



GROUP ON INTERNATIONAL AVIATION AND CLIMATE CHANGE (GIACC)

THIRD MEETING

Montréal, 17 to 19 February 2009

Agenda Item 3: Planning of actions and policy elements to be developed by the Group

REPORT OF WORKING GROUP 2

(Presented by the Chair of Working Group 2)

1. BACKGROUND

1.1 At the second GIACC meeting three Working Groups were established to examine the key elements of the proposed ICAO Programme of Action. Working Group 2 was charged with identifying a list of measures which can be implemented to address the climate change impact of international civil aviation.

1.2 Mr Raymond Cron (Switzerland) was the Chair of Working Group 2 until his resignation from the position on 1 November 2008. Mr John Doherty has been the Chair since that time.

1.3 Other members on the Working Group include representatives from Canada, India, South Africa, United Kingdom and the United States, with Brazil also contributing.

2. MEETINGS

2.1 Working Group 2 held one face-to-face meeting in Geneva on 30 and 31 October 2008 and four teleconferences on 19 September 2008, 21 November 2008, 19 December 2008 and 13 January 2008.

3. DELIVERABLES

3.1 The Terms of Reference for Working Group 2 required the group to “produce a report with the list of measures including definitions and with initial examples of implementation. Examples should be completed and information should be provided on the possible emissions reductions which can be achieved by each of these measures.”

3.2 The Report of Working Group 2 on its work so far is at Attachment A. The Report includes a Table of Potential Measures where measures are listed in the following categories:

1. Aircraft-related technology development
2. Improved air traffic management and infrastructure use
3. More efficient operations
4. Economic / market-based measures
5. Regulatory measures / other

3.3 The Report has been prepared on the basis that the table would provide a menu of available measures and some guidance about their potential impact, cost and timing. The report recognises that the circumstances will vary across the various ICAO States, and that the particular mix of measures that might be adopted in each state will vary. The report proceeds on the basis that each State would choose the set or measures that it would implement in pursuing its contribution to the goals agreed by ICAO for addressing emissions from international civil aviation. The report includes a number of suggestions for mechanisms to support implementation.

4. ISSUES

4.1 **Potential measures:** There were divergent views among members on the potential impact, cost and timeframe for many of the individual measures. The working group members tried to assess the impact, costs and timing in relation to the total (global) international aviation system across the life of the particular measure. In the absence of access to clear data, assessments varied. Rather than trying to pick a medium position on the differing views, the Report shows the ranges put forward by group members.

4.2 **Industry input:** A copy of the blank template for the Table of Potential Measures in the Report (Chapter 3) was provided to key industry representative groups and their input invited. The industry response, provided through ATAG, was made available to members for consideration in their assessments. The details of measures listed in the industry report were not incorporated directly in the Working Group Report as it was considered that the table in the Working Group Report generally covers the measures identified in the industry report albeit not in as much detail or segmentation.

4.3 **Assistance to developing countries:** A very significant issue among members of the Working Group was the level of expectation of developing countries in relation to the implementation of measures. There were divergent views among members as to how the terms of the UNFCCC and the Kyoto Protocol should be translated to measures for international aviation. Other members highlighted the principle of non-discrimination which is central to the Chicago Convention and the operation of international civil aviation markets.

5. ACTION BY THE GIACC

5.1 The GIACC is invited to:

- a) consider the Report from Working Group 2 in developing the Programme of Action;
and
- b) note the issues discussed in paragraph 4 which may require further consideration by GIACC as a whole.

**MEASURES TO LIMIT OR REDUCE
EMISSIONS FROM
INTERNATIONAL AVIATION**

REPORT OF GIACC WORKING GROUP 2

14 January 2009

Report Outline

1. Introduction
2. Framework Principles
3. Table of Potential Measures
4. Assistance to Developing Countries
5. Implementation Framework
6. Evaluation Framework

Attachment A GIACC WG2 Terms of Reference

Working Group 2 Participation

Australia

Brazil

India

South Africa

Switzerland (UK from 1 November 2008)

United States

1 Introduction

The 36th Assembly requested Council to form the Group on International Aviation and Climate Change (GIACC) to develop an aggressive Programme of Action to address the impact of international civil aviation on climate change. In providing guidance on the formation of GIACC, the Assembly sought equitable participation of developing and developed countries in formulating a Programme of Action based on consensus and reflecting the shared vision and strong will of all Contracting States.

At the second meeting of GIACC held in July 2008 it was decided to set up three Working Groups to examine the key elements of the proposed ICAO Programme of Action. Working Group 2 was charged with identifying a list of measures which can be implemented to address the climate change impact of international civil aviation.

In accordance with the terms of reference for Working Group 2 (ATTACHMENT A), this report provides GIACC with information on measures and good practice examples which States can draw on to address the climate change impact of international civil aviation. The list of measures is intended to provide ICAO Contracting States with information on the possible action which they can take and the potential contribution which these measures may make to addressing climate change. The list is not prescriptive and the expectation is that each State will decide on the combination of measures it will adopt and the approach to implementation.

The report includes broad estimates provided by some contracting states on the relative gains in terms of emissions reductions which might be achieved through different measures and on the related costs to achieve these benefits. It also reports on broad timescales for implementation of particular measures and what, if any, mechanisms may facilitate implementation by States, including the possible role of ICAO. Importantly, consideration has been given to identifying mechanisms to assist developing countries with respect to international civil aviation and climate change.

Many of the measures listed in the report are already being implemented either as part of Contracting States' policies to address international civil aviation's impact on climate change or because they are being driven by commercial pressures to reduce fuel consumption and therefore emissions. On the other hand, some government interventions and programs have a high potential to generate 'additionality' – actions that would otherwise not have occurred. While it is important to recognise and quantify the results of industry actions to reduce emissions, GIACC may find it fruitful to focus particular attention on those measures where ICAO State member governments can make positive interventions.

It is important that strategies for managing international civil aviation's carbon footprint not simply be thought of as a matter of introducing measures which directly reduce emissions. Many Government initiatives which act indirectly can also lead to emissions reductions. The table includes initiatives related to areas such as enhancing awareness about climate change impacts of international civil aviation and putting in place a policy framework that encourages action by the civil aviation industry and/or individuals and builds public confidence that appropriate measures are being taken to constrain the net carbon footprint of the industry.

ICAO's strategy should be framed on approaches that are technologically feasible, environmentally effective and economically viable. We need to look for approaches that can have broad applicability and interoperability but are flexible enough to fit the individual needs of all Contracting States.

Concerns about international civil aviation's role in climate change are largely due to the projected continued growth in this sector. While improvements already implemented in technology and operating practices have improved fuel efficiency and reduced the growth rate of emissions, and while some argue that future improvements may achieve the required progress, others argue that additional measures may be necessary to address the growth of aviation emissions.

Measures to address emissions should take into account any potential implications for safety, which must not be compromised, and for aircraft noise. Measures aimed at one type of emission (for example, CO₂) or one emission related problem (for example, climate change) should take into account any potential implications for other types of emissions (for example, NO_x) or for other emission-related problems (for example, local air quality or noise). There is a benefit to all if measures to address emissions are developed on a harmonized worldwide basis, wherever possible.

In reviewing the potential measures identified in this report, it should be noted that ICAO has already identified and provided information on a range of measures. GIACC's approach should be to build on the existing work where possible and to suggest areas for refinement or further work that does not duplicate effort or undermine the valuable work that has already been done.

No consensus has been identified on a specific strategy for addressing emissions from international civil aviation. The approach reflected in this report is that States would decide on measures appropriate to their [market][industry], and on the manner and timing of implementation, in order to achieve the goals that are defined by ICAO following the conclusion of the GIACC process.

Unlike some other industries, international aviation does not fit neatly into a model where the developed world has the more advanced industry. In fact, some of the largest airlines with the most modern fleets are based in the developing world. Divergent views were expressed among members of the Working Group as to the extent to which international civil carriers based in developing countries should be expected to implement measures to address emissions. That said, it was recognised that there needs to be emphasis on assisting the developing world in addressing international civil aviation emissions. Suggestions included that developed States and ICAO should influence development assistance agencies to better prioritize assistance in development of more efficient air traffic and airport infrastructure and should provide training and technical assistance in managing environmental impacts. In addition, it was suggested that all States and ICAO should encourage international development banks and non-governmental organizations to focus efforts and resources on the measures identified.

In applying particular measures, States should be encouraged to seek to address any ICAO goal in a manner that achieves maximum environmental benefit at least cost. This ensures that the resources spent to address international civil aviation's climate change impact will maximize the benefit gained.

2 Framework Principles

There are a wide variety of measures that States might use to address the emissions from their international civil aviation sector. ICAO should encourage States to adopt a strategy for addressing these emissions that arises out of an agreed international framework. This would recognize that, while States ultimately are responsible for choosing the particular measures appropriate to their [market][industry], enhanced collaboration and effectiveness can arise from an internationally agreed framework for a global industry like international civil aviation.

In their application of particular measures, States should be encouraged to apply the following principles:

- a) Each State retains the ultimate authority to choose the portfolio of measures, appropriate to their [market][industry], as the contribution it can make to limit or reduce greenhouse gas emissions consistent with the global aspirational goals.
- b) Recognize that in addressing international civil aviation greenhouse emissions, a mix of measures such as the following may prove helpful: technology (aircraft and engine) development including alternative fuels, improved air traffic management and infrastructure use, more efficient operations, regulatory measures, and appropriate market-based measures.
- c) States should seek to address any global aspirational goal in a manner to achieve maximum environmental benefit in the most cost effective way. This ensures that the resources spent to address international civil aviation's climate change impact will maximize the benefit gained. Each State should carefully consider each of the elements in the framework in the development of a program for its international civil aviation sector, taking into account the interdependencies among potential solutions and in the broader context of their climate change programs.
- d) Contracting States should be encouraged to work together in a variety of areas within this framework to accelerate improvements in the international civil aviation sector's environmental performance.
- e) Recognize there may be no "one date" for potential implementation of different measures, so timeframes will be indicated in ranges. While States should seek to harmonize an international approach, the appropriateness, timescales, practicability and feasibility of different measures will vary across States and regions.
- f) With respect to the question of mechanisms to facilitate implementation by Contracting States, ICAO should continue its traditional role of developing technical standards, policy guidance, and encouraging appropriate legal arrangements among its members. ICAO's role should complement that of UNFCCC, and ICAO should also take an active role in assembling and reporting information from its Contracting States in monitoring progress toward any goals agreed.
- g) Recognize the special circumstances of developing countries in developing and

implementing measures.

- h) Take into account the respective roles of all stakeholders including States, airlines, air navigation service providers, airports and manufacturers in the development and implementation of measures.
- i) Consult with all stakeholders throughout the process to include the formulation of decisions and adequate public notice of intended actions.
- j) Environmental Management Systems (EMS) are recommended as an approach, that require States and civil aviation stakeholders to systematically develop a means of measuring and addressing the environmental aspects of their operations and business in their decision-making process.
- k) States should build on work done by ICAO, including CAEP (e.g. Circular 303).

3 Table of Potential Measures

The Table below sets out what the working group has identified as the range of significant potential measures for consideration by States. The Table has been compiled from the inputs provided by working group members, and includes a summary of the assessments by the members of potential impact, costs and timescales. Members were asked to address the relative gains, costs and timeframe for each measure on a global basis – not on the basis of the impact, cost or timeframe in their particular State. The assessments were aimed at identifying the potential impact on emissions from the total (global) international aviation system and cover the entire life of the particular measure. It was recognised that there will be different circumstances across States, with different industry and economic settings and different levels of progress in implementing many of the measures in the table.

A blank copy of the table was provided to key industry representative groups and their input invited. The industry response, provided through ATAG, was made available to members for consideration in their assessments.

The assessments inevitably involve a significant element of judgement and there was significant variation in the responses from members. The summaries of assessments in the table indicate the range of assessments provided in responses.

The following criteria were identified as the basis for assessing the potential application of each of the measures shown:

- *Potential relative gains*: low < 2%; medium 2 – 5 %; high 5 – 10 %; very high > 10 %;
- *Possible timescales*: short: < 5 years; medium 5 – 15 years; long > 15 years (timing for measures to be available; full effect not necessarily reached within this timescale);
- *Estimated costs*: low, medium, high, very high.

1) Aircraft-related technology development

Measure	Definition	Implementing entity	Examples of Implementation	Potential Relative Gains	Estimated costs	Possible timescales - implementation	Possible assistance to developing countries	Comments
Aircraft minimum fuel efficiency standards	Near-term fuel efficiency standard, setting non-	ICAO		Low to medium	Low to medium	Medium	Transitional arrangements could apply.	Would provide a stronger signal than historic

	demanding requirements							reliance on high fuel costs to increase efficiency. Experience of minimum fuel standards for automobiles in the U.S. has shown this is not nearly as effective as market incentives in providing improvements in fuel efficiency.
Aggressive aircraft fuel efficiency standards, setting standards for the future	Longer-term fuel efficiency standards to encourage innovation	ICAO		Medium to high	Medium to high	Medium to long	Transitional arrangements could apply.	Would provide an aggressive signal rather than historic reliance on high fuel costs to increase efficiency. Aircraft fuel efficiency improvements without corresponding system level improvements will limit overall gains.
Purchase of new aircraft	Progressive replacement of ageing aircraft fleet with aircraft that perform well to current standards	Airlines/States	Multiple airlines	Very high	High	Medium to long (especially for fleets in developing countries)	Finance and technology	Commercial decisions of airlines could be assisted by State incentives. Airlines with oldest fleets may have greatest difficulty raising funds for

								new aircraft. There is a need to retain fair competition. Could be assisted by State incentives.
Retrofitting and upgrade improvements on existing aircraft	Improve fuel efficiency through development of modifications such as winglets, riblets, replacement of engines, avionics, etc.	Manufacturers and airlines/States	Multiple airlines	Low to high	Low to medium	Short to medium	Finance and technology	Commercial decision dependent on availability of particular retrofits, their performance characteristics, and timing. Could be assisted by State incentives.
Optimising improvements in aircraft produced in the near to mid-term	Maximising contribution of lightweight materials, engine technology, auxiliary power sources in aircraft planned for the near future	Manufacturers and airlines/States		Low to medium	Medium	Short	Finance and technology	Commercial decision between airlines and manufacturers. Could be assisted by State incentives.
Avionics	Next generation avionics systems supporting future ATM system approaches.	Manufacturers, airlines, ICAO, States	To be developed in liaison with NextGen and SESAR projects. Support for R&D through demonstration phase. Accelerated certification	Low to medium	Medium	Short to medium	Finance and technology	Could be assisted by State incentives.

			<p>process after completion of tests.</p> <p>Global standards and recommended practices to achieve harmonized and timely introduction.</p>					
Adoption of revolutionary new designs in aircraft/engines	Designs such as open rotor, blended wing body, improved laminar flow, etc	Manufacturers and airlines		High to very high	High	Medium to long	Finance and technology	Could be assisted by State incentives.
Alternative Fuels	Development of biofuels or other fuels with lower carbon lifecycle content; and associated standards for alternative fuels.	States; manufacturers; petroleum Industry; airlines	USA (CAAFI - Commercial Aviation Alternative Fuel Initiative standards).	Medium to very high	Medium to high	Medium to long	<p>Should be available for use at all major airports.</p> <p>Developing countries may be more suitable to new infrastructure.</p>	<p>Must be sustainable and consider full life cycle environmental costs</p> <p>Could be assisted by State incentives.</p>

2) Improved air traffic management and infrastructure use

Measure	Definition	Implementing entity	Examples of implementation	Potential relative gains	Estimated costs	Possible timescales	Possible assistance to developing countries	Comments
More efficient ATM planning, ground operations, terminal operations (departure and arrivals), enroute operations, airspace design and usage, aircraft air navigation capabilities.	Measures to improve pre-departure planning, ground operations, collaborative decision making, use of optimum flight levels, optimum routings, flexible tracks and fuel efficient departure and approach procedures, fully utilize RNAV/RNP capabilities, flexible use of civil-military airspace.	Air Navigation Service Providers	Australia; RSA; Europe (Single European Sky); and USA (System Wide Information Management (SWIM prototype release); NAS comprehensive for NextGen (medium term)	Low to medium	Medium to high	Short to medium	Finance and access to technology Technical support through education and training.	Aeronautical Information System (AIS) intensive with need for advance ATM communication and aircraft equipage. Could be assisted by State incentives.
More efficient use and planning of airport capacities	Measures to improve taxiing, parking, to enhance terminal support facilities and to plan new capacities when bottlenecks cause environmental problems.	Airports		Low	Medium to high	Short to medium	Technical support through education and training.	Could be assisted by State incentives.

Conversion of airport infrastructure and ground support equipment to cleaner fuels	Electrical/ gas/ biofuels operated ground vehicles	Airports	USA (VALE Program)	Low	Low	Short	Finance and technical assistance	This is primarily a domestic emissions reduction measure but with benefits for international aviation as well.
Construction of additional runways	For relief of existing congestion rather than for increasing capacity	Airports	USA	Low to high	High	Medium to long	Finance and technical assistance	Could be assisted by State incentives. Increased capacity will encourage increased emissions unless total movements are constrained.
Enhanced terminal support facilities	GPU's (replacement by direct electrical supply), preconditioned air	Airports	USA	Low	Low to medium	Short to medium	Finance and technical assistance	Could be assisted by State incentives.
Improved public transport access	Improved public transport access to airports	Airports; States	USA; EU	Low to high	Medium to high	Short to long	Finance and technical assistance	This is primarily a domestic emissions reduction measure but with benefits for international aviation as well.
Collaborative research endeavours	Efforts to implement international air traffic management improvements (AIRE and ASPIRE)	Air Navigation Service Providers, airlines, States	USA, Europe, Australia, New Zealand	Low	Low to medium	Short to long	Finance and technical assistance	Could be assisted by State incentives.

3) *More efficient operations*

Measure	Definition	Implementing entity	Examples of implementation	Potential relative gains	Estimated costs	Possible timescales	Possible assistance to developing countries	Comments
Best practices in operations	Minimising weight, improving load factors, reduced speed, improved ground operations, training pilots	Airlines		Low to medium	Low	Short	Technical assistance and training	
Optimised aircraft maintenance (including jet engine cleaning/washing)	Ensure maintenance schedule maximizes environmental performance	Airlines; manufacturers	USA (P&W Program)	Low	Low	Short	Technical assistance and training	Already in place for certain airlines
Selecting aircraft best suited to mission	Tailoring aircraft selection to use on particular routes/missions (long haul, short haul, etc.)	Airlines		Low to medium	Medium	Short to long term	Technical assistance and training	Can often be difficult given the variety of missions particular aircraft are used for by an airline. Implementation depends on fleet planning cycle.

4) *Economic / market-based measures*

Measure	Definition	Implementing entity	Examples of implementation	Potential relative gains	Estimated costs	Possible timescales	Possible assistance to developing countries	Comments
Voluntary inclusion of aviation sector in emissions trading scheme	Voluntary carbon trading	States; airlines; airports; Air Navigation Service Providers	Japan,	Low to medium	Low to high	Short to long	Not applicable for voluntary carbon trading.	Benefits depend on the obligations within the program.
Incorporation of emissions from international aviation into regional or national emissions trading schemes, in accordance with relevant international instruments	Refer to ICAO Guidance on the Use of Emissions Trading for Aviation (Doc 9885)	States; airlines	EU (from 2012)	Low to very high	Low to high	Short to medium	Exemptions or minimum thresholds could apply.	Benefits and costs depend on the obligations and structure within the program. Potential legal issues depending on how this is implemented.
Establishment of a multilateral emissions trading scheme for aviation which allows trading permits with other sectors, in accordance with relevant international instruments		Airlines; States; ICAO		Low to very high	Low to high	Medium to long	Exemptions or minimum thresholds could apply at least in initial stages.	Depends on how the program is defined and obligations under it. Likely to be more complex and cost more than incorporation into existing schemes. Potential legal

								issues depending on how this is implemented.
Establishment of a framework for linking existing emissions trading schemes and providing for their extension to international aviation, in accordance with relevant international instruments	CAEP is developing guidance in this area	States; ICAO		Low to very high	Low to high	Medium to long	Exemptions or minimum thresholds at least in initial stages.	Depends on how the program is defined and obligations under it. Likely to be less complex and cost less than a stand alone scheme. Potential legal issues depending on how this is implemented.
Emissions charges or modulation of LTO charges, in accordance with relevant international instruments	This covers fuel and NOx charges today	ICAO; States	CH, Europe, USA, Japan, India	Low to very high	Low to high	Short to medium	Exemptions or minimum thresholds at least in initial stages.	Depends on the level and nature of the charge and its uses. Potential legal issues depending on how this is implemented.
Positive economic stimulation by regulator: research programs, special consideration and government programs/legislation and accelerated	This covers NASA and European research efforts.	States; research agencies; airlines; manufacturers	Aeronautics research in engines, airframes, avionics, air traffic management and alternative fuels in various	Low to very high	Medium to high	Medium to long	Finance and access to technology.	Governmental R&D to foster noise and emissions gains has been a traditional focus and helped provide the technology gains from better

depreciation of aircraft			countries around the world.					aircraft.
Accredited offset schemes	Measures to facilitate purchase of carbon credits by organization or individuals to offset emissions from individual air travel	States; airlines; companies; passengers	Passengers as individuals or through employers	Low to very high	Low (to industry)	Short	Voluntary participation.	Success of these schemes strongly influenced by passenger confidence in quality of the offset
Explore extension of CDM	UNFCCC agreement needed to apply credits from CDM to international aviation	States; UNFCCC		Low to very high	Low to medium	Medium	CDM Projects in developing countries	This could prove difficult given the wide variety of potential applications.
Taxation of aviation fuel		States	USA; Netherlands; Norway	Low to high (depending on level of Tax)	Low to high (depending on level of Tax)	Short		Domestic taxes may provide resources for initiatives which benefit international aviation as well as domestic.

Footnote

In 2001, the Assembly endorsed in Resolution A33-7, “the development of an open emissions trading system for international aviation” requesting the Council to take “into account the interests of all parties concerned, to evaluate the costs and benefits of the various measures with the goal of addressing aircraft engine emissions in the most cost-effective manner (and)...develop as a matter of priority the guidelines for open emissions trading for international aviation focusing on establishing the structural and legal basis for aviation’s participation in an open trading system.”. In the same Resolution the Assembly urged "States to refrain from unilateral action to introduce emission-related levies inconsistent with the current guidance".

In 2004, the ICAO Assembly endorsed in Resolution A35-5, the “the further development of an open emissions trading system for international aviation” and requested that the Council focus on two approaches: “a voluntary trading system that interested Contracting States and international organizations might propose” and provision of “guidance for use by Contracting States, as appropriate, to incorporate emissions from international aviation into Contracting States’ emissions trading schemes consistent with the UNFCCC process.” In both cases, the Council was to “ensure” that the guidelines for an open system “address the structural and legal basis” for aviation’s participation in such a system. The Assembly also urged “Contracting States to refrain from unilateral implementation of greenhouse gas emissions charges prior to the next regular session of the Assembly in 2007” and encouraged Contracting States and the Council to “take into account of the interests of all parties concerned, including potential impacts on the developing world.”

In 2007, the Assembly adopted guidance for applying emissions trading to aviation by States and, in Appendix L of Resolution A-36-22, urged “Contracting States not to implement an emissions trading system on other Contracting States’ aircraft operators except on the basis of mutual agreement between those States.” In the same Appendix L, the Assembly concluded that “existing ICAO guidance is not sufficient at present to implement greenhouse gas emissions charges internationally, although implementation of such charges by mutual agreement of States members of a regional economic integration organization on operators of those States is not precluded” and urged “Contracting States to refrain from unilateral implementation of greenhouse gas emissions charges”. Subsequently, 42 Contracting States did not agree that these conclusions were appropriate and entered a formal reserve on Appendix L.

5) *Regulatory measures / other*

Measure	Definition	Implementing entity	Examples of implementation	Potential relative gains	Estimated costs	Possible timescales	Possible assistance to developing countries	Comments
Airport movement caps/slot management		States; airports; airlines	Australia (Sydney)	Low to High	Low to high	Short	Technical assistance and training	Depends on the structure of the scheme. Potential legal issues depending on how this is implemented.
Enhancing weather forecasting services		States; airlines; private industry	USA: JPDO Weather WG	Low	Medium	Short to Medium RSA: short	Finance & access to technology	
Requiring transparent carbon reporting	Wide publication of routine aviation carbon footprint reports +formal examination of carbon footprints in EIA processes	States; industry	USA: Form 41 reporting	Low to medium	Low	Short	Technical assistance and training	
Conferences workshops		ICAO; multiple stakeholders		Low to medium	Low	Short	Education and training programmes	

4 Assistance to Developing Countries

Specific ideas have been proposed by members to assist developing countries to play their part in tackling climate change within the context of the global aspirational goals developed in GIACC.

Members from the developing countries have highlighted the need for consistency between such measures and the terms of the UNFCCC and the Kyoto Protocol, but without pre-empting any future agreements in the UNFCCC. There are divergent views among the members of the Working Group as to how this should be translated to measures for international aviation. Other members highlighted the principle of non-discrimination which is central to the Chicago Convention and the operation of international civil aviation markets.

In general terms, any assistance to developing countries should be coordinated with social and economic development in an integrated manner, taking into account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty.

Options for possible assistance to developing countries can be grouped under the themes of economic measures, technology transfer, appropriate financial assistance, education and training, and support for adaptation. And these cover a range of possible actions in aviation-related areas.

Since the role of this group is to focus on measures, we have set out below the specific ideas which have been suggested in the working group as areas where assistance to developing countries should be considered – where it is potentially most practicable and most useful.

- **Economic / market-based measures:**

- The use of economic/market-based measures, including carbon offset schemes, emissions trading schemes and emissions charges, could provide funding for assistance through, inter alia, Clean Development Mechanisms (CDM) to approved projects in developing countries.

In regard to emissions trading schemes, South Africa (with support expected from other developing countries) is of the view that:

- When Annex 1 countries consider emissions trading schemes to meet their commitments under the UNFCCC and the Kyoto Protocol, cognizance must be taken of the principle of non-discrimination and the principle of *common but differentiated responsibilities*.
- In addition, having regard to the 36th Assembly Resolution Appendix L (see footnote to Part 4 – Economic/market-based measures – of the Table of Potential Measures) developed states considering the implementation of emissions trading schemes should consider the potential impact on

developing states – both in terms of air services and to wider funding of measures addressing climate change in those states.

- **Technology transfer:**
 - Development and enhancement of endogenous capacities and technologies of developing countries.
 - Development of facilities to enable local implementation of measures where practicable (e.g. capacity for retrofitting of existing airframes (winglets, etc) and modifying engines on existing aircraft, providing infrastructure for alternative fuels). These could take the form of influencing commercial companies to see opportunities in developing countries.
 - Support to enable the development and application of advanced air traffic management tools, with appropriate on-aircraft equipment and training of personnel.
- **Financial assistance:**
 - In addition to the general funding available to developing states through the UNFCCC framework, consideration should be given to funding international aviation-specific projects through the ICAO Objectives Implementation Funding Mechanism¹, as may be amended, to address all forms of technology transfers and implementation of more efficient systems. A variety of funding modalities exist under the Mechanism to suit the needs of particular donors, and these provide a framework for flexible arrangements for the implementation of projects.
- **Education and training:**
 - Developing countries should be given assistance with the development and implementation of education and training programmes, including the strengthening of national institutions and the exchange or secondment of personnel to train local experts in international civil aviation-related environmental matters.

¹ Appendix G of the Global Air Navigation Plan, 3rd Edition - 2007 (Doc 9750 AN/963), incorporating Resolution A27-18: Funding for Technical Co-operation Activities

5. Implementation approach

This section addresses potential mechanisms to support the implementation of measures across all States.

Options for consideration include:

- working through ICAO to develop guidance and supporting information on the measures, building on work already done, such as Circular 303;
- encouraging cooperation among regional groupings to develop coordinated approaches on issues such as air traffic management which affect several States;
- encouraging States to establishing partnership arrangements to share information and expertise;
- encouraging all States to develop and publish action plans which articulate the proposed approach in that State to its contribution;
- action plans could set out the proposed measures to be given priority, the approach to implementation, timing and anticipated results;
- in the case of developed countries, the approach to assisting developing countries;
- a mechanism for monitoring and reporting on the implementation of the States' action plans, and updating as necessary; and
- provision for assistance from other States and industry, possibly facilitated through ICAO, in the assessment of areas for action and development of the action plan.

6. Evaluation framework

Text to be developed after GIACC 3 meeting, having regard to goals and monitoring.

GIACC WORKING GROUP 2 TERMS OF REFERENCE

Task

To provide information on measures and good practice examples of which States could take to address the climate change impact of international civil aviation. The list of measures is not intended to be prescriptive but should provide ICAO Contracting States with information on the possible action which they could take and the potential contribution which they could make to addressing climate change.

Actions

- a) The working group should identify a comprehensive list of key measures which can address international civil aviation's climate change impact. These should cover each of: technology development, improved air traffic management, more efficient operations and market based measures. (Coordination with the Global Aspirational Goals Working Group will be necessary for this task)
- b) As far as practicable the working group should provide clear definitions of different measures, to minimise uncertainties about the relationships and overlaps between different possible actions [and to flag up potential trade-offs].
- c) For each measure the working group should collect examples of implementation to enable States and operators to learn from the experience of others and to facilitate good practice. It should also provide contact details of those who have valuable experience to share.
- d) The group should provide the best information possible on the relative gains in terms of emissions reduction which might be achieved through different measures and the related costs to achieve this taking into account that priority setting has to be done individually by States.
- e) The working group should identify the potential earliest practicable timescales for implementation of different measures so that it is clear whether measures offer the prospects for action in the short, medium or only the longer term.
- f) With respect to the question of how to implement measures described at a), the working group should consider mechanisms to facilitate implementation by States, including the possible role of ICAO in this.
- g) Evaluation framework on all measures indicating the feasibility, practicality, affordability of implementing these measures in order to assist Member States to make informed choices.
- h) The working group should identify measures to assist developing countries in fulfilling their obligations with respect to international civil aviation and climate change.

Deliverable

For GIACC/3 the working group should produce a report with the list of measures including definitions and with initial examples of implementation. Examples should be completed and information should be provided on the possible emissions reductions which can be achieved by each of these measures.

— END —