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ASSEMBLY — 39TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 22: Environmental Protection – International Aviation and Climate Change – Policy, Standardization and Implementation Support

CLIMATE CHANGE & AVIATION GROWTH IN INDIA

(Presented by India)

EXECUTIVE SUMMARY

With a significant passenger growth rate, India will be the 3rd largest aviation market in the world by 2020. However, the country has to face environmental challenges commensurate with this growth. In order to achieve sustainable growth in civil aviation, DGCA has taken proactive initiatives. This information paper provides the initiatives taken by the DGCA and its stakeholders to reduce the emissions towards a sustainable growth.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objective E – <i>Environmental Protection</i> .
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<i>Financial implications:</i>	Not applicable.
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1. INTRODUCTION

1.1 At present, India is the world's ninth largest aviation market with more than 80 operational airports with 17 airports having international operations, more than 700 aircraft, 14 scheduled airlines and nearly 120 non-scheduled operators. Currently, India's aviation industry caters to nearly 122 million domestic and 47 million international passengers. Over the next decade, the market could reach 337 million domestic and 84 million international passengers. Therefore, the Indian aviation industry has a large potential for growth in the years to come.

1.2 India continues to face the challenges of sustaining its economic growth while dealing with the global threat of climate change. This threat emanates from accumulated GHG emissions in the atmosphere, anthropogenically generated through long-term and intensive industrial growth of developed nations. Climate change may alter the distribution and quality of India's natural resources and adversely affect the livelihood of its people. With the economy closely coupled with its natural resources and climate sensitive sectors such as agriculture, water and forestry, India may face a major threat because of the projected changes in climate in the years to come. Global aviation's economic impact is estimated at 2.2 trillion US dollars, representing 3.5% of the worldwide Gross Domestic Product (GDP). The industry transports around 3 billion passengers every year and supports almost 57 million jobs. Within the Asia-Pacific region, aviation represents a 470 billion dollar industry, transports 780 million passengers and supports 24 million jobs.

1.3 Intergovernmental Panel on Climate Change (IPCC) report has established that aviation's contribution to climate change, though small at present, could grow if appropriate actions are not taken to offset the growth. Although developing countries such as India, do not have any legal binding on reduction of GHG emissions, however, several proactive initiatives are being taken by all its stakeholders to reduce or minimize carbon emissions from aviation sector.

1.4 India signed the UNFCCC on 10th June, 1992 and ratified it on 1st November, 1993. The Kyoto Protocol to the UNFCCC was adopted in 1997, which requires developed countries and economies in transition to reduce their Greenhouse Gas (GHG) emissions below 1990 levels. India acceded to the Kyoto Protocol on 26th August, 2002. As per the UNFCCC and its protocol, developing countries such as India, do not have binding on GHG mitigation commitments in recognition of their small contribution as well as low financial and technical capacities.

1.5 India is engaging actively in multilateral negotiations in a positive, constructive and forward looking manner with an objective to establish an effective, cooperative and equitable global approach based on the principle of Common but Differentiated Responsibilities (CBDR) and respective capabilities. The success of India's efforts would be significantly enhanced provided the developed countries affirm their responsibility for GHG emissions and fulfil their commitments to transfer new and additional resources and climate friendly technologies to support both adaptation and mitigation in developing countries rather by imposing the same level of standards and requirements on all States to developed countries.

2. DISCUSSION

2.1 Carbon Footprint for Civil Aviation Sector:

2.1.1 The carbon footprint represents an important tool to understand the sources and magnitude of carbon emissions of any industry or organization based on which future emission reduction

policies/strategies can be formulated. In 2012 the DGCA completed the first-ever detailed carbon footprint of Indian aviation for the year 2011 (i.e., domestic operations, and Indian/foreign flights to/from India). It was released during the 50th DGCA conference held during October, 2012 and obtained significant recognition from the international aviation community. Since then, carbon footprint Report for Indian aviation sector is being developed annually for monitoring purposes.

2.1.2 The salient features of carbon footprint report for 2014 is as follows:

- a) The total carbon emissions for 2014 was 16.4 million tonnes of CO₂;
- b) In 2014, global airline operations were responsible for the emission of 739 million tonnes of CO₂ representing 2-3% of global anthropogenic emissions;
- c) In 2014, major airports emitted 0.82 million tonnes of CO₂;
- d) India's total carbon emission from aviation represents less than 1% which is significantly lower than the global average;
- e) In the absence of any reduction measures, CO₂ emissions may reach 30 million tonnes by 2020;
- f) The internationally accepted efficiency indicator for carbon emissions is kgs of CO₂ per RTK. Continued efforts of DGCA towards reduction in carbon emissions has resulted in reduction of this value from 1.06 in 2011 to 0.95 in the year 2014 bringing it at par with the global average; and
- g) Overall, in 2014, CO₂ emissions from Indian scheduled passenger airlines has increased which is attributed to domestic operations by new airlines, introduction of new routes and an overall increase in aircraft movements by the airlines as well as passenger growth.

2.2 **Airline initiatives:**

2.2.1 Fuel cost of any airline is the largest constituent of their operational cost and any saving in fuel cost leads to decrease in the total operational cost with an addition benefit of reduction in carbon emissions as well. With this objective, airlines have started adopting following measures that help them in reducing their fuel consumptions leading to reduction in carbon emissions too:

- a) Upgradation of aircraft fleet through renewal and engine modernization program for better fuel efficiency;
- b) With a view to further improve fuel efficiency, airlines have started looking towards new aircraft models with state-of-art technologies and more fuel efficient engines that may result in substantial reduction in emissions in future. With induction of Boeing 787 Dreamliner which offers superior economic performance with 15% lower fuel consumption and future order of A320NEOs and B737Max options, further improvement in fuel efficiency is expected;
- c) Engine core water wash at regular intervals to increase fuel efficiency;
- d) Use of Computerized Fuel Plan (CPF) as conservative criteria for computing fuel requirements for a flight path;

- e) Usage of APU has been replaced by ground electrical power and air conditioning by airport based support system;
- f) Airlines have also adopted “Single Engine Taxi-in/out” policies and procedures specific to their operations;
- g) Airlines have adopted delayed deceleration approaches with aircraft kept in clean aerodynamic configuration during the approach phase of flight to reduce fuel burn;
- h) Usage of New Flight Planning System leading to preparation of flight plans by optimizing the routes and provides cost effective routing for every flight; and
- i) Usage of Electronic Flight Bags (EFB) is a major initiative towards paperless cockpit leading to weight and fuel saving in everyday operations.

2.3 **Airport initiatives:**

2.3.1 Airports in India are committed to conduct its business in an environment friendly and sustainable manner by minimizing the impact of their activities on the environment through optimization of natural resource utilization and energy consumption resulting in reduced emissions. Energy conservation and renewable energy development along with emission reduction is an integral part of their business strategy towards achieving credibility and sustainability in the aviation business. Airports in India have identified the emission sources from airlines and other business units operating within the premises of the airports and started working to minimize them such as on-site fuel consumption and electricity consumption, etc. With this objective, airports have started adopting following measures to reduce emissions:

- a) Adoption of Carbon Accounting & Management System (CAMS) for reducing airports GHG emissions which is based on the guidelines provided in the ISO 14064-1 for quantification and reporting of greenhouse gas emissions and removals. Airports are also using Environment Management System (ISO 14001), Energy Management System (ISO 50001:2011) and Green House Gas Reporting (ISO 14064) mechanism which helps them to develop and implement policy, objectives and action plans taking into account legal and other requirements for GHG reduction;
- b) Participation in Airport Carbon Accreditation Programs at various levels for emission reduction;
- c) Participation in Leadership in Energy and Environment Design (LEED) with an objective to reduce pollution & waste management, provision for eco-friendly vehicles, use of recycled water, energy-efficient electric lighting, etc;
- d) Use of advanced aerobridges fitted Fixed Electrical Ground Power (FEGP) and Preconditioned Air (PCA) in order to minimize aircraft and vehicular pollution at the airport and prevents the use of APU at parking bay;
- e) Use of dedicated Compressed Natural Gas (CNG) vehicles and electrically operated baggage tugs and buggies for transport of baggage, cargo and passenger in the apron, cargo and passenger terminal building;

- f) Installation of solar power plant at airside premises and solar water heaters at the terminals in order to promote renewable energy use;
- g) Continuous Descent Approach (CDA) and Continuous Decision Making (CDM) procedures to reduce taxi time leading to fuel saving; and
- h) As of now, Bangalore, Hyderabad, New Delhi and Mumbai airports are members of Airport carbon Accreditation and have been accredited at different levels such as Optimization and Reduction levels.

2.4 **Air Navigation Services initiatives:**

2.4.1 India has launched the Future India Air Navigation System (FIANS) initiative, which is based on projects in the fields of communication, navigation and surveillance. Indicative projects include implementation of Performance Based Navigation (PBN), use of Automatic Dependent Surveillance-Broadcast (ADS-B), harmonization with international systems, human resources development and training, etc. PBN roadmap has been developed and several projects have already been launched. For example, PBN implementation at some airports has already reduced flight distance resulting in fuel saving. In future, more emphasis will be given on PBN and ATM related technical issues to further streamline congestions at airports and airspace, avoid delays at runways for take-off and landings, etc.

2.4.2 India has launched GPS-aided geo augmented navigation (GAGAN) satellite based navigation system which has been jointly developed by Indian Space Research Organization and Airport Authority of India and certified by the DGCA. The system provides improved efficiency, direct routes, approach with vertical guidance at runways, reduced workload of flight crew and air traffic controllers, increased fuel savings and reduction in carbon emission for the benefit of environment.

3. **CONCLUSION**

3.1 In conclusion, India and its aviation industry have taken a number of important steps to address aviation's contribution to climate change.

4. **ACTION BY THE ASSEMBLY**

4.1 The Assembly is invited to note the information contained in this Paper.

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