



GROUP ON INTERNATIONAL AVIATION AND CLIMATE CHANGE (GIACC)

FOURTH MEETING

(MONTREAL, 25 TO 27 MAY 2009)

SUMMARY OF DISCUSSIONS — DAY 1

Agenda Item 1: Administrative Matters

Opening of the meeting

1. Opening the meeting, the President of the Council welcomed GIACC Members (and their Advisors) to the Fourth Meeting of the GIACC, in particular, Mr. Yuan Ji (China), replacing Mr. Zhanbin Wang, Mr. L. Gupta (India), replacing Mr. R.P. Sahi, and Mr. M. Dierikx (the Netherlands), replacing Mr. P. Griffiths (United Kingdom), who were attending for the first time. Mr. Z. Thwala (South Africa) was unable to attend due to unexpected urgent official matters.
2. The President began by thanking everyone for the incredible efforts that they had put into the GIACC process. The progress that the Group had achieved since the beginning of the journey was encouraging. He had followed the GIACC's work very closely and looked forward to its reports and the discussions over the next few days.
3. In noting that this Fourth Meeting would conclude the deliberative process of the GIACC, the President indicated that the Group must determine the main points of consensus to move towards a common strategy and, where consensus was not possible, define the disparate views. The Group's fundamental task was finalizing the Programme of Action on International Aviation and Climate Change and drafting the GIACC Report to be presented to the Council in June/July 2009 and to the High-level Meeting in October 2009.
4. The ICAO Council had scheduled a High-level Meeting on International Aviation and Climate Change to be held from 7 to 9 October 2009. That meeting would review the Programme of Action and recommendations to provide concrete advice on how to reduce greenhouse gas (GHG) emissions from international aviation. As the Group was aware, the GIACC's schedule had been designed to support the ICAO Council in taking decisions concerning a climate change policy with respect to international aviation, in preparation for the Fifteenth Meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) (COP15) in December 2009.
5. The President noted that, on 30 April 2009, he had had the pleasure of attending a tripartite meeting to COP15 at the Headquarters of the International Maritime Organization (IMO) in London with the IMO Secretary-General and the Executive Secretary of the UNFCCC. They had discussed potential obstacles in the process leading up to COP15, as well as the potential outcome, both for the environment

and for the two international transport sectors. It had been noted that a globally-harmonized framework was essential for tackling GHG emissions from international aviation due to its global nature.

6. The President emphasized that the environment community expressed great expectations for ICAO and the GIACC process to bring forward the aggressive Programme of Action as envisioned by the 36th Session of the Assembly. One of the most important issues that the Group would have to deal with during the next few days was aspirational goals consistent with Appendix K (*ICAO Programme of Action on international aviation and climate change*) of Assembly Resolution A36-22 (*Consolidated statement of continuing ICAO policies and practices related to environmental protection*). The President was confident that everyone in the room realized the need for decisive action if the real and pressing environmental challenges related to aviation were to be dealt with effectively.

7. The President considered that it was helpful to recall that the aspirational goals were thought of in terms of the change in average fuel efficiency of the global in-service civil fleet performing international operations. Those goals would not be assigned to a particular State, region or operator. They would reflect the shared actions of all parties through their application of the basket of measures based upon their particular circumstances. In this framework of co-operation and shared responsibility, the President hoped that the Group would find consensus on mid- and long-term goals.

8. In then reviewing the key principles to be kept in mind, the President recalled that Assembly Resolution A36-22 established the GIACC, as well as its mandate and the scope of its work. As a Group established by the Council, it was imperative that the GIACC carried out its work in keeping with its terms of reference and the full terms of the said Resolution and in line with the overriding principles of ICAO and operated on the basis of consensus.

9. The President observed that, in keeping with the Group's focus on policy, the meeting had been arranged to provide updated information during the morning session of the first day. The agenda would then be dedicated to the presentation of reports from the Goals Development Working Group (WG4) and the Market-Based Measures Working Group (WG5) and to the discussion on the Programme of Action and the GIACC Report. He urged the Group to use its time productively.

10. In underscoring that the GIACC could count on his full co-operation to assist it, if necessary, the President thanked the Group for its contributions to date and wished participants a very successful meeting. The text of the President's opening address is available on the GIACC secure website and on the ICAO public website.

11. The Chairperson of GIACC/4, Mr. G. López Meyer (Mexico), who had been elected at GIACC/3 together with the Vice-Chairperson, Mr. J. Doherty (Australia), indicated that he was very pleased and honoured to preside over the Group's Fourth Meeting. It was a great responsibility, not only for him but for all GIACC participants, to develop, in the remaining few days, a comprehensive Programme of Action to address the serious problem of international aviation emissions' impact on climate change.

Review of the working arrangements

12. The GIACC took the action proposed in paragraph 8.1 of WP/1 and: approved the purpose of its Fourth Meeting as set forth in paragraph 2 thereof; noted the Agenda for the meeting contained in Appendix A; noted the Group's terms of reference as approved by the Council and previously accepted by the Group as presented in Appendix B; approved the proposed programme for the meeting outlined in Appendix C as revised in light of comments made on the need to focus discussions on the GIACC Report; and noted the Group's working methods and working hours as set forth in paragraphs 6 and 7 of the paper.

Approval of the summaries of discussion of GIACC/3

13. As no comments or suggested amendments had been received regarding the summaries of discussion of the Third Meeting contained in GIACC/3-SD/1, /2 and /3, which had been posted on the GIACC secure website, the summaries were approved in the form presented as being an accurate representation of the Group's deliberations.

Agenda Item 2: Review of aviation emissions-related activities within ICAO and internationally

Presentation by the Chief of the Economic Analyses and Databases Section (C/EAD)

14. Pursuant to a request made during GIACC/3, the Chief of the Economic Analyses and Databases Section (C/EAD) presented IP/5 on ICAO's role during the 1973-1974 oil crisis and fuel efficiency. She highlighted the ICAO Council Recommendation adopted in early 1974 (C 82) to address the effects of the oil crisis on international civil aviation, as well as Assembly Resolution A22-27, which directed the Council to collect and make available to States relevant information on the future availability of aviation fuel. In also elaborating on the results of a subsequent study undertaken by ICAO, published in 1979 in Circular 149-AT/52, and comparing them to the actual results, C/EAD underscored that the fuel efficiency on international air services was not impacted by oil price evolution.

15. Further to an additional request made during the Third Meeting regarding fuel consumption data under Article 67 (*File reports with Council*) of the Chicago Convention, C/EAD elaborated on the recommendations of the Fourteenth Meeting of the Statistics Panel (STAP/14) (Montréal, 23-27 March 2009) on fuel consumption data collection to be presented to the upcoming Tenth Session of the Statistics Division (STA/10) (Montréal, 23-27 November 2009) (*cf.* IP/4). One recommendation related to the introduction of a new form for reporting fuel consumption by commercial air carriers which would include items on aircraft type (passenger versus all cargo) and the alternative fuels share of total fuel consumed (by aircraft type). C/EAD emphasized that, in order to assist States in reporting their data, the Organization would continue to hold workshops and provide on-the-job training.

16. In concluding, C/EAD underscored, *inter alia*, the need to carefully analyze the impact of the current economic crisis on air travel fuel consumption and to closely monitor fuel consumption and fuel efficiency through an *ad hoc* annual data collection. The text of C/EAD's presentation is available on the GIACC secure website and on the ICAO public website.

17. Observing, from one of the graphs, that an increasing trend in air travel's share of oil consumption was projected from 2005 to 2030, one Member queried how it would be possible to address international aviation's impact on climate change when a decrease in oil consumption was required in order to reduce aviation GHG emissions. C/EAD noted that the graph represented the scenario as defined in IP/1 on global aviation CO₂ emissions projections to 2050 prepared by the Projections Task Group (PTG) of the Forecasting and Economic Analysis Support Group (FESG) and the Modelling and Databases Task Force of the Committee on Aviation Environmental Protection (CAEP).

Review of developments since GIACC/3

Presentation by the Chief of the Environmental Section (C/ENV)

18. The Chief of the Environmental Section (C/ENV), who is also the Secretary of the Committee on Aviation Environmental Protection (CAEP), then presented three papers: IP/1 on global aviation CO₂ emissions projections to 2050; IP/2 on the CAEP's responses to requests from GIACC/3; and IP/3 on recent developments regarding environmental protection in ICAO and other United Nations (UN) bodies.

19. In introducing IP/1, C/ENV outlined the CAEP's environmental trends/goals assessment for 2012, 2020 and 2025 based upon the interpolation of existing data and possible scenarios based on broad brush assumptions for 2050. She stressed that even under the most aggressive technology forecast scenarios, the anticipated gain in fuel efficiency from technological and operational measures would not offset the expected growth in demand-driven aviation CO₂ emissions. C/ENV noted that a multi-faceted approach toward sustainability was possible using alternative fuels, unforeseen technological advances and market-based measures.

20. In her presentation of IP/2, C/ENV outlined the CAEP's initial views on exploring a fuel efficiency metric that would take into account alternative fuels and on considering fuel conversion factors for alternative fuels and the development of an aviation CO₂ standard. She also presented a CAEP report on a possible weight average for passengers, the status of developing new guidance replacing Circular 303 (*Operational Opportunities to Minimize Fuel Use and Reduce Emissions*) and studies on market-based measures.

21. In then introducing IP/3, C/ENV elaborated on the Bonn Climate Change Talks (29 March – 8 April 2009), which prepared two draft negotiating texts for COP15 which were to be discussed during the forthcoming meeting of UNFCCC subsidiary bodies in Bonn (1-12 June 2009). She also provided information on relevant IMO meetings and developments in ICAO, in particular, the ICAO Workshop on Aviation and Alternative Fuels (Montréal, 10-12 February 2009) and the proposed ICAO Conference on Aviation and Alternative Fuels (Rio de Janeiro, November 2009).

22. Underscoring that the said Conference had the full support of the Brazilian Government, one Member expressed the hope that GIACC Members would attend.

Overview of the process and timeline leading to the High-level Meeting on International Aviation and Climate Change (Montréal, 7 to 9 October 2009)

23. The Secretary of the GIACC outlined the process and timeline leading to the High-level Meeting which would undertake a larger policy review of the GIACC's Report and the decisions thereon taken by the Council during its upcoming 187th Session in preparation for COP15 in December 2009. He indicated that it was necessary to distribute the said Report in all language versions by 26 June 2009 at the latest so that it could be considered by the Council prior to the end of its session and so that States and Observers participating in the said High-level meeting would have two months in which to submit papers thereon to ICAO for translation by the 26 August 2009 deadline. It was expected that, following the High-level meeting, a consensus would be reached within ICAO on its position for COP15 on limiting or reducing aviation GHG emissions' impact on the global climate, which would be made available to the UNFCCC Secretariat by 23 October 2009. To submit ICAO's position any later would make it unlikely that it would be given the desirable level of consideration by COP15.

24. The Secretary of the GIACC proposed that the Group review the first two sections of the draft GIACC Report, namely, the *Summary of Programme of Action Recommended by GIACC* and the draft Recommendations, during its three-day meeting and leave the remainder to be reviewed the following two days by those Members who were able to stay in Montréal or, in their absence, by their designated Advisors. In light of concerns expressed that Members unable to remain in Montréal after the close of the meeting on 27 May 2009 should have the opportunity to review the final report and comment on substantive issues, it was subsequently agreed that the Secretary of the GIACC would e-mail participants a copy of the final report for comment only on those sections which were not agreed by consensus and which were demonstrated to not accurately represent the discussions. A deadline of noon (Montréal time) on 3 June 2009 was set for such comments.

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

Presentation of the Report of the Goals Development Working Group (WG4)

25. Ms. N. Lobue (United States), who was Co-Chairperson, together with Mr. M.V. Pinta Gama (Brazil), of the Goals Development Working Group (WG4), elaborated on the Group's Report (WP/2), which had been presented during the previous day's co-ordination meeting.

26. The Co-Chairperson of WG4 underscored that the Working Group had started from the work done by the Working Group on Global Aspirational Goals (WG1) rather than recreating that work. Referring to the terms of reference of WG4, she recalled that GIACC/3 had come to general agreement on a 2 per cent per year improvement in fuel efficiency as a short-term global aspirational goal until 2012. WG4 had been tasked with reviewing available data to determine if that percentage was the most appropriate. It had also been tasked with progressing the development of possible medium- and long-term aspirational goals based specifically upon fuel efficiency in consultation with the Committee on Aviation Environmental Protection (CAEP) and taking into consideration available data on industry trends and relevant forecasts. The Co-Chairperson noted that WG4 had separated the fuel efficiency goals based on the types of measures (air traffic control modernization measures and technology measures). WG4 had further been requested to assess the scope for additional goals and statements to indicate a strong ambition for addressing aviation emissions, including in the form of carbon neutrality. Observing that some progress had been made in that regard, she noted that discussion had focused on the areas of alternative fuels and market-based measures. The latter term was used as defined by ICAO, in a broad sense, and included such measures as carbon off-sets, fuel taxes and cap-and-trade or emissions trading. Recalling that WG4 had also been tasked with reviewing goals provided by industry and others with respect to the level of ambition for addressing aviation emissions, the Co-Chairperson noted that while representatives of industry had been offered the opportunity to provide input on some particular "guiding questions" used to focus the Working Group's discussion, they had not. Furthermore, although they had been asked to join Members of WG4 in a face-to-face meeting, they had not participated therein. While some input had been received from representatives of industry in the last week, as it had been after the Working Group had completed its deliberations, it was not reflected in its Report (WP/2).

27. Recalling the very productive discussion that had taken place during GIACC/3 on a way forward in developing global aspirational goals, the Co-Chairperson of WG4 noted that the GIACC had acknowledged the principles of non-discrimination and equal and fair opportunities to develop international aviation set forth in the Chicago Convention, as well as the principles and provisions of common but differentiated responsibilities (CBDR) under the UNFCCC and the Kyoto Protocol. WG4's task had been to work in a way that would acknowledge the work needed to be done in ICAO while still respecting the larger framework. While its recommendations were to be based on global aspirational goals in the form of fuel efficiency, it would also consider goals of greater ambition for addressing aviation emissions, including goals in the form of carbon neutrality.

28. The Co-Chairperson of WG4 noted that, absent new information, the Working Group had agreed on a 2 per cent annual fuel efficiency improvement by 2012 as the short-term global aspirational goal. It had considered using a baseline of 2000 or 2005 and had requested relevant input from the Secretariat. Indicating that it seemed that either baseline would work, she noted that there was a difference regionally in impact depending on which baseline was used. The selection of a baseline year had thus been identified as one issue on which further discussion was necessary in GIACC to see if a decision could be reached or if that should be left open for further work. The Co-Chairperson of WG4 noted that, although there had not been final agreement on a recommendation to the GIACC regarding a medium- and long-term global aspirational goal in the form of fuel efficiency, there had been a very constructive narrowing of the goals. Two per cent had been raised as a particular figure that could be a floor. That was approximately what industry had come forward with in the 2020 timeframe. The United States had proposed 2.5 per cent

annually for the medium term and 3 per cent annually for the long term, goals in fuel efficiency that would require work by governments to try and accelerate delivery of carbon-friendly technologies and/or procedures in their air traffic systems. While recognizing that those were more ambitious fuel efficiency goals, the United States had wished to give some boundaries for them.

29. For the medium-term, WG4 recommended a range from 2 per cent to 2.5 per cent annual fuel efficiency improvement from 2020 or 2025. The Co-Chairperson of WG4 recalled, in this context, that WG1 had acknowledged a general sense that GIACC's target dates should be consistent with those of the UNFCCC (2020 for the medium term). The United States had, however, proposed 2025 as a target date as it would allow for additional time for a more ambitious fuel efficiency goal. Such a goal was partly dependent on carbon-friendly technology coming into the market and on airlines being able to use that technology. As it usually took between 10 and 15 years for such technology to become available, 2020 would be very short period of time. The selection of a target date for the medium term was another item for further discussion by the GIACC. For the long term, a range from 2 per cent to 3 per cent annual fuel efficiency improvement from 2021 or 2026 to 2050 was being recommended, 3 per cent being a more ambitious goal based on advancing maturing technologies faster. WG4 had agreed on 2050 as the target date.

30. The Co-Chairperson of WG4 noted that the Working Group had discussed the two fuel efficiency metrics that had been put forward by WG1, namely, volume of fuel/Revenue Tonne Kilometer (RTK) and mass of fuel/RTK. Both metrics worked, depending on the reporting system used. WG4 had acknowledged that while mass of fuel per RTK might provide greater accuracy, volume of fuel per RTK was potentially easier to use in view of current reporting systems: most carriers reported the amount of fuel in gallons or liters. As the volume of fuel per RTK did not significantly degrade accuracy and was much easier to implement, WG4 had decided to recommend that as the fuel efficiency metric.

31. In observing that WG4 had discussed goals to indicate stronger ambition, the Co-Chairperson noted that the focus had been on carbon neutral growth for the medium term (2020 or 2025) and potential emissions reductions for the long term (2050), with a baseline of 2000 or 2005. It was assumed that, if the GIACC came to closure on a baseline year and target dates, they would be the same for both fuel efficiency goals and goals of stronger ambition. While there had been some exchange of views regarding the long term, most of the discussion had been on the medium term and carbon neutral growth: what it would take to get there, what measures might be applicable and how it might be accounted for. With respect to the long term, there had been a general sense, although not agreement, that there was interest in a stronger ambition of emissions reductions. However, WG4 did not recommend, or even have significant discussion regarding, the magnitude of such reductions. Although the European Union (EU) had proposed that in 2050 the global aviation sector should maintain the same percentage share of global GHG emissions as it had in 1990, there had been significant disagreement thereon. The Working Group had not spent much time coming up with alternatives.

32. The Co-Chairperson of WG4 noted that the Working Group had considered, as a metric for goals indicating stronger ambition, net CO₂ intensity. As it had been acknowledged that alternative fuels were going to be a significant factor in a more ambitious medium term goal, the Working Group had considered how to account for alternative fuels which did not have the same carbon footprint as the current kerosene-based jet fuels. It had been agreed that a CO₂ factor (mass of CO₂/mass of fuel) was needed to account for the benefits of such fuels and that a fuel density conversion factor (mass of fuel/volume of fuel) was required as CO₂ factors were typically mass-based. The Working Group had also considered how to account for the use of market-based measures to reach the more ambitious goals and had agreed on a factor of market-based measures CO₂ reductions/RTK. The resulting formula was as follows:

$$\text{Net CO}_2 \text{ intensity} = \text{fuel efficiency metric} \times \text{CO}_2 \text{ factor} \times \text{fuel density factor} - \text{market-based measures factor}$$

$$\text{Vol}_{\text{fuel}}/\text{RTK} \times \text{Mass}_{\text{CO}_2}/\text{Mass}_{\text{fuel}} \times \text{Mass}_{\text{fuel}}/\text{Vol}_{\text{fuel}} - \text{MBM CO}_2 \text{ Reductions}/\text{RTK}$$

metric

The Working Group considered that more work might need to be done on the above metric and that the GIACC might wish to recommend to the CAEP to continue work thereon.

33. The Co-Chairperson of WG4 then outlined issues that had come up in the discussions that had to be solved before the GIACC could move forward on more ambitious goals. Recalling that a range from 2.0 per cent to 2.5 per cent annual fuel efficiency improvement was being recommended as a medium-term goal, she indicated that it would be necessary to decide whether a specific figure should be chosen or whether it should be left as a range, which would allow for more ambition and potentially more investment in such things as air traffic procedures and bringing technology to market. Noting that the second issue was “triggers” to indicate a threshold to seek to achieve more ambitious goals, the Co-Chairperson of WG4 underscored that all wanted to continue to have aviation be a significant global economic engine. Developing countries in particular considered that aviation would help their economies. One suggested type of trigger was per capita income. While interest had been expressed in such a trigger, the Working Group had not reached closure thereon, as it could be applied differently in States. Thus while WG4 considered that that was an area that might have some promise, some additional work was required before it could make a recommendation around it. A third issue was assistance to developing countries, which, while not *per se* within the Working Group’s terms of reference of the WG, was central to the overall successful implementation of GIACC’s recommendations. The Working Group acknowledged that some goals, particularly the more ambitious ones, could not be reached without some assistance. The Co-Chairperson of WG4 recalled, in this regard, the recommendations made by WG2 for assisting developing countries relating to economic/market-based measures, technology transfer, appropriate financial assistance, education and training and support for adaptation. WG4 wished to ensure that there was recognition that the GIACC should continue to have some solid proposals that would enable various States to have action plans that would contribute to the overall goal of addressing aviation emissions. The text of Ms. Lobue’s presentation is available on the GIACC secure website and on the ICAO public website.

34. Mr. C. Burleson, an Advisor to Ms. Lobue, then presented IP/12, which summarized the findings from a fuel trends analysis conducted by the United States’ Federal Aviation Administration (FAA) that reflected economic and aviation activity from 2006 to the present and the projected fuel consumption and CO₂ emissions savings that could be achieved from a combination of measures and compared those results to those presented in IP/1. IP/12 provided some additional fuel burn scenarios to those set forth in the latter paper and used assumptions that had been adjusted to reflect economic activity, aircraft technology, air traffic management advances and fuel price (including market-based measures add-on). In underscoring that the resultant 2050 fuel burn projection of between 470 to 565 million tonnes was significantly lower than the earlier MODTF projections of between 730 and 850 million tonnes, Mr. Burleson emphasized that there were positive implications: it could make it either more feasible to use alternative fuels as less supply would be required or less costly for market-based measures (fewer charges or emission permits to purchase) to offset fully aviation’s carbon growth in the longer term. He noted that, based on the scenarios used in IP/12, the United States was more optimistic that there was a way of attaining some of the more ambitious global aspirational goals. To a point raised regarding the accuracy of the FAA’s forecasts, Mr. Burleson emphasized that the latter were as accurate as the MODTF forecasts. The text of Mr. Burleson’s presentation is available on the GIACC secure website and on the ICAO public website.

35. Discussion of the Report of WG4 and the two presentations was deferred to the next day.

Agenda Item 2: Review of aviation emissions-related activities within ICAO and internationally

Presentation of IP/6 submitted by the International Air Transport Association (IATA)

36. Recalling that at GIACC/3 Mr. P. Steele had given a presentation on behalf of the Air Transport Action Group (ATAG) of which he was the Executive Director which had outlined industry’s

goals for reducing aviation CO₂ emissions, the Secretary of the GIACC noted that he had now submitted IP/6 on behalf of IATA, which set forth the goals that its Member airlines intended to try to achieve to reduce such emissions. They were proposing, as the short-term goal (to 2012), an improvement in the in-service fleet fuel efficiency on a global level of 1.5 per cent on average per year. In the medium-term (2013 to 2020), they were proposing further improvements in fuel efficiency of 1.5 per cent on average per year. IATA Member airlines would also strive to collectively achieve carbon neutral growth in the 2020 to 2025 timeframe, using additional measures as appropriate, including the use of low carbon sustainable alternative jet fuels. In the long term (to 2050), they would strive to collectively reduce their net CO₂ emissions in 2050 by 50 per cent compared to 2005 emission levels.

37. Referring to the MODTF scenarios set forth in Table 1 of IP/1, which used 2006 as a baseline rather than 2005, the Secretary of the GIACC noted that annual global aviation fuel burn was estimated at 187 million tonnes. Half that amount was a fuel burn in the order of 93.5 million tonnes. Under the MODTF's most aggressive scenario, which was a fuel burn improvement of 1.5% per year for all aircraft entering the fleet after 2006 based on technology and operational improvements, the fuel burn would be 730 million tonnes in 2050. The reduction from 730 million tonnes to 93.5 million tonnes would constitute an 85 per cent reduction in net CO₂ emissions. That was what the IATA Member airlines had put forward, albeit with a number of caveats, such as their goals represented a global solution that applied to all airlines equally.

38. GIACC/4 noted the information provided by IATA in IP/6.

Presentation of the Report of the Market-based Measures Working Group (WG5)

39. As the Chairperson of Working Group 5 (WG5) on Market-based Measures, Mr. P. Schwach (France) elaborated on the Working Group's Report (WP/3) which had been presented during the co-ordination meeting on 24 May 2009. IP/7 on work already done by ICAO on market-based measures and reference documentation and IP/8 on existing, planned or envisaged schemes, including market-based measures, both by the Chairperson, served as background material to the Report.

40. In noting that WG5 had closely followed GIACC's terms of reference as established by the Council, the Chairperson emphasized that in so doing it had filled a gap that would otherwise have existed if the Working Group had restricted itself to what had been discussed up to now in WG1, WG2 and WG3. It was thus very important to pay attention to WG5's results. He recalled, in this context, that paragraph 2 b) of the GIACC's terms of reference specified that, in identifying a menu of options from which States could choose to limit or reduce GHG emissions attributable to international civil aviation, the Group was to examine market-based measures including, *inter alia*, emissions trading, taking into consideration the nature of the scheme (global, regional or national). It was thus not WG5 which had come up with the idea of examining a global emissions trading scheme. Under paragraph 2 b) the Group was also to: examine how compatibility and inter-operability of the schemes could be achieved; consider mechanisms to determine equivalence of different measures and to benchmark the latter; take into account the interests of developing countries; consider charges and taxes; and consider positive economic incentives, *etc.*

41. The Chairperson of WG5 noted that the Working Group had first of all carried out a complete review of the work already done by ICAO on market-based measures. Recalling that ICAO had been addressing market-based measures in the Assembly, the Council and the CAEP since 1998, he emphasized that that historic work already answered, in part, the issues raised by the Council in the GIACC's terms of reference and that many conclusions had already been reached, on, for instance, what type of market-based measures were acceptable. The Chairperson of WG5 cited, as examples, the conclusions that a carbon-related tax applied either on fuel or passengers should be ruled out as it did not contribute directly to reducing aviation emissions and that a revenue neutral charge based on fuel efficiency should likewise be ruled out as being impractical and having minimal effect on the environment. It had also

been concluded that a carbon fuel charge and a carbon passenger charge would be acceptable provided that the revenues were directed to mitigation of aviation's environmental impact. Carbon offsets would likewise be acceptable. While the work already done by ICAO had answered many of the questions raised regarding market-based measures, some questions remained unresolved after ten years, such as: the geographical scope; the compatibility between systems to avoid double counting/charging and ensuring equivalence of the different measures; and how to combine in the design of a global scheme the principle of non-discrimination between operators set forth in the Chicago Convention and the principle of CBDR established under the UNFCCC and the Kyoto Protocol, an issue which had been discussed during the GIACC's three meetings.

42. WG5 had examined all of the market-based measures schemes of which its Members were aware that were either in existence, in the process of being developed or proposed and were for implementation by a State or a group of States at the national or regional level. It had also considered scenarios or concepts for a global sectoral approach which had been proposed for study by industry or by Members. The Chairperson noted, in this context, that a number of schemes had been developed in New Zealand, Australia and Europe and that proposals related to market-based measures were currently being discussed in the United States. WG5 had received a number of proposals from industry for a global sectoral approach, one that would not entail excessive administrative charges for industry. The latter did not want a patchwork of market-based measures that were incompatible and difficult to manage.

43. Having reviewed these existing, potential and conceptual schemes, WG5 had drawn a number of conclusions. In underscoring that the objective of market-based measures was not to reduce demand for international air transport by increasing its cost, the Chairperson of WG5 noted that the Working Group had looked for a reconciliation between the growth of international aviation and a limitation in aviation emissions in all of the schemes that it had examined. As international aviation grew, any improvements in fuel efficiency that had been achieved might not be sufficient to limit the emissions. Thus the schemes that had been reviewed were all "open" systems aimed at compensating for emissions so as to enable growth without reducing demand. Recalling that WG5 had also looked for the implementation of the principle of CBDR in the schemes, the Chairperson underscored that in those schemes that were currently in place the principle was not included, or only to a small extent. He noted, in this regard, that the European emissions trading scheme contained a *de minimis* clause to exclude small emitters and a clause on recognizing equivalences of different measures. The global systems proposed by either WG5 Members or industry did allow for differentiated treatment.

44. In outlining the philosophy underlying the Working Group's discussions, the Chairperson noted that there had been wide support for resolving the said outstanding questions relating to market-based measures. These were not technical matters which would entail requests for new studies by the CAEP; rather, they were policy issues that required discussion and negotiation at the international level. It was hoped that the enthusiasm generated by the 36th Session of the Assembly and the establishment of the GIACC, which would be amplified by the convening of a High-level meeting in October 2009 to review the latter's Programme of Action and the perspective of COP15 in December 2009, would enable those questions to be taken up again and resolved. That was a challenge that would probably continue to the 37th Session of the Assembly.

45. The Chairperson of WG5 noted that the reality was that, if market-based measures were simply left in the basket of measures made available to States without any accompanying implementation measures, then they would not function well: either States would apply them only to domestic aviation and not to international aviation or a region such as Europe would try to apply them to international aviation and be met with disputes and difficulties. If the GIACC wished to honestly and sincerely promote market-based measures in addition to technological and operational measures and to encourage States to choose them from a basket of measures, then it should consider the way to implement the various market-based measures and what should accompany their implementation.

46. In order to organize its ideas, the Working Group had developed three main types of scenarios to implement market-based measures and had weighed their pros and cons without, however, reaching full consensus. The debate had, nonetheless, facilitated an agreement on main conclusions. Scenario A was a “business as usual” scenario without an ICAO mandatory framework. Market-based measures would be implemented by States or by regions, with a diversity of policies and parameters, such as taxation of fuel or emissions trading, different applicable entities (operators or flights) and different scopes. While Scenario A was simple and was already being introduced in certain parts of the world, it could give rise to limitations, difficulties and disputes that could hinder the implementation of the market-based measures. There was also the risk raised by industry that it would result in a patchwork of market-based measures that would be very difficult to implement and manage.

47. At the other end of the spectrum was a very ambitious scenario, Scenario B, an ideal global scheme under a sectoral approach. A unique global system would be created on a mandatory basis imposing a global emissions cap-and-trade system for international aviation. The system could include a principle of differentiation between developed and developing countries, based on different caps or different dates to reach the same cap, according to maturity markets. The Working Group considered that Scenario B had many advantages as it settled many problems, such as distortion of competition and carbon leakage. It did, however, raise other problems, such as that of implementation. ICAO currently did not have the institutional authority to impose such a global system on States or to administer any funds collected. In underscoring that the objective was not to have a mandatory scenario that was applicable worldwide, the Chairperson of WG/5 emphasized that a global scenario was not necessarily obligatory. It could also be aspirational. ICAO could set a global goal for the international aviation sector in terms of market-based measures. For example, it could offset the 3 per cent growth that technological improvements could not and then encourage States to put in place market-based measures that were adapted to their national circumstances to attain that goal. The Chairperson of WG5 indicated that, which there thus could be an aspirational global scenario, it would be difficult to draw a conclusion thereon and the Working Group had not reached consensus.

48. WG5 had therefore considered, as a compromise, Scenario C, under which market-based measures would be implemented by States or by regions but within an ICAO framework. That framework would define agreed principles for the implementation of market-based measures, including how they should contribute to global goals, the geographical scope, the equivalence of different measures and the allocation of collected funds. It would provide a co-ordinated plan so that individual State policies constituted building blocks for a future global system. While Scenario C was more ambitious than what had been done by the CAEP, which had issued guidance, it was less ambitious than a unique global scenario which allowed for many local adaptations.

49. The Working Group had reached a number of conclusions which would have to be transformed into recommendations for the Council if the GIACC approved them. These were set forth in paragraph 5 of WP/3. Referring to the conclusions regarding a general sectoral approach for international aviation, the Chairperson of WG5 noted that the Working Group generally agreed that market-based measures implemented by States or by regions with different policies and parameters in the absence of a global sectoral framework developed by ICAO (Scenario A) were far from optimal. That approach would make co-ordination more difficult, create risks of distortion of competition and unnecessary burdens for industry, as well as complicate industry compliance. The second conclusion was that a unique global sectoral system for international aviation could be desirable. However, enforcement powers would have to be established in ICAO or some other UN Agency to manage such a global system. For that reason, among others, the Working Group recognized that implementation of such an approach would face major challenges, particularly in the short and medium term. WG5 had also concluded that, as a matter of priority, it was more feasible to develop further a sectoral framework through an ICAO régime, allowing States and

regions to adopt their own market-based measures in line with the globally-agreed principles established by that framework (*cf.* paragraphs 5.1.1 to 5.1.3).

50. With reference to the conclusion set forth in paragraph 5.1.4, the Chairperson of WG5 noted that in discussing it during the previous day's co-ordination meeting, Members had requested that it be redrafted along the following lines: "The ICAO framework should ensure that the principle of non-discrimination set forth in the Chicago Convention, as well as the principle of CBDR under the UNFCCC, were respected. While acknowledging those two principles, it was necessary to ensure that: a) only the most efficient and cost effective measures were chosen; b) industry compliance was facilitated; c) market-based measures were co-ordinated to avoid a duplication of effort; and d) the geographical scope for each local system of market-based measures was clearly defined." The conclusion set forth in paragraph 5.1.5 was partially covered by that conclusion: the framework should also ensure at least that double counting/charging was avoided. Equivalence between two types of market-based measures should be established on the basis of tonnes of carbon emissions reduction provided on a given flight and not on the cost of the measures, especially if prices of carbon credits were different in different markets.

51. In then drawing attention to WG5's conclusions regarding market-based measures options for States and regions, the Chairperson indicated that the Working Group had noted that ICAO had already undertaken extensive work on market-based measures to address the climate change impact of international aviation emissions, notably through the CAEP, which had issued a considerable amount of guidance. The Working Group had generally agreed that neither closed emissions trading nor closed charging systems were the most cost-effective option. It had also recognized that while taxation on fuel could be an option, it raised policy and legal issues, including in relation to bilateral air services agreements (*cf.* paragraphs 5.2.1 and 5.2.2). The Working Group had also acknowledged that, among the other possible options, two types of measures had been selected by the States and regions that were currently developing market-based measures: open down-stream emissions trading schemes with direct inclusion of aircraft operators *i.e.* operators have a cap on their emissions and must buy allowances if they exceed it; and open up-stream schemes imposing uplifted fuel charges on aircraft operators *i.e.* fuel vendors have a cap on kerosene, for example, and must pay a charge if they exceed it (*cf.* paragraph 5.2.3). The Working Group considered that those two options were not incompatible. For example, under Scenario C, some States could implement one option and other States, the other option, as the issues of equivalences and compatibility would be taken care of under the global framework.

52. Noting that the Working Group had also discussed the interaction of State and regional measures, the Chairperson indicated that it considered that it was important to ensure effective interaction between market-based measures adopted by States and regions in order to avoid double burdens on air operators, as well as to minimize the risks of distortion of competition and carbon leakage. In that context, WG5 had noted that international aviation access to a global carbon market could be pursued by linking the local carbon markets developed under States and regional measures. The Working Group recommended that ICAO work with appropriate stakeholders, whether the UNFCCC or others, to further develop guidance with a view to facilitating the process. It recognized that, to ensure non-discrimination between operators, the application of similar measures to all operators on routes between States or regions could represent a solution. The Working Group also agreed that implementation of measures per country of departure and other criteria should be considered as an acceptable alternative to minimize competitive distortions (*cf.* paragraphs 5.3.1 to 5.3.3).

53. WG5 had also considered the second principle of CBDR. It had recognized the need to take into account the specific needs and capabilities of developing States when implementing market-based measures. The level of maturity of different States' and regions' aviation markets should in particular be considered (*cf.* paragraph 5.4.1). Referring to paragraph 5.4.2, the Chairperson noted that it had been amended in light of the discussion during the said co-ordination meeting to indicate that the Working Group had considered various ways of applying the principle of CBDR and had noted the following as possible

approaches, based on its analysis of the existing scenarios: a) making the stringency of market-based measures different for different aviation markets; b) distributing revenues generated taking into account the level of development of States; c) exempting small emitters under a given threshold; d) phasing in the participation of States on the basis of the level of maturity of their market. That list was not exhaustive.

54. The Working Group had also discussed the difficult and somewhat controversial subject of the use of revenues generated by market-based measures applicable to international aviation. It had considered that it was only logical for such revenue to be used to fund climate change mitigation and adaptation measures in aviation, as a priority, and possibly in other sectors, domestically but also abroad. As climate change was global, a tonne of CO₂ saved in one sector would have the same effect as a tonne of CO₂ saved in the aviation sector. WG5 considered that, above all, a portion of the revenues generated should be used, as a priority, to assist developing countries. The text of Mr. Schwach's presentation is available on the GIACC secure website and on the ICAO public website.

55. In thanking WG4 and WG5 for their efforts, the Chairperson of GIACC/4 noted that their reports were excellent and were the result of many hours of work.

Discussion of the Report of the Market-based Measures Working Group (WG5)

56. During the ensuing discussion, one Member observed that Scenario C seemed to be the most pragmatic one for the future of international civil aviation. Recalling, however, that according to ICAO's guidelines, market-based measures, particularly emissions trading schemes which involved other States' aircraft operators, should only be implemented on the basis of mutual agreement, he indicated that it would be difficult for his State to accept Scenario C if it did not include that very important element.

57. Observing that WG5 had discussed that issue in a non-confrontational manner, the Chairperson of WG5 stressed the need to seek consensus thereon. The Working Group had recalled Assembly Resolution A36-22, Appendix L, which set forth the requirement for mutual agreement for the imposition of an emissions trading scheme on carriers from another State, to which 42 States had expressed a reservation. While not calling into question what had been done previously, WG5 had kept in mind that there would be another Assembly in 2010 which might facilitate matters. Without venturing into legal or institutional issues, and speaking only from a pragmatic point of view, the Chairperson underscored that it was very difficult to attain mutual agreement. He recalled, in this context, that although the EU Directive on Aviation ETS included the possibility of mutual agreement, a Conference held to discuss and conclude such mutual agreements had not met with success. Thus while mutual agreement was good if it could be achieved, in practice it did not enable the implementation of market-based measures. It was necessary to be realistic.

58. In noting that his State opposed an open emissions trading scheme, the Member indicated that, from the economic point of view, the latter could be justified only when the marginal cost for the reduction for one unit of CO₂ emissions was equal among the sectors concerned. He considered that if the cost for a kilogram reduction of CO₂ emissions was equal between the international aviation sector and another sector, then an emissions trading scheme could be practical and workable. If, however, it were to cost the international aviation sector \$1 million and the other sector only \$1 000, then the goal for capping emissions was not fair or equal. A more ambitious cap should be applied to the other sector; otherwise the international aviation sector might unreasonably suffer. The Member noted that it was very difficult to know what the marginal costs of the various sectors were. While he was aware of an isolated successful precedent regarding the reduction of SO_x emissions by power generators in the United States, that involved a closed emissions trading scheme. The Member emphasized that while his State did not exclude the possibility of market-based measures such as carbon offsets, it did not consider that an open emissions trading scheme was appropriate for the international aviation sector unless it were based on mutual agreement.

59. Another Member underscored that there was nothing to preclude a framework from including the principle of mutual agreement if that was something that was agreed by all the parties. Part of the challenge of developing the framework was reaching consensus on what the parameters might be and those parameters might invoke some elements that already existed in terms of the debate; they might challenge some of those existing elements or they may add some new ones. In her view, that was the challenge and the interest of moving on a sectoral framework, or an ICAO framework, to help guide what individual Member States might choose to do to address their aviation emissions. In suggesting that consideration be given to some timelines for some of the said scenarios, the Member indicated that, if there was an appetite to have a transitional approach commencing with Scenario C, then perhaps a timeline of 2012 should be established to actually develop that framework, which would allow all of the intervening time to be used to consider what the parameters should be. If Scenario B were considered to be the long-term goal, then it would be possible to articulate by 2012 how to proceed towards that scenario, again not committing ICAO to Scenario B but committing to the process to evaluate and assess the considerations that would need to be in place in order for it to move towards that scenario.

60. The Vice-Chairperson of GIACC/4 observed that the said requirement for mutual agreement for the imposition of an emissions trading scheme set forth in Assembly Resolution A36-22, Appendix L, reflected the issue at that time. Separate to that Appendix, the Assembly had established the GIACC under Appendix K to develop a framework and a strategy to deal with the issue of international aviation emissions. Part of the thinking had been that if the GIACC could develop a framework, including market-based measures, which could achieve endorsement through the ICAO process, then it would override the specific wording of Appendix L. Compliance with that framework would override the individual requirement for mutual agreement in a particular case. Thus the agreement would come from compliance with a globally-agreed framework rather than from a particular negotiation.

61. In emphasizing the need to take the issue of market-based measures very seriously, the Vice-Chairperson of GIACC/4 recalled from C/ENV's presentation that international aviation's contribution to CO₂ emissions would double by 2020 and quadruple by 2050, based on medium assumptions which took into account what could be foreseen now as efficiency gains. While there might be the hope of alternative fuels and major technological breakthroughs, they could not be relied upon to counterbalance the potential growth of aviation emissions in making forecasts. The advantage that the market-based measures provided was that the aviation sector might be able to purchase offsets from other sectors to achieve a responsible trajectory for its emissions. The aviation sector could not find efficiencies without curtailing growth. It seemed, from the said projections, that the only way that the aviation sector could achieve a neutral and ultimately decreasing trajectory for its emissions was through a decrease in operations. The real value of the market-based measures was that those emissions savings could be purchased by the aviation sector at much less economic cost overall from other sectors where the savings could be made more efficiently. Thus while all were concerned about the impact of market-based measures on carriers and their operations, such measures seemed to be a very important element of a way to achieve a responsible future for aviation as a whole.

62. A Member indicated that she did not consider that WG5 had discussed the framework of any particular type of market-based measure; in fact, it had tried to come up with a framework where different States might have complementary measures. Averring that further work might need to be done in that regard, she noted that the CAEP was doing some work on how States' different interests and the different types of market-based measures that they might find most applicable could be worked. The Member maintained that the GIACC was a little ahead of itself in talking of specific measures. While agreeing that the statistics showed that efforts would have to be made to address aviation emissions, she underscored that the point of IP/12 presented by the United States was that, with the global economic downturn, it was not necessarily sure that the growth of aviation emissions would be as dramatic as originally projected. That being said, the Member still believed that there would be growth and that it was

necessary to take additional action, whether by using alternative fuels or market-based measures or combinations thereof.

63. In underscoring that WP/3 on market-based measures raised a great deal of concern in his country and in developing countries in general, a Member observed that every international agreement on the protection of the environment recognized the different responsibilities for the degradation of the planet's ecosystems; the "polluter pays" principle had garnered acceptance. CBDR and sustainable development were all agreed principles that had been enshrined in the results of the 1992 UN Rio Conference on Environment and Development. Emphasizing that developing countries were making many efforts to fight climate change, the Member cited the Brazilian and Chinese national plans, which were recognized worldwide as ambitious attempts to reduce GHG emissions. In underscoring that the bases of multilateral agreements on the environment could not be subverted by ICAO, he stressed the need to be cautious in discussing market-based measures. The Member considered that the way WP/3 was presented subverted the spirit and the letter of those multilateral agreements. He emphasized that although developing countries would continue to make substantive efforts to fight climate change, they could not accept to share the burden equally with developed countries as was being suggested by WG5's Report given that climate change was attributable, in most part, to developed countries.

64. Sharing this view, another Member emphasized the need to take into consideration not only the principles of non-discrimination and equal and fair opportunities to develop international aviation set forth in the Chicago Convention, but also the principles and provisions on CBDR established under the UNFCCC and the Kyoto Protocol.

65. In also strongly supporting that view, a Member reiterated that the implementation of market-based measures was a major concern to developing countries and that that might be an area where it would be very difficult to achieve consensus. There were many areas that did not favour the developing countries. The Member averred that the language used in the Report regarding the use of generated funds to assist developing countries was too vague.

66. Stressing that market-based measures were an integral part of action to address aviation GHG emissions, another Member emphasized that WG5's Report proposed a range of such measures and not only an emissions trading scheme. Furthermore, it highlighted, in a substantial number of paragraphs, the need to take into account the specific needs and capabilities of developing countries when implementing such measures. He noted that if GIACC/4 were to agree to Scenario C, then it would be entrusting ICAO to develop a suitable implementation framework which would enshrine the principles of CBDR and non-discrimination.

67. Referring to his earlier comments, a Member reiterated that his State did not exclude the possibility of market-based measures, such as carbon offsets. He suggested that when an implementation framework was developed, it should take account certain principles, such as those proposed by Australia as reflected in paragraph 3.3.4.1 of the Working Group's Report. In his view, such a framework should be implemented on a voluntary basis by States and industry and should be equally applicable. Furthermore, participants in such a framework, especially those from developing countries, should have incentives to more aggressively achieve a reduction of aviation CO₂ emissions. The framework should contribute to attaining more ambitious goals, as well as the global aspirational goals. Lastly, the cost to ICAO of administering such a framework should be either nothing or very low.

68. Observing that there was much misunderstanding with respect to WG5's Report, a Member stressed that it had been intended to be as far-reaching as possible. Many ideas had been raised and proposals made during the Working Group's deliberations. WG5 had heard from a number of industry players who had put forward their vision of how a potential sectoral approach might work. None of those approaches, including the variants that Australia and Canada had suggested, had been put forward as

positions. The Working Group had not considered whether they were good or bad ideas or whether ICAO should accept them or not. There was no proposal on the table that any of those ideas and suggestions had to be accepted today. They had been useful as a launching point for debate and an early expression of views with respect to possible directions, major concerns and some of the considerations that had to be taken into account as ICAO moved from the current scenario, under which States, individually, or regions, individually, decided how far they wanted to go in addressing aviation emissions. They set their own goals and decided themselves what degree of market-based measures they would use.

69. Recalling that the GIACC had recognized, at its First Meeting, that international civil aviation did not have any boundaries, the Member noted that the Group had recognized that there was a need to move gradually and that it was up to the GIACC to decide how gradual that was. It was also necessary, however, to communicate to the larger global dialogue by recognizing the need to demonstrate progress on this issue. The reason why Scenario C was being put forward was that it was totally non-binding; there was no obligation on any State to do anything differently from what they currently did. Scenario C only stated that there should be a dialogue that established an ICAO framework. Noting that many good suggestions had been made for possible elements of such a framework, the Member indicated that they should be fully debated.

70. Reiterating that the scenarios that put forward in the Working Group's Report had been an effort to focus the discussion, another Member underscored that they had served to do that. WG5 had considered that Scenario B was not practical at the present time and that Scenario A would probably engender litigation. Noting that Scenario C was a very carefully worded effort to find a way forward on a very contentious issue, she indicated that discussion thereof needed to continue. In agreeing that some of the developing countries had all raised valid issues that needed to be considered, the Member recalled that at GIACC/3 the Group had acknowledged, in its document *A way forward in the GIACC process*, ICAO's principle of non-discrimination while recognizing the greater UNFCCC framework and the principle of CBDR. Scenario C involved a collection of national efforts where each State could take actions that were consistent with its views on what the best way forward should be. That being the case, the issue of CBDR would not necessarily arise. Additional work to develop an ICAO framework would be required in moving forward.

71. While recognizing that market-based measures might prove necessary to reduce aviation emissions to the required level, a Member emphasized that they should be optional, with States implementing them as they saw fit. He underscored that by making them optional for non-Annex I States and requiring that they be implemented on the basis of mutual agreement, the principle of CBDR would be observed. Furthermore, the airlines of non-Annex I States would not be subjected to unfair practices.

72. A Member clarified that he was willing to continue to discuss market-based measures and scenarios on the understanding that they would have some degree of flexibility and in light of what was discussed in GIACC/3. His comments were more directed to one particular measure, an emissions trading scheme. If Annex I States wished to establish a cap-and-trade scheme that would only impact them and would be based on mutual agreement, then that would demonstrate the lead that those States were taking in addressing climate change. It should be very clear, however, that any quantified targets attributable to developing countries would not be consistent with their historical responsibilities. Any discussion of an emissions trading scheme should take place in that context. Furthermore, it should be clear that any such scheme should not lead to competitive distortions. The Member noted that there were several practical doubts regarding the management of such emission trading schemes.

73. Averring that the market-based measures were based on a lot of "ifs", a Member indicated that the GIACC should recommend to ICAO that it should encourage those States that were in a position to take such measures to take the lead and do so, in order to set an example.

74. The Secretary of the GIACC indicated that the views expressed would be reflected in the draft GIACC Report.

— END —