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WORKING PAPER

ASSEMBLY — 38TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 17: Environmental Protection

INDONESIA GREEN AVIATION INITIATIVES FOR SUSTAINABLE DEVELOPMENT: ALTERNATIVE FUEL FOR AIRCRAFT OPERATIONS

(Presented by Indonesia)

EXECUTIVE SUMMARY	
This working paper provides and shares information on Indonesia's Green Aviation Initiatives for Sustainable Development regarding Alternative Fuels for Aircraft Operations as part of pre-implementation and implementation measures of the State Action Plans regarding climate change and mitigation of greenhouse gas (GHG) emissions.	
Strategic Objectives:	This working paper relates to Strategic Objective C – *Environmental Protection and Sustainable Development of Air Transport.*
Financial implications:	No additional resources required.
References:	Not applicable.

1. INTRODUCTION

1.1 The Directorate General of Civil Aviation, Ministry of Transportation, has taken several policy and implementation measures in line with the commitment of the President of the Republic of Indonesia to actively participate in and contribute to the global initiatives of mitigation of climate change and reduction of greenhouse gas emissions by 26% accumulative up to the year 2020 with its own activities on the basis of 2005 emissions. These measures are considered with reference to the ICAO global policy and guidelines.

1.2 Regarding the global initiatives of mitigation of climate change and reduction of greenhouse gas emissions, Indonesia very much appreciates the ongoing work of the ICAO Council to forge a consensus among ICAO Member States including a basket of measures and related action. This ongoing work is encouraging and Indonesia is prepared to fully support the emerging path towards consensus outlined by the Council.

1.3 Following the International Green Aviation Conference 2013 (IGAC-2013), Indonesia has initiated policy, strategy and implementation measures on alternative fuel for aircraft operations, regarding domestic and/or international flights, for the period of 2016-2020.

2. SUSTAINABLE DEVELOPMENT OF ALTERNATIVE, RENEWABLE FUEL FOR AIRCRAFT OPERATIONS

2.1 Indonesia is the world's largest archipelago state, situated between latitudes 11°S and 6°N, and longitudes 95°E and 141°E. It consists of 17,508 islands, about 6,000 of which are inhabited. Referring to the 2010 national census, the population of Indonesia is 237.6 million[1]. Nowadays, as a member of the G-20 major economies, the Indonesian economy is the world's sixteenth largest by nominal GDP and the fifteenth largest by purchasing power parity. There are 45 million members of the consuming class and 53% of the population lives in cities, producing 74% GDP. There are 55 million skilled workers. The estimated gross domestic product (nominal) as of 2012 was US$ 928.274 billion, with an estimated nominal per capita GDP of US$ 3,797, and per capita GDP PPP of US$ 4,943[2]. Using the current estimation scenario of 5% - 7% GDP growth per year up to 2030, the Indonesian economy will become more significant as seventh largest in the world with 135 million members of the consuming class, 71% of the population living in cities producing 86% GDP, and with 113 million[3] skilled workers with a domestic market of US$ 1.1 trillion. The estimated GDP will be between US$ 6.7 and 9.9 trillion[4].

2.2 In an archipelagic country, air transportation has a major role to play in connecting the islands and vast inland areas of Indonesia. It shall provide connectivity for national, regional, and remote areas and connect Indonesia to international destinations. It enables business travel as well as travel for leisure, employment, family visit and friends. Furthermore, air transportation provides for rapid, efficient and affordable connections to support national logistic flow of goods, including when necessary government missions for disaster relief. However, sustainable development of air transport and of the aviation industry shall always consider and consistently keep an optimum balance between economic, social and environmental factors.

2.3 Aviation industry growth can affect global climate change and contributes 2% of the greenhouse gas pollution in terms of carbon emissions[5]. In this regard, Presidential Decree No. 61 of 2011 "The National Action Plan for Greenhouse Gases" (RAN-GRK) as a national policy framework. It provides for GHG emission reduction and the obligation for the Energy and Transport sector is 26% (equivalent to 38 million tonnes CO2e) cumulative up to the year 2020, and 41% (equivalent to 56 million tonnes CO2e) with contribution of international support (see Table 1[6] in the Appendix). Furthermore, Ministry of Transportation Decree No. KP 201 of 2013, dated February 21 2013, has been issued to implement the above framework.

2.4 With GDP growth of around 6% - 7% per year, Indonesia has the largest economic growth in Southeast Asia. The air transportation sector grew by approximately 15% per year for domestic flights and up to 20% for international flights in recent years. In line with this growth, the increase of air transport with next generation fleet growth of 10% on average per year, results in an estimate of 92 million passengers by 2015 and 172 million passengers by 2020. The direct consequence will be an increase in energy consumption (aircraft fuel) by an average of 12% per year for domestic flights and an average of 8% per year for international flights (see Figure 1 in the Appendix), which will certainly have an impact on the increase in carbon emissions[7].

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1 Central Bureau Statistic, "*Census 2010"*, Jan 2011.
2 IMF, *World Economic Outlook Database*, Oct 2012.
3 Raoul Oberman," *The Archipelago Economy : Unleashing Indonesia's Potential", McKinsey Global Institute (MGI), Nov 2012.*
4 Adhi Dharma Permana, "*Indonesia Energy Outlook 2012*", BPPT.
5 IPCC 2007.
6 Presidential Decree No. 61 of 2011 "*The National Action Plan for Greenhouse Gases"*, 2011.
7 DGCA-Indonesia, "*National Action Plans of Reduction Emissions of GHG Air Transportation Sector 2012-2020*", Nov. 2013

2.5 The Directorate General of Civil Aviation (DGCA) has expressed a commitment for the reduction of GHG emissions in accordance with the IATA global policy scenario (see Figure 2 in the Appendix). It considers that alternative fuel implementation measures will play a significant role in the mitigation program of GHG (40% up to 50%) besides the technology, operational and infrastructure efficiency initiatives. Therefore Indonesia will contribute to alternative fuel implementation measures in accordance with national resources and capacity.

2.6 Based on the assumptions of growth of the national economy and the growth of the air transport sector, as well as the analysis of carbon emissions by using ICAO Carbon Emissions Calculator Ver. 2.3, the estimated potential emissions reduction by implementing 2% alternative fuels will reach 0.323 – 0.379 $MtCO_2$/year in the period 2016-2017, and rising to 0.583 – 0.729 $MtCO_2$/year in the period 2018-2020. Thus, the potential accumulation of carbon emission reduction up to 2020 will achieve 2.725 $MtCO_2$ or contribute the equivalent of 17% of total emissions reductions in the air transport sector.

3. FUTURE PROGRAM AND IMPLEMENTATION MEASURES (2013-2016)

3.1 For the period 2013-2016, the future program and implementation measures will include the following:

a) develop cooperation within domestic and international level between all stakeholders and among others on program action, technical, include the financial, institutional, legal framework and capacity building;

b) develop a pre-implementation roadmap in detail on each program measure;

c) initial and advanced study and research on potential national resources of alternative fuel;

d) review the existing legal framework whether it is sufficient to start the renewable energy initiative program for airport operation including laws on aviation and the environment; review Government Regulations on energy conservation and the environment, air pollution control and environmental certification; review the Decree of Finance Ministry on the provisions of fiscal policy in the form of taxes allowance, import taxes and incentives for renewable energy initiatives.

e) establish the MRV (Measurement, Reporting and Verification) system for the validation of the implementation of renewable energy measures by the Government as well by third parties, including establishment of core activities and supporting activities such as database and information system on airport energy consumption and renewable energy.

f) draft the necessary legal framework to support the implementation program of alternative fuels, including Government Regulations and their derivatives in the form of standards, specifications, guidelines for testing and certification, the production standards and quality assurance, quota, price and distribution guidelines, etc; Government policies to provide incentives for investors and manufacturers of alternative fuels (aviation bio fuels), including airline operators as end users in order to encourage interest of the private sector to contribute to this program;

g) provide funding to enable all necessary steps, beginning with the study, research and development, testing and certification, plant investment and operations, production and maintenance; such funding should come from a consortium of contributors including the regional and national governments, the private sector, and international support funds and climate finance funding. The international financial support for the implementation of alternative fuels for the three main programs capacity building,

technology transfer and investment of commercial production plant. The form of international financial assistance for the capacity building and technology transfer is expected as a grant, while for plant investment it could take the form of a business partnership such as an equity stake, FDI, debt swap, loan concession, CDM, etc.

3.2 Funding needs during the pre-implementation program for all stakeholders is estimated at US$ 10 million. For technology transfer programs, studies, research and development, testing and certification as well as implementation of MRV, commercial feasibility study including risk assessment, needs are estimated at US$ 40 million. Furthermore, the funds necessary for production facilities of alternative fuels for 200.000 – 300.000 Kilolitre/year, maintenance and distribution and other commercial activities are estimated at U.S. $ 400 million[8,9] with an estimated increase in cost of construction of the plant of US$ 50 million.

4. ACTION BY THE ASSEMBLY

4.1 The Assembly is invited to take the *Green Aviation Initiative for Sustainable Development regarding Alternative Fuels for Aircraft Operations* into account for the formulation of Policy and recommended Implementation Measures regarding the mitigation of GHG emissions.

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[8] Andy Kershaw, "London Biojet Project"; British Airways and Solena

[9] Delia Dimitriu and Frederich Eychenne"The Romanian Camelina Value Chain, Case Study on Land Used Change" MMU and Airbus

APPENDIX

Sector	Mitigation GHG Reduction Target (Giga ton CO2e)		Total	Action Plans
	26%	15% (Total 41%)		
Forestry and Peat Land	**0.672**	**0.367**	**1.039**	• Forestry fire controlled, • Water resources & system management, • Land and forestry rehabilitation, • Deforestry prevention, • Community empowerment. dll
Waste	**0.048**	**0.030**	**0.078**	• 3R strategy waste management • Urban waste management integration
Agriculture	**0.008**	**0.003**	**0.011**	• The application of cultivation technology • The introduction of low-emission rice varieties, • Efficiency of irrigation water, • Use of organic fertilizer. • Utilization of feces / urine of livestock agricultural wastes for biogas
Industry	**0.001**	**0.004**	**0.005**	• Conservation and energy audit, • Application of a modified process and technology
Energy & Transportation	**0.038**	**0.018**	**0.056**	• The use of Bio-fuels, • Energy conservation and efficiency, • Development of renewable energy • Converting to CNG fuel, • Development of mass transportation, KRL etc • Improved quality of roads, • Side demand management,
Total	**0.767**	**0.422**	**1.189**	

Table 1. National GHG Reduction Measures and Targets up to 2020[10]

[10] Presidential Decree No. 61 of 2011 "*The National Action Plan for Greenhouse Gases*", 2011.

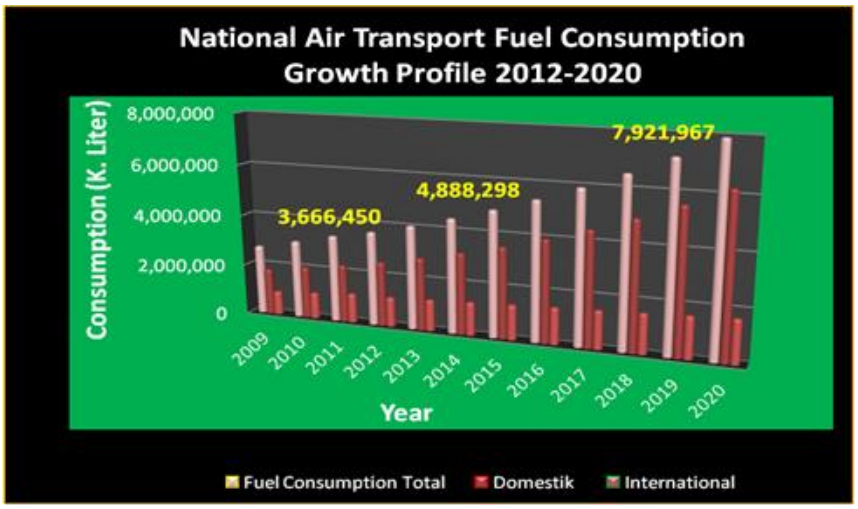

Figure 1. National Air Transport Fuel Consumption Growth Profile 2012-2020

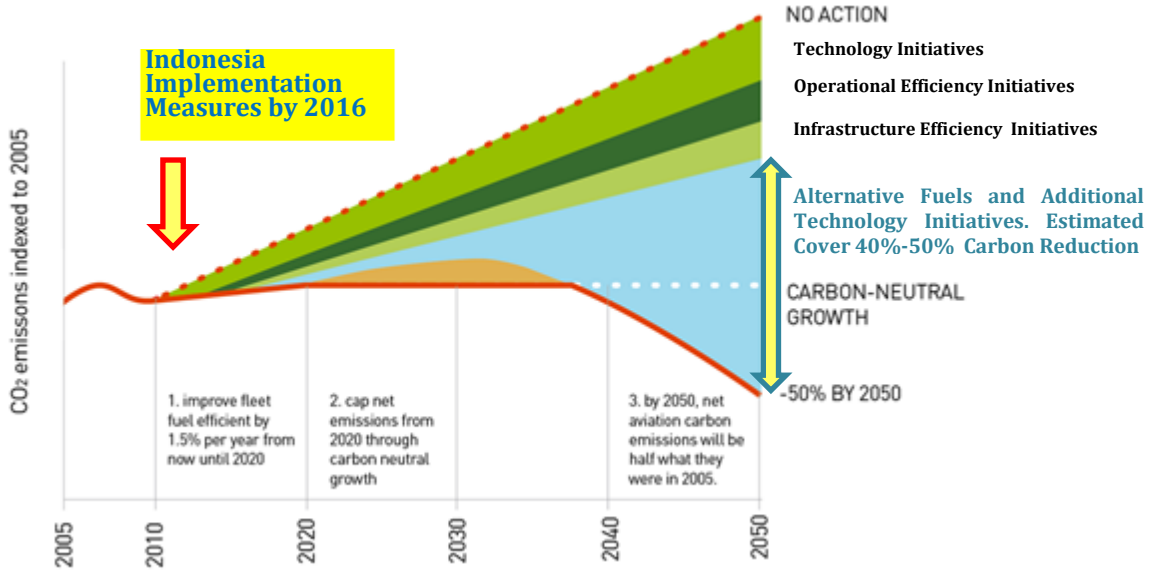

Figure 2. Global IATA Policy Scenario for Carbon Neutral Growth until 2020 and 50% Carbon Reduction until 2050

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