Responsibilities (CBDR) according to the level of economic development of different groups of countries. In this context, various forms of differentiation applicable to aviation could be envisaged, for example some differentiated targets and certain exemptions, along with transitional arrangements and incentives for one or more groups of developing countries.

4.4 CBDR provides a gateway for such features of Kyoto as the CDM and ET, and should therefore be of substantial benefit to both aviation and tourism. There is not only no real reason why international aviation should continue to be an exception to general CBDR-type provisions, but also their application should actually be to the advantage of the sector. If aviation is given access to CDM and ET, then the establishment of targets applicable to the sector may be more tolerable for stakeholders in the sector and should help in mollifying public opinion in opposition to development.

4.5 If there is to be a truly global regime for aviation there is therefore in all probability a need: (i) to modify Article 2, paragraph 2 of Kyoto or include some form of specific "operational linkage" cross-referencing in Articles 6, 12 and 17, and have it apply to all UNFCCC Parties; (ii) to remove the particular treatment provided by Article 2, paragraph 2; or (iii) to mandate some form of sectoral treatment.

4.6 Other reasons for bringing aviation directly within the ambit of a post-Kyoto agreement include:

- a) the strong symbiotic relationship air transport has with tourism and trade, which predicates that it should not be treated in isolation; and

⁸ ICAO has since 1951 issued guidance material promoting exemption of aviation fuel from taxation on a reciprocal basis and this concept has been included in the vast majority of the air services agreements which regulate international air transport (no less than 98 per cent of the more than 2 200 bilateral agreements filed with ICAO). Thus, except within regions such as Europe where there is a multinational body (the EU) with the authority to supplant air services agreements between individual States, agreement on taxation of aviation fuel for international operations has proved intractable to date.

- b) the rationale for air transport operations to be treated analogously with alternative transport modes, in order to minimize price, tax, “polluter pays” or other discrimination in favour or against any particular mode, notably from the perspective of consumers in assessing their travel options.

4.7 There are some fundamental issues which need to be addressed if a global framework for mitigation of GHGs from aviation is to be achieved:

- A) the scope of greenhouse gases to be encompassed;
- B) the modalities of ‘sectoral treatment’;
- C) application of CBDR;
- D) earmarking of revenues from levies, emissions trading, etc; and
- E) governance.

A – Scope of greenhouse gases to be encompassed

4.8 Whilst the scientific challenge refers to GHGs, climate change policies are currently focused on CO₂. The European ETS and the industry proposals all relate to one primary GHG only, namely CO₂, while the UNFCCC encompasses several GHGs.

4.9 Current scientific evidence suggests that aviation’s non-CO₂ effects in relation to basic CO₂ effects are well above the average multiplier or ratio for all man-made emissions. There are also differences in the relative impact of individual non-CO₂ GHGs between aviation and man-made emissions at large (and, in the case of aviation, there are GHGs not covered by the Kyoto Protocol which ultimately may prove more significant than some included in the Protocol, for example contrail-induced cirrus). The non-CO₂ impact for aviation might be addressed by integration into CO₂-based policy frameworks through conversion to CO₂ equivalents or by the use of a multiplier to gross up the CO₂ impact to cover both CO₂ and non-CO₂ effects. However, at present there remain difficulties in assessing accurately the non-CO₂ climate impacts from aviation at high altitude. Thus aviation may warrant transitional arrangements from initial inclusion of CO₂ only to coverage of climate impacts of all aviation emissions once there is a clear scientific basis for this.

B – Sectoral treatment

4.10 Sectoral treatment is available under UNFCCC provisions. Air transport’s GHG emissions are in total comparable to those of countries such as Australia or France in the case of international emissions and to Canada or the United Kingdom in the case of domestic plus international. Hence, if aviation, a high-tech industry, were to ‘be treated as a country’ it would be equivalent to an Annex I Party. However, treatment as an indivisible Annex I Party would clearly contravene the principle of CBDR. Hence differentiation would still be required, which would need to be allied with one or perhaps several global targets for the sector. Also, unless refined, a global sectoral target might be considered discriminatory in that it would not distinguish between a carrier operating predominantly short-haul (lower absolute emissions, higher per-kilometre emissions) and one operating predominantly long-haul (higher absolute emissions, lower per-kilometre emissions).

C – Application of Common But Differentiated Responsibilities

4.11 In the case of international aviation application of CBDR requires reconciliation of the divergence between CBDR and principles in aviation's Chicago Convention of non-discrimination amongst operators. It should also avoid air transport and tourism market distortion, and minimize carbon leakage through rerouting of air services.

4.12 The traditional application of CBDR in the UNFCCC has been to establish different requirements for different countries (notably between Annex I and non-Annex I countries). However, the Convention does not preclude alternative forms of differentiation in future agreements.

4.13 Discussion of CBDR in the aviation context has tended to be in terms of application to air carriers in the first instance. However, it would be difficult to apply an exemption or preferential treatment directly to an air carrier *per se*, not only because that would clash with the Chicago Convention's equal applicability provisions but also because it would offer loopholes and potential carbon leakage.

4.14 The sectoral approach as propounded by the AGD Group is predicated on such one alternative interpretation of the application of CBDR, namely that all airlines would be subject to the basic provisions, but that a preferential share of revenues would be allocated to developing countries.

4.15 The AEA proposal (and perhaps the evolving IATA position) accommodates CBDR given the differentiated target setting for different "Blocs".

4.16 Another approach would be application of CBDR to air routes, with the routes classified according to the countries involved irrespective of carrier, and carriers consequently impacted to the extent they fly on specific routes.

4.17 The country classification would ideally be the generically applicable classification to be developed by the UNFCCC, for example, (i) industrialized (current Annex I); (ii) emerging; and (iii) developing⁹. Routes would be classified correspondingly according to the countries that they touch, with flights between countries in different groups falling under the "lower common denominator" in terms of target setting (for example, a flight between an Annex I country and a developing country would be classified according to the latter). Differing targets (absolute or intensity-based) and/or exemptions would apply according to classification.

4.18 The **Appendix** to this paper elaborates on one possible way of carrying this air route classification concept forward, a way which could be adapted for either the sectoral approach or the traditional one (with allocation of GHGs from air transport to individual States).

4.19 Whatever form of CBDR is finally adopted, it will need to be linked to open access for air transport to global carbon markets such as Kyoto's Clean Development Mechanism and Emissions Trading, to be counted as compliance against any target for the sector.

D – Earmarking of revenues

4.20 The use of revenues earned from levies and auctioning or trading of emissions permits for aviation should be directed to greenhouse gas (GHG) mitigation activities yielding measurable, reportable and verifiable mitigation results. Two issues are: (i) the extent to which such revenues should, consistent

⁹ With a view to the longer term a further refinement might be to divide the third group between: a) developing countries generally; and b) developing island and least developed countries.

with the principle of CBDR, be directed towards projects in developing countries; and (ii) the extent to which they should be kept within the sector.

4.21 The Adaptation Levy proposal from the Least Developed Countries clearly meets the principle of CBDR. It does raise a question, which arises with the United Kingdom's Air Passenger Duty as well, of coverage of freight as well as passengers. Of some interest in this context is the concept being developed in the shipping world of an International Emission Reduction Scheme, whereby ships would be charged for their emissions based on where they unload their cargo, with exemptions in developing countries.

4.22 Proposals for concerted multi-country levies on international passengers or flights in the past, for example as a source of funding for UN peacekeeping operations, have not met with widespread success through lack of broad political will, lack of demonstrated cost-relatedness or benefit, competitive and legal issues. A French initiative for a tax on airline tickets to finance the global fund to combat Aids, tuberculosis and malaria has achieved significant income but, not being mandatory, is applied by relatively few countries.

4.23 Exemption of aviation fuel from taxation is built into the vast majority of the air services agreements which regulate international air transport. Other taxes on aviation, such as the French scheme and the proposed Adaptation Levy, are discouraged by (non-binding) ICAO recommendations but are not usually legally proscribed through provisions in air services agreements.

4.24 As for sectoral earmarking, the position of the air transport industry generally is not only that revenues raised from, for example, levies or auction of carbon allowances be channeled entirely into climate change mitigation projects, but that these projects should be kept within the sector. Other bodies have taken a broader view of what defines the target, for example travel and tourism, travel and business, and greening the economy as a whole. In this regard, it will be important to look at the pros and cons of a sectoral agreement for aviation in the context of broader revenue-generating schemes such as a World Climate Fund recently proposed in the UNFCCC by Mexico¹⁰. Ultimately, the goal should be to determine the most cost-effective way of reducing GHG emissions irrespective of sector, while at the same time maintaining an incentive for improvement in every sector.

4.25 Finally, an air carrier should only pay once for its emissions from either international or domestic aviation. Thus a global scheme for aviation would require adjustments in the European ETS and possibly some reconsideration of application of national policy regarding levies on aviation.

E – Governance

4.26 The issue of administration and enforcement of a global sectoral approach is another key question. Fundamental will be effective performance monitoring, appropriate indicators, targets, reporting methods and auditing processes. It is States that are ultimately Members of the UNFCCC (and of ICAO) and it is difficult to conceive of what action might be taken against a target-failing or miscreant aviation sector unless air carriers are individually identified and linked back with the State of their principal place of business – something which would become a necessity if the option of including domestic aviation were to be taken.

4.27 The AGD Group has proposed a central UN body, either existing or new, to administer the system, allocating emissions allowances directly to individual airlines through both auctioning and

¹⁰ Under this proposal, contributions would be made by States, determined by criteria such as GHG emissions, population and GDP; the concept has been publicly supported by many States and was endorsed at the recent G8 meeting.

free allocation. IATA has stated that the body chosen to administer a sectoral approach for aviation should be one that can most efficiently and cost-effectively undertake that administration and if this were not to be ICAO, then ICAO must still have a supervisory or other appropriate role.

4.28 The legal authority of ICAO decisions is limited though, deriving from their moral or political value in expressing a collective view of States (only ratification of the Chicago Convention leads to a treaty obligation). However, one possibility offered by use of the ICAO medium is the prospect of public global auditing, with individual States potentially applying sanctions in the case of non-compliance, as is the case with aviation safety and security.

4.29 The precise mechanism for moving forward on reducing aviation emissions will be determined by COP/15 but there is clearly a need for a more collegial approach to both mitigation and adaptation of climate change in travel and tourism under the UNFCCC umbrella, particularly on economic instruments, firstly amongst the UN family (notably ICAO, IMO, UNEP, UNWTO and WMO) and secondly with the private sector and NGOs.

5. CONCLUSIONS

5.1 Tourism context

- a) tourism – business and leisure travel – is an economic catalyst and can be a primary vehicle for poverty alleviation, *inter alia* meriting priority in economic stimulus packaging;
- b) tourism is both a vector and a victim of climate change;
- c) through the Davos Declaration and follow-up in the UNFCCC, the tourism community has recognized its responsibility to mitigate GHG emissions and to take action accordingly;
- d) the UNFCCC principle of Common But Differentiated Responsibilities (CBDR) is acknowledged in that some differential targets, exemptions, transitional arrangements and incentives for one or more groups of developing countries and island States are likely to be fundamental to any post-Kyoto agreement;
- e) air transport is the dominant and rising constituent of GHG emissions from international travel and tourism, particularly for medium- and long-haul trips;
- f) international air transport has a strong symbiotic relationship with international tourism and should not be treated in isolation; and
- g) air transport operations should be treated analogously with other transport modes

5.2 Air transport specifics

- a) the economic regulation and the environmental regulation of air transport should preferably be considered in conjunction (for example, as well as offering more balanced policy, a more liberalized market would allow more efficient choices and operations);

- b) consistent with broader UNWTO commitments, measures taken to reduce air transport emissions need to reflect coherence with strategies to reduce emissions in tourism destinations, to reduce poverty and to promote development in the world's poorest countries, fostering implementation of the Millennium Development Goals;
- c) the principle of CBDR should apply to aviation, which under a post-Kyoto agreement should have full access, on a par with other sectors, to global carbon markets including some form of Joint Implementation, a Clean Development Mechanism and Emissions Trading, to be counted as compliance against any target for the sector;
- d) in a post-Kyoto framework there is therefore a need to reconcile the divergence between principles in aviation's Chicago Convention of non-discrimination amongst operators and those in the present Kyoto Protocol of differentiated responsibilities amongst countries;
- e) economic instruments for the mitigation of aviation emissions should:
 - minimize carbon leakage through rerouting of air services;
 - minimize both air transport and tourism market distortion;
 - encourage liberalization, while providing safeguards and promoting support for the UNWTO/ICAO concept of *Essential Service and Tourism Development Routes* (see Appendix);
 - minimize any negative impact on (or preferably provide incentives for) developing countries;
 - provide preferential measures for least developed countries
- f) air transport may warrant transitional arrangements from initial inclusion of CO₂ only to coverage of climate impacts of all aviation emissions, due to current uncertainty regarding the impact of non-CO₂ aviation emissions at high altitude;
- g) some specified portion of revenues from levies and trading of emissions permits should be allotted to related aviation and tourism GHG mitigation activities, and there should be financial and other incentives for the earliest possible global introduction of sustainable aviation biofuels; and
- h) there is a need to find a way of enabling aviation, on a non-duplicative and equitable basis, to be encompassed in existing or proposed Emissions Trading Schemes (consistent with the more general need for linkage between schemes and the avoidance of double counting).

5.3

Mechanisms

- a) there should be continued recognition of the key role of ICAO and full support for its extensive activities in the fields of airframe and engine technology, air traffic management and operational approaches leading to tighter standards on aircraft emissions and improved operating procedures;

- b) the parallel IATA strategy should be endorsed;
- c) economic instruments for mitigation of aviation GHG emissions can have needs and consequences reaching well beyond air transport and ought to be addressed in partnership by all the international governmental parties directly concerned, and in close consultation with the private sector and NGOs; and
- d) there is a need for an open, collegial forum for the development of any sectoral or other follow-up agreement to COP/15 specific to aviation, including address of economic instruments in partnership by all intergovernmental parties representing directly affected sectors (and notably the UN bodies: ICAO, IMO, UNEP, UNWTO and WMO), in close consultation with NGOs and both public and private enterprise.

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The Discussion Paper, while prepared for UNWTO, does not necessarily represent the views of UNWTO, nor does it imply endorsement from any of the organizations mentioned above.

Comments from any source continue to be welcome. Communications should be addressed in the first instance to Chris Lyle, Representative of UNWTO to ICAO, in Montréal, clyle@airtransporteconomics.ca, tel: +1 514 484 8632.

APPENDIX

A POSSIBLE AIR ROUTE CLASSIFICATION *MODUS OPERANDI* IN A POST-KYOTO FRAMEWORK

1. SETTING AND CONSOLIDATING TARGETS

1.1 As regards elaboration of targets, for example: (i) routes touching only Annex I territory might be subject to an absolute (emissions reduction) target; (ii) routes touching only emerging country territory subject to an intensity (fuel efficiency) target; (iii) routes touching only developing countries would be exempt (but subject to reporting); and (iv) routes between Annex I or emerging country territory and developing country territory would also be exempt (an example of the “lower common denominator”). This concept would still need to be carefully fenced to avoid “carbon leakage” (for example, multiple stage flights might need to be considered throughout according to the origin and destination of the flight, to avoid a flight between other countries taking in a developing country and qualifying for an exemption for the entire flight¹¹) but appears to be feasible. Any residual fuel bunkering effect should by definition benefit developing countries by adding air capacity to their territories.

1.2 The assessable GHG emissions according to classification would be accrued by each carrier operating the routes concerned and either applied to global sectoral targets for aviation¹² or included in national inventories according to the principal place of business of the carrier. The latter option would provide greater national flexibility and control in planning for GHG emissions reduction and inter alia would reduce or even eliminate the problem of needing to distinguish between international and domestic emissions; however, it has the potential to result in differentiated treatment between carriers operating on the same routes depending on their principal place of business.

1.3 Since air carriers from developing countries tend to fly almost entirely to, from and within such countries, they would accrue little if any assessable GHG emissions. In fact there are potentially a number of advantages of such an approach in terms of benefits for poorer countries. Not only would some CDM/ET projects and trading revenues be earmarked for support of GHG reduction projects in these countries, but additional incentives for participation by developing countries might include financial support to safeguard/promote international tourism routes to and from these countries.

1.4 In the latter regard, at the instigation of UNWTO a study has been carried out jointly by the ICAO and UNWTO Secretariats on *Essential Service and Tourism Development Routes* (ESTDR). This important safeguard takes existing concepts such as Essential Air Services in the United States, Remote Air Services in Australia, and Public Service Obligations in the European Union, and applies them to routes to and from the Least Developed Countries. The joint study showed that the approach is viable and provided guidance as to its implementation. Provision supporting its application should be made in applicable schemes aimed at the reduction of GHGs from aviation¹³.

¹¹ A further criterion might be that a carrier exercising traffic rights beyond third/fourth freedom would have the sectors assessed according to the classification for each sector (for example, a flight Glasgow-London-Amsterdam-Cairo would be entirely exempted if the only traffic rights available and exercised relate to Cairo, but would lose the exemption for Glasgow-London and/or London-Amsterdam if traffic rights are exercised between Glasgow and London, Glasgow and Amsterdam or London and Amsterdam). While this would add another wrinkle to the assessment mechanism and may produce some (albeit minimal) distortion, the information is readily available and infrequently changing, and a methodology based on aircraft operations is preferable to having to identify volumes, origin and destination of passengers or freight carried.

¹² Non-assessable GHG emissions would simply be recorded for analytical purposes pending future consideration.

¹³ A current version of ESTDR material may be found at <http://www.icao.int/icao/en/atb/epm/Ecp/EssentialRouteScheme.htm>.

2. OBTAINING ADEQUATE DATA

2.1 The primary reason that aviation bunker fuels were given particular treatment in the Kyoto Protocol was that allocation of the emissions to countries was considered too difficult. While the practical issue of deciding which State is responsible for which aviation emissions remains, the availability of data and of tools to carry out the allocation is now much improved. The aviation sector is particularly well blessed with traffic and operational data including passenger and freight flows by flight and by true origin and destination, the specific aircraft and routing used, average distance and hours flown. The European Commission, after intensive work, has already established a comprehensive reporting process in connection with application to air carriers of the European Emissions Trading Scheme. ICAO has been considering the addition of fuel consumption to its own statistical data collection to meet UNFCCC reporting needs but has, at least in the first instance, decided that this would be difficult given that ICAO reporting is generally by air carriers and UNFCCC by country of departure. ICAO is therefore simply proposing at this time to meet only internal needs by undertaking a generic fuel consumption statistical collection (which would have no regional or route breakdown).

2.2 Pending further consideration regarding ICAO's statistical collection, UNFCCC may therefore rely on data such as those available for Europe and some other States and/or fuel consumption estimates derived separately by ICAO's Committee on Aviation Environmental Protection from numerical models¹⁴. Data input for such models is readily accessible from ICAO and several other sources, derived from the flight characteristics of the air carrier over the flight stage (or possibly from a development of ICAO's Carbon Emissions Calculator, which has been designed to allow passengers to estimate the emissions attributed to their air travel). Translation of operational data into fuel consumption data and hence GHG emissions using established methodology is believed to produce sufficiently accurate results. There are numerous complementary and supplementary data sources for the "hybrid" data and modelling approach, including for example MIDT (Marketing and Information Data Tapes) from the Global Distribution Systems, which collect statistics for many routes, carriers and aircraft flown. Procedures could be set up whereby modelled estimates may be pre-empted by air carriers willing and able to provide their own verified fuel consumption figures for each route concerned.

3. STRUCTURAL AND PROCEDURAL CONTEXT

3.1 Such a structure as that described above, while necessarily multifaceted to address a multifaceted issue, should once in place be relatively straightforward to apply and it should be robust, verifiable and enforceable. Also importantly, it should minimize market distortion while enabling transition in parallel with the evolution of an economic regulatory framework (for example regarding ownership and control of air carriers beyond national or regional borders and consequent relocation of principal place of business).

3.2 No country would of course be required to develop its own national or regional form of Emissions Trading or other economic instrument applying to air transport. For example, the United States has recently accepted the concept of (self-imposed) targets, claims that these could be achieved using technical and operational measures alone, and sees no need for economic measures for international aviation (US domestic aviation has been subject to a fuel tax for some time).

— END —

¹⁴ Such as PAGODA (from EUROCONTROL), PIANO (UK software company Lissys), and SAGE (United States Federal Aviation Administration).