



**Agenda Item 8: Environment Matters**  
**8.3 Aviation and Global Climate**

**AVIATION AND CLIMATE CHANGE**

(Presented by the Secretariat)

**SUMMARY**

This paper provides an overview of ICAO's work on aviation and climate change, in particular the activities of the Group on International Aviation and Climate Change (GIACC) and supporting activities of the Committee on Aviation Environmental Protection (CAEP) aimed at addressing greenhouse gas emissions from international aviation.

Action by C/CAR/DCA is in paragraph 6.

**References:**

- Assembly Resolution A36-22: Consolidated statement of continuing ICAO policies and practices related to environmental protection

**Strategic  
Objectives**

*This working paper is related to Strategic Objectives C1 and C2.*

**1. Introduction**

1.1 The 36th Session of the ICAO Assembly in September 2007 recognized the critical importance of ICAO's providing continuous leadership to international civil aviation in limiting or reducing emissions from aircraft that contribute to global climate change, and called for the formation of a high-level Group on International Aviation and Climate Change (GIACC). The GIACC was tasked to develop and recommend to the Council a Programme of Action on International Aviation and Climate Change for which technical support would be provided by the Committee on Aviation Environmental Protection (CAEP). The GIACC was formed in January 2008, and is comprised of 15 senior government officials representative of all ICAO regions with an equitable participation from developing and developed States.

1.2 Appendix K of Assembly Resolution A36-22, identified the four key elements of the Programme of Action as 1) an implementation framework, 2) global aspirational goals for international aviation, 3) measures to achieve emissions reductions, and 4) means to measure progress. GIACC held its first meeting in February 2008 and its second meeting in July 2008, in which three working groups were formed to expedite work on the key elements of the Programme of Action.

1.3 The working groups were tasked with bringing specific proposals forward for consideration at the third GIACC meeting (GIACC/3) in February 2009. Following GIACC/3, two working groups were formed to further discuss global aspirational goals and market-based measures and to further explore options in these areas for consideration at the fourth and final GIACC meeting (GIACC/4) in May 2009. In parallel with GIACC activities, CAEP and the Secretariat have continued their related work which supported and informed the GIACC process.

1.4 This paper briefly describes the conclusions of GIACC and supporting activities of CAEP to address greenhouse gas (GHG) emissions from international aviation. All the documents related to the GIACC are available at: [http://www.icao.int/env/meetings/Giacc\\_Root.html](http://www.icao.int/env/meetings/Giacc_Root.html).

## **2. Overview of GIACC Conclusions**

2.1 As a result of its four meetings, GIACC recommended a global aspirational goal of 2% annual improvement in fuel efficiency of the international civil aviation in-service fleet. This would represent a cumulative improvement of 13% in the short-term (2010 to 2012), 26% in the medium-term (2013 to 2020) and about 60% in the long-term (2021 to 2050), from a 2005 base level. There was no consensus reached on stronger proposals, such as carbon neutral growth in the medium-term and carbon emissions reduction in the long-term. As a result, GIACC recommended to the ICAO Council that further work on both medium and long-term goals be carried out.

2.2 The goals agreed by GIACC would not attribute specific obligations to individual States. The different circumstances, respective capabilities and contribution of developing and developed States to the concentration of aviation GHG emissions in the atmosphere will determine how each State may contribute to achieving global aspirational goals.

2.3 GIACC recommended a basket of measures from which States may choose to reduce international aviation emissions, with the use of aircraft-related technology, improved air traffic management and infrastructure, more efficient operations, economic/market-based measures, and regulatory measures. Each State would retain the ultimate authority to choose the portfolio of measures appropriate to its circumstances, consistent with the global aspirational goals, and be encouraged to develop and file with ICAO individual action plans.

2.4 Given the diverging views on the application of market-based measures across national borders, GIACC recommended that the ICAO Council establish a process to develop, expeditiously, a framework for market-based measures in international aviation, taking into account the conclusions of the High-level Meeting to be held in October 2009 and the outcome of the fifteenth meeting of the Conference of the Parties (COP15) of the United Nations Framework Convention on Climate Change (UNFCCC) to be held in December 2009.

2.5 The need for accurate and complete data on aviation traffic and fuel burn was recognized by GIACC, and further work by the Secretariat under its Article 67 authority was recommended, including the provision of technical and financial support to developing countries to assist them in this regard.

2.6 The Programme of Action agreed by consensus in GIACC (**Appendix**) was accepted by the Council at the end of June 2009.

### **3. Supporting Activities in CAEP**

3.1 Prior to the formation of GIACC, the seventh meeting of CAEP in February 2007 decided to establish medium and long-term fuel burn goals relating to technological development of airframe and engines, as well as those goals relating to operational measures such as the improvement of air traffic management. Utilizing the Independent Experts (IE) processes under CAEP, the projections on technological and operational improvements were incorporated into the environmental goals assessment for year 2016, 2026, 2036 and 2050 timeframes using prediction models. In response to the request from the GIACC/3, the assessment was extended to include the year 2012, 2020, 2025 and 2050 timeframes.

3.2 CAEP endorsed the use of the “Commercial Aircraft System Fuel Efficiency Metric (CASFE = Fuel Mass Consumed / Payload × Distance)” as the fuel efficiency metric for the environmental goals assessment, and agreed on further refinement of the metric by taking into account alternative fuels. Information was provided to GIACC/4 (GIACC/4-IP/2) in this regard.

3.3 At present CAEP is finalizing its technical work on the quantification of future CO<sub>2</sub> emissions trends and fuel efficiency improvements of the global aviation system for the period 2006 through 2050. The preliminary result was provided to GIACC/4 (GIACC/4-IP/1) for its deliberations. The CAEP Steering Group meeting in June 2009 reviewed the preliminary result prior to its final consideration at the eighth meeting of CAEP to be held in February 2010.

3.4 CAEP is also continuing its technical work on mitigation measures, including the increase of current NO<sub>x</sub> emissions stringency and, as recommended by GIACC, the development of an aviation CO<sub>2</sub> Standard. Building upon ICAO guidance on Operational Opportunities to Minimize Fuel Use and Reduce Emissions (Circular 303), which identifies and reviews various operational opportunities and techniques for minimizing fuel consumption and hence CO<sub>2</sub> emissions in civil aviation operations, CAEP is developing new guidance material to be finalized in February 2010. This guidance material will contain new and updated information on current initiatives relating to fuel burn reduction and, to the extent possible, feature new provisions including reporting and monitoring of aviation emissions as well as aviation emissions assessment methodologies.

3.5 CAEP is preparing a report that offers guidance on methods of calculating fuel burn and CO<sub>2</sub> from operating civil aircraft (on a gate-to-gate basis) including passenger and freight traffic and reporting the related CO<sub>2</sub> emissions at the local, national and global levels.

3.6 It is also worthy of note that, on the subject of market-based measures to reduce aviation CO<sub>2</sub> emissions, ICAO developed a template in 2004 for voluntary agreements between aviation industries and public organizations, and collected and shared information on voluntary actions to reduce aviation GHG emissions by Contracting States and various stakeholders in 2007. In the same year, ICAO also published guidance for States for incorporating international aviation emissions into their trading schemes (The Guidance on the Use of Emissions Trading for Aviation, Doc 9885).

3.7 CAEP is now conducting a study on issues related to linking open emissions trading systems involving aviation. With the implementation of different emissions trading schemes throughout the world, the increased harmonization of features and processes may facilitate the linkage of such schemes, thus enabling the creation of a global scheme. CAEP is also developing a study on the potential for carbon offset measures to mitigate the impact of aviation on climate change, recognizing its potential for implementation in the short term. Information on the latest CAEP work on mitigation measures was provided to GIACC/4 (GIACC/4-IP/2).

#### **4. Aviation and Alternative Fuels**

4.1 In addition to technical, operational and market-based measures, the use of alternative fuels offers one of the most promising options for reducing aviation emissions. In February 2009, an ICAO Workshop on Aviation and Alternative Fuels (<http://www.icao.int/waaf2009/>) explored potential options and examined challenges to the development and deployment, and discussed as to what initiatives would promote international cooperation, related to aviation alternative fuels.

4.2 ICAO is planning a Conference on Aviation and Alternative Fuels to be hosted by Brazil from 16 to 18 November 2009. The conference will consider establishing an internationally agreed roadmap for facilitating the implementation of alternative fuels for aviation. The results of the conference should also prove of interest to COP15. Information on the latest ICAO work on aviation and alternative fuels was provided to GIACC/4 (GIACC/4-IP/3).

#### **5. Next Steps**

5.1 Appendix K of Assembly Resolution A36-22 requested the Council to convene a High-level Meeting to review the ICAO Programme of Action on International Aviation and Climate Change, taking into account COP15. The High-level Meeting will be held from 7 to 9 October 2009 in Montreal to review the Programme of Action recommended by the GIACC and considered by the Council. The report of the High-level Meeting will focus on conclusions and recommendations and will be considered by the Council during its 188th Session, thus enabling ICAO to provide input to COP15 in December 2009.

5.2 It must be noted that the development schedule of the Programme of Action by ICAO is aligned with the Bali Roadmap under the UNFCCC, and the Contracting States of ICAO represent a virtually identical constituency as the States that are parties to the UNFCCC. The draft negotiating text that resulted from the Bonn climate talks in June 2009 (paragraphs 135 to 138.1 of FCCC/AWGLCA/2009/INF.1 available from [www.unfccc.int](http://www.unfccc.int)) already contains proposed options for international bunker fuels which States have begun discussing.

5.3 The opinion of Parties to the UNFCCC has continued to be divided over the issue of how to deal with GHG emissions from international aviation and maritime transport in the future agreement, with some States being willing to establish targets for the sectors under the UNFCCC and others supporting the coordination of all aspects of international aviation and maritime GHG emissions under ICAO and IMO, respectively. The High-level Meeting will provide an opportunity for the 190 ICAO Contracting States to have an informed and structured debate on aviation, with expert advice. It also marks the final and therefore critical opportunity to do so in advance of COP15.

5.4 In this context, the views and positions of all ICAO Contracting States on the issue of emissions from international aviation at COP15 in December 2009 should be fully consistent with the conclusions and recommendations adopted by the High-level Meeting, and be the shared vision and strong will of all 190 ICAO Contracting States to address emissions from international aviation.

## **6. Action by the C/CAR/DCA Meeting**

6.1 The C/CAR/DCA Meeting is invited to:

- a) note the information presented in this paper;
- b) request that States submit papers with their views and suggestions on the Programme of Action to the upcoming High-level Meeting on International Aviation and Climate Change (HLM);
- c) request that States participate in the HLM with the objective of emerging with a shared vision on how to address bunker fuels from international aviation at COP15;
- d) continue considering environmental issues in the planning and implementation of regional air navigation systems including the development of new routes, design of terminal procedures, and ground movements; and
- e) note that CAEP will continue to keep the regions informed of future developments on the subject of aviation and climate change.

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## APPENDIX A

### GIACC PROGRAMME OF ACTION

*(This Programme of Action was adopted by consensus in GIACC)*

1. GIACC recognizes the critical importance of addressing climate change, and thus recognizes the need to strive to find ways and means to limit or reduce the impact of greenhouse gas emissions from international civil aviation on the global climate.
2. GIACC agreed that decisions of this group shall not prejudice the outcome of the negotiations under the UNFCCC and Kyoto Protocol.
3. GIACC acknowledges the principles and provisions on common but differentiated responsibilities and respective capabilities, and with developed countries taking the lead under the UNFCCC and the Kyoto Protocol.
4. GIACC acknowledges the principles of non-discrimination and equal and fair opportunities to develop international aviation set forth in the Chicago Convention.
5. While there was no consensus, some GIACC Members are of the view that the Programme of Action does not address the commitments under article 2.2 of the Kyoto Protocol.
6. Notwithstanding the substantial fuel efficiency improvements achieved by the aviation sector and the impact of the current economic downturn, GIACC recognises that the projected growth of international air traffic will outweigh the gains made by currently projected fuel efficiency improvements resulting in an average year over year increase in total fuel burned.
7. GIACC recommends a strategy for efforts to achieve global aspirational goals.
8. The short term goal to 2012 agreed by the GIACC is for improvements in the in-service fleet average fuel efficiency of international aviation operations at the rate of 2% per year, calculated on the basis of volume of fuel used per Revenue Tonne Kilometre performed.
9. Agreement was reached in GIACC on goals in the form of fuel efficiency for the medium and longer terms. Specifically, the Group recommends an annual improvement of 2% over the medium term until 2020. For the long term, the GIACC recommends an aspirational global fuel efficiency improvement rate of 2 % per annum from 2021 to 2050.
10. These goals are established on the basis of forecasts and GIACC recommends that they be reviewed on a periodic basis in light of scientific and technological advances. To achieve these goals will require a significant investment in technological development.
11. In addition to fuel efficiency goals, the group considered goals that could indicate stronger ambition. For the medium term, the discussions focused on a goal of carbon neutral growth by 2020. For the long term, the GIACC discussed carbon emissions reductions. No consensus was reached in either case, and GIACC recommends further work on both medium and long term goals.
12. While there was no consensus, some GIACC members are of the view that it would be necessary and feasible to achieve carbon neutral growth in the medium term, relative to a baseline of 2005, and to achieve substantial CO<sub>2</sub> emissions reduction for the long term for global international aviation.

13. Under the recommended strategy, goals would not attribute specific obligations to individual States. The different circumstances, respective capabilities and contribution of developing and developed States to the concentration of aviation GHG emissions in the atmosphere will determine how each State may contribute to achieving the global aspirational goals.

14. GIACC recommends that the Council should adopt the basket of measures developed by GIACC, from which States may choose (<http://www.icao.int/>), covering aircraft-related technology development, improved air traffic management and infrastructure use, more efficient operations, economic/market-based measures, and regulatory measures. The basket includes measures to facilitate access to assistance, particularly for developing countries.

15. GIACC has provided an initial table showing the basket of measures, which can be further developed through ICAO. GIACC also recommends that ICAO should continue to develop, and update as necessary, guidance to States on the adoption of those measures, including measures to assist developing countries, as well as access to financial resources, technology transfer and capacity building.

16. GIACC acknowledges that there remains disagreement on the application of market-based measures across national borders. GIACC recommends that the ICAO Council establish a process to develop a framework for market-based measures in international aviation, taking into account the conclusions of the High-Level Meeting and the outcome of the UNFCCC COP-15 with a view to complete this process expeditiously.

17. GIACC recommends that Council should encourage States, to develop action plans which articulate the proposed approach in that State, and file those plans with ICAO.

18. GIACC recommends that Council direct the Secretariat to develop and implement a mechanism under Article 67 of the Convention to collect annually from States data on traffic and fuel consumption.

19. GIACC also recommends that Council seek to develop approaches for providing technical and financial assistance in the reporting process to developing countries.

20. GIACC also recommends that the Council seek to develop a CO<sub>2</sub> standard for new aircraft types.

21. The cumulative progress achieved by States on a global level should be reported by ICAO on a triennial basis to the Assembly.