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EXECUTIVE COMMITTEE

Agenda Item 17: Environmental Protection

AGREEMENT OF VOLUNTARY ACTIVITY FOR GHG REDUCTION IN THE REPUBLIC OF KOREA

(Presented by the Republic of Korea)

EXECUTIVE SUMMARY

This paper demonstrates the voluntary initiatives and measures taken in the Republic of Korea (ROK) for the sake of greenhouse gas (GHG) emission reduction. These initiatives and measures are supported by the agreement signed between the government and air carriers. The ROK proposes that Member States share their achievements in GHG reduction that were derived by voluntary agreements of fuel saving activities in various areas, for instance efficient fuel management in aircraft scheduling and aircraft maintenance; aircraft weight reduction to improve aircraft performance; and operation procedure improvement at the air traffic control facilities.

Strategic Objectives:	This working paper relates to Strategic Objective C – *Environmental Protection and Sustainable Development of Air Transport.*
Financial implications:	No financial implications.
References:	ICAO template and guidance on voluntary measures.

1. INTRODUCTION

1.1 The Republic of Korea (ROK) is not obliged to reduce its greenhouse gas (GHG) emission under the Kyoto Protocol; however, the ROK has called for a 30% reduction of Business As Usual (BAU) by 2020, as a mid-term national target. This figure is the highest target of GHG reduction that the Intergovernmental Panel on Climate Change (IPCC) has recommended for developing countries, which is between 15 and 30%.

1.2 Currently, a total of seven air carriers are operating in the ROK, including five low-cost carriers (LCCs). The GHG emission has been increasing steadily over the last five years by 8% on the annual average, due to the growth of LCCs and the increased demand for air transportation.

1.3 The GHG emission of the ROK's air carriers was approximately 17.3 million tons in 2010, which accounts for 2.6% of the whole nation's GHG emission. International flights account for 93.2% whereas domestic flights account for 6.8% of the whole aviation emission.

1.4 The ROK established a Guideline for Voluntary Reduction Agreement in January 2010. The agreement is based on the standard agreement developed by ICAO as a proactive response to international climate change regulations. It incorporated opinions of civil organizations by holding a Non-Governmental Organization (NGO) advisory meeting. A Voluntary Agreement Committee which consists of the private sector, the government and research institutions was organized in order to set the GHG reduction target and check the implementation status.

1.5 At the first phase, three air carriers, which are Korean Air, Asiana Airlines and Jeju Air, participated in the voluntary reduction agreement. At the current third phase, seven air carriers including five LCCs agreed to sign the agreement. The participating air carriers voluntarily set a target of fuel efficiency improvement after reviewing the annual average of fuel efficiency recorded in the last three years. The air carriers prepared detailed implementation measures and performed reduction activities for the agreed period.

1.6 Evaluations were conducted to verify implementation results, target achievement status and the effectiveness of reduction tools.

2. PROCEDURES TO ACQUIRE DATA

2.1 Most of calculation criteria for fuel consumption, GHG emission and tonne-kilometer results came from the 2006 IPCC Guidelines for National GHG Inventories. The method for monitoring fuel consumption data was applied considering conditions of participating air carriers.

2.2 **Fuel Consumption:** Fuel consumption data is based on the amount of fuel that was actually consumed by each flight. Depending on the air carriers' circumstances, fuel consumption data is acquired for the Aircraft Communications Addressing and Reporting System (ACARS) equipped aircraft in the following ways:

— Actual fuel consumption for each flight = Amount of fuel remaining in the fuel tank after the previous flight + Amount of fuel supplied to the aircraft fuel tank for the next flight – Amount of fuel remaining in the fuel tank for subsequent flight is completed

— Fuel consumption amount of aircraft without the ACARS is calculated by using the data from the flight log sheets.

2.3 **GHG Emission**: The tier2 methodology that separates the Landing and Take-off (LTO) stage from the cruise stage is applied to calculate the amount of GHG emission. Also, data on the number of LTOs by aircraft type and fuel consumption is utilized. The emission factors for LTOs and cruise by aircraft type are based on the 2006 IPCC guidelines.

2.4 **Calculation Formula for Tonne-Kilometer**: Tonne-kilometer data is calculated by multiplying the distance by payload, whereas the distance is calculated by adding the additional coefficient of 95 km to the great circle distance. The great circle distance can be defined as the shortest distance between two points on earth, and the World Geodesic System - 1984 (WGS 84) is applied for calculation. The longitude and latitude of the aerodrome is based on the aerodrome location data published in the Aeronautical Information Publications (AIP). The payload is calculated by adding up the freight and mail weight, revenue passengers, non-revenue passengers, positioning crew and checked baggage weight. The basic value for the passengers and checked baggage is set to 100 kg per passenger. When calculating the weight of the passengers and checked baggage, the duty crews for the flight and infants without seats are excluded from this calculation.

2.5 **Fuel Density**: In case the amount of fuel uplift and the fuel quantity in the fuel tank is measured in units of volume, the airline can convert the amount into mass by using the actual fuel density values. In case fuel density is not available, the standard density factor of 0.8 kg/liter can be applied.

3. MEASURES FOR GHG REDUCTION

3.1 Voluntary Measures to Reduce GHG

3.1.1 Air carriers participating in the voluntary agreement implemented fuel saving activities in various areas, such as efficient management in overall aircraft scheduling; flight operation including activities from ramp-out to ramp-in and aircraft maintenance; aircraft weight reduction to improve aircraft performance; and operation procedure improvement by the air traffic control service providers.

3.2 Effective Measures for GHG Reduction

3.2.1 The top-ranking GHG reduction measures taken by airlines to improve aircraft fuel efficiency are as follows:

a) application of dynamic and tactical cost index

b) use of idle reverse thrust on landing and reduced flap on take-off

c) application of one engine taxing

d) efficient Fuel Correction Rate (FCR) margin application by analyzing fuel consumption data

e) use of Ground Power Unit (GPU) instead of Auxiliary Power Unit (APU)

f) alternate airports optimization

g) engine water washing

4. CONCLUSION

4.1 Voluntary initiatives and measures supported by the agreement between the government and air carriers were proved to be effective in GHG emission reduction.

5. FUTURE PLAN

5.1 The challengeable reduction target will be recommended by considering the fuel efficiency level of each carrier and will be based on ICAO recommendations of the annual average target of 2% fuel efficiency improvement.

5.2 Competition amongst participating air carriers will be encouraged by reflecting implementation results to the international air transport right assessment. Assessment indicators consist of four parts, which are fuel efficiency, fuel efficiency improvement rate, reduction target and achieved target.

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