Indonesia Green Aviation Initiatives for Sustainable Development Air Transportation

Purpose: Information
Submitted by: AEG Chair (United States)
MINISTRY OF TRANSPORTATION
DIRECTORATE GENERAL OF CIVIL AVIATION

Indonesia Green Aviation Initiatives for Sustainable Development Air Transportation

Development National Strategy and Implementation Measures on Mitigation of Climate Change and GHG Emissions

By

Arfiyanti Samad
Secretary of Directorate General of Civil Aviation
APEC-Transportation Working Group-38
Bali, 1-4 July 2013

OUTLINES

- Indonesia Government Commitment on Climate Change
- DGCA Organization Role & Function on Environmental
- Sustainable Development Concept
- Sustainable Development of Air Transport
- Mandate ICAO Assembly 37
- Indonesia and Air Transportation Profile
- Indonesia Green Aviation Initiatives
- 6 Pillars Policy & Strategy and Basket of Measures
- Roadmap Indonesia Green Aviation Initiatives
- Resume Implementation Measures Q2-2013
- Implementation Measures Achievements
- Resume
Indonesia, as announced by the President of the Republic of Indonesia on the G-20 Summit in Pittsburgh 2009 and COP-15 meeting in Copenhagen, is aiming to reduce 26% of CO2 from business as usual by 2020 and 41% with the international support.

Presidential Decree number 61/2011 on National Action Plan for GHG Emission Reduction

Presidential Decree number 71/2011 on Implementation of The Greenhouse Gas Inventory

Table 1: Sector Obligation for Mitigation of GHG

<table>
<thead>
<tr>
<th>Sector</th>
<th>Emission Reduction Plan (Giga Ton)</th>
<th>Responsibility Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry and Peat</td>
<td>0.767</td>
<td>Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Public Works, Ministry of Industry</td>
</tr>
<tr>
<td>Waste</td>
<td>0.048</td>
<td>Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Public Works, Ministry of Industry</td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.000</td>
<td>Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Public Works, Ministry of Industry</td>
</tr>
<tr>
<td>Industry</td>
<td>0.003</td>
<td>Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Public Works, Ministry of Industry</td>
</tr>
<tr>
<td>Intermodal Transportation</td>
<td>0.002</td>
<td>Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Public Works, Ministry of Industry</td>
</tr>
<tr>
<td>Total</td>
<td>0.824</td>
<td>Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Public Works, Ministry of Industry</td>
</tr>
</tbody>
</table>

Source: President Decree No 61/2011 and Attachment
Sustainable Development is defined as balancing the fulfillment of human needs with the protection of the natural environment. A common definition of sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The field of sustainable development can be conceptually broken into three constituent parts: environmental protection, economic sustainability, and social justice.

Figure 1: The Concept of Sustainable Development

1) Source: Adapted from Ralph Hall, Introducing the Concept of Sustainable Transport to the U.S. DOT through the Reauthorization of TEA-21

---

**MINISTRY OF TRANSPORTATION**

**DIRECTORATE GENERAL OF CIVIL AVIATION**

**Vicious Cycle Development (Less sustainable) vs Virtuous Cycle Development (Sustainable)**

- Economic Growth
- Increase Traffic (Passenger & Cargo)
- Infrastructures Development
- Road / Route Airport/Space
- Urban Sprawl / Land Use Management
- Need More Fleet
- Economic and Project Based Solution Approach

- Resilience & Sustainable Growth
- Connectivity Improvement
- High Energy Efficiency Technology & Operational Improvement
- Low Fossil Fuel Dependency Alternative Fuels & Renewable Energy
- Protect Community & Green Environment Reducing GHG & Pollutants
- Economic, Market and Energy Security Price Fuel Control

---

7/30/2014
Sustainable Development Air Transport

- Low emission & pollutant
- Low noise-heat-vibration
- Energy Conservation
- Conserved biodiversity
- Less impact to human life
- Low Carbon Footprint

- Economic viable
- Technical feasibility
- Highest efficiency
- Green economic support
- High climate resilient
- Safety and security

- Equity
- Accessibility
- Connectivity
- Affordability
- Generic replication
- Community based concept
- Etc.

Ministry of Transportation
Directorate General of Civil Aviation

Mandate ICAO Assembly 37 ICAO on International Aviation and Climate Change

1. Achieve a global 2% annual fuel efficiency improvement up to 2050;
2. Further explore the feasibility of more ambitious goals, including carbon neutral growth by 2020 and 50% emissions reductions by 2050;
3. Develop a global CO2 Standard for aircraft;
4. Facilitate the development and deployment of sustainable alternative fuels for aviation;
5. Facilitate the implementation of operational changes and the improvement of air traffic management and airport systems;
6. Develop the system of Market based Measures

Table 2: Contribution Fuel Efficiency Initiatives

- Aircraft Technology Improvement
- Engine Technology Improvement
- ATM/PBN Improvement
- Market based Measures

Source: Sustainable Aviation Progress Report ICAO/ATAG
Global Energy Transportation Outlook 2010

Figure 6 - Transport Oil Consumption By Type
Sources: International Energy Agency 2010

Figure 7: Indonesia Transportation Emissions Contribution
Sources: McKinsey, 2007

Indonesia 2012 and Future 2030 Profile

16th largest 9th largest economy in the world

55 million 113 million skilled workers

45 million 135 million members of the consuming class

GDP US$928.274 billion US$6.685 trillion

per capita GDP US$3,592 US$22,276

Indonesia Air Transportation 2012 - 2020 Profile

442 973 Transport Category Aircraft

3,7 M Kilo lt 7.9 M Kilo lt Fuel Consumptions

62 million 170 million Passenger

8.9 Mton CO2 20.5 Mton CO2 Emissions

Growth Tension to Air Transport

Sources: Central Bureau of Statistics, IMF, McKinsey Global Institute, BPPT, Bappenas
MINISTRY OF TRANSPORTATION
DIRECTORATE GENERAL OF CIVIL AVIATION

Indonesia Green Aviation Initiatives

3rd Main Pillars Soft System Sustainable Development:
- Strengthen the Organization (Role, Function and Responsibility)
- Improvement of Legal Frameworks and Regulations, Procedures, Guidelines, Management Tools
- Enhancement Human Resources Capacity

3rd Main Elements:
- Green Flight
- Green Corridor/Air Space
- Green/Eco-Airport

Basket of Measures

1. Measures on improvement Organization, Policy and Rule Making & Capacity Building of Human Resource of Stake Holders
2. Airlines Operator Carbon Emissions Reduction Measures
3. Air Navigation Services and Traffic Management Measures
4. Airport Operator (Eco Airport) Carbon Emissions Reduction Measures
6. Market-based Measures

6TH Pillars POLICY and STRATEGY on MITIGATION of GHG EMISSIONS
Implementation Measures Achievement

- Capacity Building, workshop-training, seminar, symposium, forum group discussion on national and international level
- Continuous Active Participation on Global Forum UNFCCC, Montreal Protocol COP/MOP, ICAO CAEP, Regional EST
- Pre implementation period 2013-2016 for alternative fuels and renewable energy program (study, R & D, national and international collaboration)
- Registry NAMAs for Alternative Fuels and Renewable Energy for 2013 and seeking for International Financial Support
- Continuous implementation measures on aircraft regeneration, Operational Efficiency, Eco-Airport, ATM/PBN, and
- Develop Data-base, Inventory GHG system, as well as MRV system.
## Resume Implementation Measures Q2-2013

<table>
<thead>
<tr>
<th>No</th>
<th>Program</th>
<th>Quantity/ Location</th>
<th>Potential Emission Reduction (Million Ton CO2)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aircraft Regeneration</td>
<td>• 261 New Technology Aircraft</td>
<td>2.4</td>
<td>Garuda Indonesia, Citilink, Lion Group, Indonesia Air Asia, Sriwijaya Air, Mandala, etc.</td>
</tr>
<tr>
<td>2</td>
<td>Operational Efficiency</td>
<td>• 2 Airlines</td>
<td>0.3</td>
<td>PT. Garuda Indonesia, PT. Indonesia Air Asia</td>
</tr>
</tbody>
</table>
| 3  | Airport Renewable Energy Eco-Airport Council Green Building | • 1 Airport  
• 6 Small Airport  
• 15 Airport  
• JAATS | - | - |
| 4  | ATM and PBN (up to 2012) | • 23 RNAV routes / RNP 10  
• 1 STAR – SID  
• 10 RNP Approach  
• 2 RNP-AR | - | DGCA |
| 5  | Alternative Fuels and Renewable Energy | 1 Initial Study / Research NAMAs Registry | - | On Going DGCA |

---

## Resume Green Flight Program Q2-2013

### Aircraft Regeneration

<table>
<thead>
<tr>
<th>DATA</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIRBUS A320</td>
<td>14</td>
<td>22</td>
<td>24</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>AIRBUS A330</td>
<td>6</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>BOEING 737-800</td>
<td>4</td>
<td>19</td>
<td>42</td>
<td>51</td>
<td>72</td>
</tr>
<tr>
<td>BOEING 737-900ER</td>
<td>17</td>
<td>30</td>
<td>43</td>
<td>55</td>
<td>67</td>
</tr>
<tr>
<td>ATR-42</td>
<td>11</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>ATR-72</td>
<td>3</td>
<td>6</td>
<td>13</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>101</td>
<td>149</td>
<td>184</td>
<td>238</td>
</tr>
</tbody>
</table>

**Achievement up to Q2-2013:**
- 261 New Technology Aircraft (10% up to 15% per year replace conventional technology aircraft)
- 2 Airlines Implement the Operational Efficiency Program
- 2.7 Million Ton Carbon Reduction

### Operational Efficiency Implementation
- Potable Water Management
- Optimum Centre of Gravity
- Nearest Alternate
- Cost Index
- ATC Coordination (Direct Routes & Optimum Flight Level)
- Pilot Flight Technique
- Maintenance Program

### Carbon Emissions Reduction of Aircraft Regeneration and Operational Efficiency

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Emissions Reduction (Mil. Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>12.7</td>
</tr>
<tr>
<td>2008</td>
<td>16.6</td>
</tr>
<tr>
<td>2009</td>
<td>21.2</td>
</tr>
<tr>
<td>2010</td>
<td>21.7</td>
</tr>
<tr>
<td>2011</td>
<td>22.6</td>
</tr>
<tr>
<td>2012</td>
<td>24.1</td>
</tr>
<tr>
<td>Total</td>
<td>93.591,138</td>
</tr>
<tr>
<td>Aircraft Regeneration 2009 - 2012</td>
<td>2.8955</td>
</tr>
<tr>
<td>Total Emissions Reduction up to 2012</td>
<td>2.8968</td>
</tr>
</tbody>
</table>
MINISTRY OF TRANSPORTATION
DIRECTORATE GENERAL OF CIVIL AVIATION

Improvement Eco-Airport Initiatives

The Objectives:
- To establish airports to have global environment point of view;
- To conduct airport operations that are integrated with its environment;
- To operate airports that consider sustainable development;

8 Environmental Factors
1. Atmosphere
2. Energy
3. Noise/Vibration
4. Water
5. Soil
6. Waste
7. Natural Environment
8. Others

Towards Improvement Eco-Airport Implementation

ECO airport beyond the compliance / pro active comply with regulation polluter pays principle

ACHIEVEMENT: 15 ECO AIRPORT COUNCIL
40 AIRPORT WITH EIA Program

MINISTRY OF TRANSPORTATION
DIRECTORATE GENERAL OF CIVIL AVIATION

GREEN BUILDING INITIATIVES

JAATS HEAD QUATER OFFICE
(Jakarta Automatic Air Traffic System)
1. Design and Specifications
2. Materials (Roof, etc)
3. Heat Protection System
4. Water Recycling System
5. Lighting System
6. Air Conditioning System
**MINISTRY OF TRANSPORTATION**  
**DIRECTORATE GENERAL OF CIVIL AVIATION**

**Improvement Eco-Airport Initiatives**

Figure 9: Airport Operation Renewable Energy Initiative

1. Radin Inten II - Lampung
2. Merdei - Kab. Manokwari - Papua Barat
3. Rampi - Kab. Masaenda - Sulawesi Selatan
4. Ilaga - Kab. Puncak - Papua
5. Yufai Semaring - Long Apung - Kalimantan Tengah
6. Raitum - Pegunungan Bintang - Papua
7. Banta Bane - Polewari - Maluku

Figure 10: LED Taxiway and Runway Installments

**MINISTRY OF TRANSPORTATION**  
**DIRECTORATE GENERAL OF CIVIL AVIATION**

**Improvement ATM/PBN Initiatives**

Figure 11: ATM / PBN Development Achievement
MINISTRY OF TRANSPORTATION
DIRECTORATE GENERAL OF CIVIL AVIATION

Improvement ATM/PBN Initiatives

Figure 12: ATM / PBN Development 2013

1. Indonesian DGCA has established the system and task force which is in line with the National, ICAO and UNFCC, in order to implement the mitigation programs of climate change and reducing the aviation’s GHG emissions up to 2020.

2. Indonesian green aviation initiatives consist of GREEN FLIGHT, GREEN CORRIDOR/AIR SPACE and GREEN/ ECO-AIRPORT.

3. Continuous implementation measures on aircraft regeneration, Operational Efficiency, Eco-Airport, ATM/PBN, and develop database, Inventory GHG system, as well as MRV system, and

4. International collaboration to research and development for alternative fuels and renewable energy program.

Resume
Thanks You

Green Solutions for a Brighter Future

arfiyantisamad@dephub.go.id