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ASSEMBLY — 38TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 17: Environmental Protection

INDONESIA GREEN AVIATION INITIATIVES FOR SUSTAINABLE DEVELOPMENT: RENEWABLE ENERGY FOR AIRPORT OPERATIONS

(Presented by Indonesia)

EXECUTIVE SUMMARY	
This working paper provides and shares information on Indonesia's Green Aviation Initiatives for Sustainable Development on Renewable Energy for Airport Operations as part of pre-implementation and implementation measures of the State Action Plan of Indonesia 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 renewable energy for airport operations, especially for airports in the eastern part of Indonesia, for the period of 2013-2020.

2. SUSTAINABLE DEVELOPMENT ON RENEWABLE ENERGY FOR AIRPORT 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 At present, Indonesia operates 233 airports, including 29 international and 204 domestic airports, with the following categories: Primary Hub Airport (8 airports), Secondary Airport (17 airports), Tertiary Airport (41 airports), and 167 Feeder Airports; there are also 447 Aerodromes for Light Aircraft (ALA); see the Ministry Decree No. 11/2010 (see Figure 1 in the Appendix). Existing electric energy needs for airport operations are generally supplied by PLN (state owned company), with a backup electric system using electric generators powered by diesel fuel. The electric energy is used for terminal operations, communications and navigation systems, runway, taxiway and apron lighting, and for infrastructure and industry support operated inside the airport area. Based on primary data obtained, the energy profile of the airports (primary, secondary and tertiary) operated by the state-owned commercial airport operators (PT. Angkasa Pura I and PT. Angkasa Pura II) as well as by the airport department of the DGCA (UPT DGCA) can be seen in Figure 2 in the Appendix.

2.4 The Aviation Green Initiatives for Sustainable Development of Renewable Energy for Airport Operations have the objective to support the electricity needs of airports in a sustainable manner and at the same time to enhance the safety and security of flight operations. They can reduce energy consumption and dependence on electricity generated from fossil fuels and at the same time provide the benefit of reducing greenhouse gas emissions. The implementation of this initiative will be based on ICAO Annex 14.

2.5 The growth of GDP of about 6% -7% per year in Indonesia is the largest in Southeast Asia, while the air transportation sector grew by approximately 15% per year for domestic flights and up to 20% for international flights. 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 for airport operations, estimated to double by 2020 as seen in Figure 3 in the Appendix.

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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.

2.6 Furthermore, the airport energy configurations will include renewable energy supplied by solar, wind and biomass based technology. In accordance with the Ministry of Transportation Decree Number KP 201 of 2013 regarding the National Action Plan for Green House Gas Emissions Reduction, especially the implementation measures on renewable energy for airport operations, will be conducted continuously to achieve a total of 7.5 MW capacity (3% of Total Capacity by 2020) at 20 non-commercial airports operated by DGCA including also private airports participation from Angkasa Pura I and Angkasa Pura II.

3. PROGRAM AND PROGRESS OF PRE-IMPLEMENTATION MEASURES

3.1 The sustainable development of renewable energy for airport operation refers to the policy, strategy and roadmap of the National Action Plan (RAN-GRK) for the Air Transport Sector 2012-2020, taking into account several criteria[5,6] among others:

1) potential GHG mitigation: the total of carbon dioxide (CO_2) emissions reduction;

2) success rate: review of aspects of management, stage, level of difficulty and the parties involved;

3) positive impact (co-benefits) of social, economic and environmental quality of life;

4) financing in this case should be calculated in detail regarding abatement cost, access and financial risk, expenditure program;

5) measures-Reporting and Verification (MRV): methodology, availability of data and data development in the future;

6) sources of law, policy and the needs of policy making in the implementation of NAMAs;

7) the location and the affected institution or program provider.

3.2 The renewable energy for airport operations program is being implemented in two stages: pre-implementation phase in 2013-2014 with a pilot study for research on potential renewable energy resources, primarily at eastern part of Indonesia airports. This includes the installation of solar energy (photovoltaic) panels at several airports based on the national project development program, particularly on airports having problems with the supply of electrical energy. By the end of 2014, the renewable power will have a total installed capacity of 0.75 MW that includes existing installed solar-based renewable energy on some airports with a total capacity of 437.5 KVA, as can be seen in Table 1 in the Appendix.

3.3 During the 2016-2020 period, the installation of renewable power sources in 20 (twenty) domestic and international airports with a total capacity of 7.5 MW will proceed. The estimated potential emissions reduction by renewable energy implementation measures accumulative up to 2020 will achieve 0.511 M tonnes CO_2, as part of a 15% total carbon emissions reduction performed by the Eco Airport initiative.

[5] Tilburg, X. van, L. Cameron, L. Würtenberger, S. Bakker "*On developing a NAMA Proposal"*. ECN-O-11-053, 2011.
[6] Situmeang, H., S. Lubis (eds, 2011) *Development of Indonesia NAMAs Framework*. Report II, 19 July 2011.

4. FUTURE PROGRAMS AND IMPLEMENTATION MEASURES (2013-2016)

4.1 Future programs and implementation measures during 2013-2016 will include the following:

a) develop cooperation at the domestic level between all stakeholders and among others on program action, technical aspects, the financial, institutional and legal framework, and capacity building.

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

c) initial and advance study and research on potential national resources of renewable energy for airports operations.

d) review the existing legal framework for sufficiency to start the renewable energy initiative program for airport operation including laws on aviation and the environment; Government Regulations on energy conservation and the environment, air pollution control and environmental certification; 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 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 regarding airport energy consumption and renewable energy.

f) provide funding to enable all necessary steps for beginning with the initial study, research and renewable energy plant investment, operations and maintenance. Such funding should come from a mechanism sourced from government, the private sector as well from international sources. Funding needs in the pre-implementation program for all stakeholders is estimated at US$ 3 million for studies and research, technology support and transfer, testing and certification, a commercial feasibility study including risk assessment, as well as to develop and implementation of MRV. An estimated US$ 1 million will be needed for capacity building. Furthermore, the funds necessary for installation of 7.5 MW of the Renewable Energy facilities are estimated at U.S. $ 30 million within the period 2016 –2020.

5. ACTION BY THE ASSEMBLY

5.1 The Assembly is invited to take the *Green Aviation Initiative for Sustainable Development regarding Renewable Energy for Airport Operations* into account for the formulation of Policy and recommended Implementation Measures regarding the mitigation of GHG emissions.

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APPENDIX

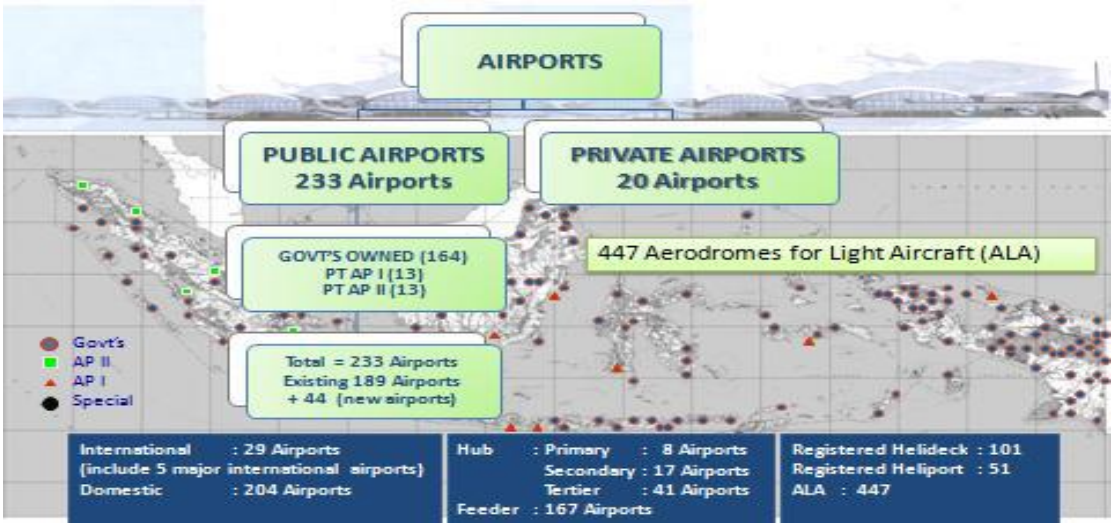

Figure 1. Indonesia Airport Outlook under Ministry Decree No. 11/2010

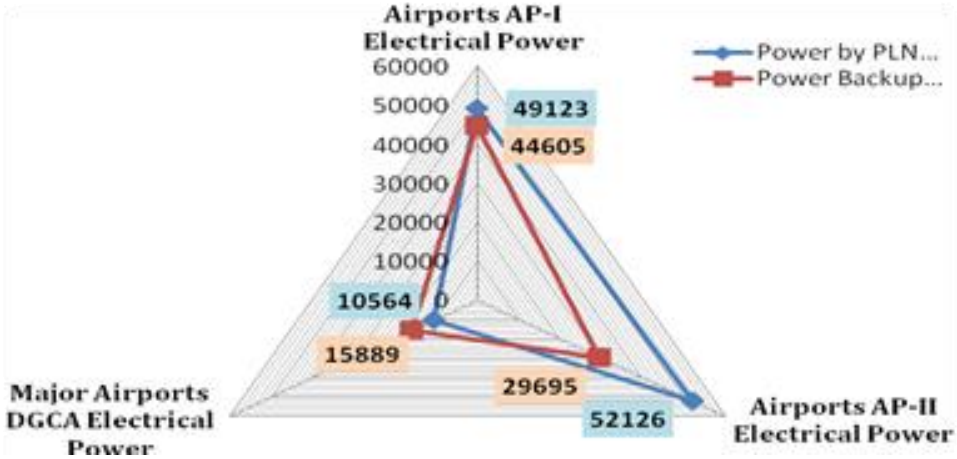

Figure 2. Airport Electrical Power Installed Profile

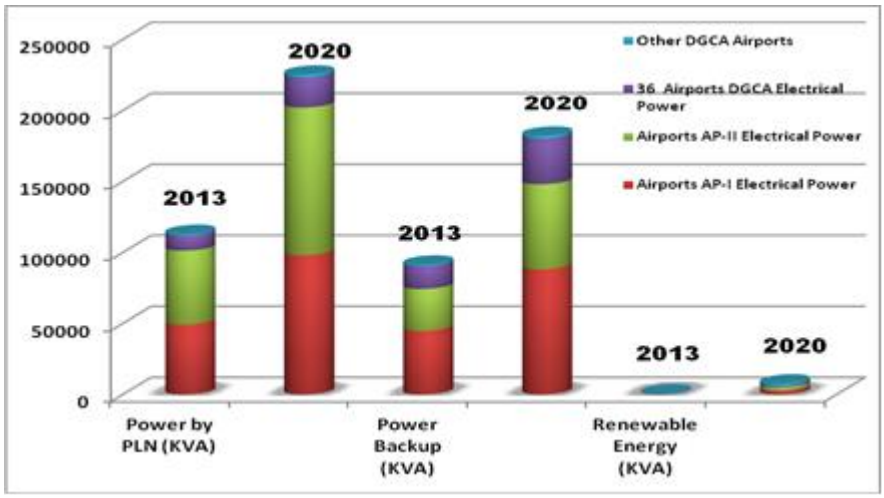

Figure 3. National Airport Energy Configuration and Growth Profile 2013 and 2020

No.	Airports	Inverter Capacity	Installed	Remaks
1.	Ilaga – Papua	**1.300 VA**	2011	
2.	Merdey – Papua Barat	**2.300 VA**	2012	
3.	Batom - Papua	**1.300 VA**	2012	
4.	Yuvai Semaring – Kalimantan Tengah	**3.000 VA**	2012	
5.	Bandaneira – Banda	**1.000 VA**	2012	
6.	Rokot Sipora	**1.300 VA**	2012	
7.	Radin Inten II – Lampung	**180.000 VA**	2011	
8.	Andi Jemma – Masamba	**500 VA**	1997	
9.	Seko – Seko	**250 VA**	2012	
10.	Long Apung	**1.000 VA**	2013	
11.	Namrole	**300 VA**	2013	
12.	Wahai	**1.000 VA**	2012	
13.	Buli Maba - Halmahera	**2.500 VA**	2012	
14.	Wamena	**2.500 VA**	2012	
15.	Rampi – Rampi	**250 VA**	2012	
16.	Komodo – Labuan Bajo	**240.000 VA**	2013	

Table 1. Existing renewable energy voluntarily installed by airports

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