The Utilization of Advanced Biofuels in Aviation Sector

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The 3rd Bioenergy Week 2015
“Global Bioenergy Partnership Workshop on Sustainable Bioenergy in Asia”
Santika Premier, Medan – Thursday, May 28, 2015
Aviation produces a small but growing share of CO2 emissions

*Source IPCC*
⇒ Low-carbon, sustainable fuels needed to ensure future for aviation.

⇒ Biofuel could reduce the environmental impact of aviation.

⇒ Global and Government policy.

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**Kyoto Protocol**

**Indonesia Green Aviation Initiatives**

**IATA Four-Pilar Environmental Strategy**

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**Garuda Indonesia**

*The Airline of Indonesia*
The four-pillar strategy was adopted by the global aviation industry, as well as ICAO states, in 2007.

**IATA FOUR PILLAR STRATEGY**

**IMPROVED TECHNOLOGY**
- Fleet Renewal
- **Bio Fuels**
- Radical New Engine Advances

**EFFECTIVE OPERATIONS**
- Improved operational practices
- Efficient aircraft operations

**EFFICIENT INFRASTRUCTURE**
- Implementation of ATM (Air Traffic Management)
- Airport Infrastructure

**POSITIVE ECONOMIC MEASURES**
- Carbon Offset & Trading
- Carbon Incentives

*The four-pillar strategy was adopted by the global aviation industry, as well as ICAO states, in 2007*
Garuda Indonesia will prioritize sustainable environment as one of our main values. Our vision to provide the highest level of sustainable environment by reducing emissions, maintain the noise at acceptable level and other impacts on the environment caused by our activities.
• To reduce dependence on fossil fuels, aviation biofuel is the answer for sustainable alternative aviation fuels.

• Biofuels as a principal way to achieve zero carbon growth, while the industry continues to grow.

• Sustainable alternative aviation fuels require significant investment and governmental support.

• The utilization of biofuels in aviation requires local development of feedstock as well as local conversion to biofuels to reduce transportation cost.
Sustainable Alternative Aviation Biofuel:

- A renewable source
- Sufficient amount of feedstock (not a food stock)
- Have a stable supply
- Should not cause harm to environment
- Affordable price
AVIATION BIOFUEL

Biofuel emission: 4 ton CO2

Biofuel cost: 201,7 mio IDR

Trip Fuel: 4.138 kgs

'B' biofuel blended 50:50 with avtur requires no engine modification

Avtur emission: 13 ton CO2

Avtur cost: 34,8 mio IDR

Note: Biofuel assumption using Cameline based Bio-SPK
The Indonesia Aviation Biofuels and Renewable Energy Task Force (ABRETF) was launched in 2014 (DG Decree No.: 517 K/73/DJE/2014 & KP. 429 Year 2014) under a cooperation agreement among the Ministry of Energy and Mineral Resources (Through the EBTKE) and Ministry of Transportation (Through the DGCA).

Its objective is the implementation of the National Action Plan for Greenhouse Gases Sub-Sector Aviation (RAN-GRK MoT Decree No. KP 201 Year 2013) which includes the development of Aviation Biofuels in Indonesia.
Garuda Indonesia actively participated in 4 sub working groups:

- Policy Making, Regulation, Organization and Human Resources Capacity Enhancement
- Research and Development
- Trial and Certification
- Commercial, Risk and Sustainable Evaluation
Aviation Biofuel Target Based on The National Action Plan (Road Map) 2012-2020

2012
Study, Research & Development

2015
Testing

2016
2% Biofuel

2018
3% Biofuel

Biofuel Challenges

- **Technically viable**
  - ASTM and Def Stan approved
  - High quality standard

- **In demand**
  - Airline support
  - In commercial use

- **Sufficient supply**
  - Small refinery capacity
  - Premium price
  - Limited sustainable feedstock

Supply is the main challenge
Thank You