


# Indonesia's Preparedness Towards Decarbonization of Air Transport

**Capt. M. Mauludin**
**Directorate General of Civil Aviation (DGCA) Indonesia**
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# REGULATORY FRAMEWORKS

| International | National | Ministry of Transportation | DGCA |
|---|---|---|---|
| ➢ **ICAO**<br>➢ Long-term aspirational goal (LTAG)<br>➢ CNG2020<br>➢ 2% of annual fuel efficiency improvement<br>➢ **UNFCCC** Paris Agreement | ➢ **Indonesia Enhanced NDC target** by **31,89%** emission reduction with own resources and further up to **43,2%** with additional international support by 2030<br>➢ **President Decree:**<br>➢ National Action Plan (No. 61/2011)<br>➢ National Inventory of Greenhouse Gas Emissions (No. 71/2011)<br>➢ Carbon Pricing (No. 98/2021) | ➢ **Ministrial Decree** Determination of Climate Change Mitigation Actions in the Transportation Sector (KM 8/2023)<br>➢ Establishment of Ad-hoc team for the Climate change mitigation action Implementation and MRV in transportation sector. | ➢ Establishment of Ad-hoc team for the Climate change mitigation action Implementation in air transportation sector<br>➢ **Indonesia's Action Plan** to Reduce CO2 Emissions from Aviation Sector (2013, 2015, 2021) |

# PROGRAMS FOR DECARBONIZATION OF AIR TRANSPORT

## AIRCRAFT FLEET RENEWAL

Replacement of the old transport-category aircraft

## AIRCRAFT OPERATIONAL EFFICIENCY

Single engine taxi, Idle reverse thrust on landing, etc

## AIR NAVIGATION EFFICIENCY

Performance Based Navigation (PBN) & User Preferred Routes (UPR)

## SUSTAINABLE AVIATION FUEL

SAF Development using local feedstock


## CORSIA IMPLEMENTATION

Voluntarily join CORSIA since pilot phase

## ECO-AIRPORT

Utilization of renewable energy, energy-saving equipment, Electrification and Airport greening

## DGCA Role

- Rule making process
- Capacity building
- Build national & international cooperation
- Development of the emission database system

### 2013-2015

- Eco-Airport Program
- Establishment of first State Action Plan

### 2016-2018

- Commitment to voluntarily participate in CORSIA (ICAO 39th Assembly )
- Update State Action Plan

### 2019-2021

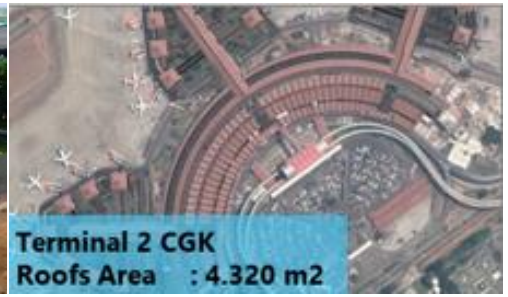
- MRV CORSIA & Verification Body Accreditation
- Solar PV Operation in CGK
- PBN RNAV 2 Domestic & Trial of UPR
- SAF Production & Lab test
- Update State Action Plan

### 2022-2024

- SAF Bioavtur J2.4 Flight test on CN235 and commercial flight Jakarta-Solo on B737-800

# RENEWABLE ENERGY USING ON-GRID SOLAR PV IN AIRPORT

## Operated Solar PV Capacity: 2.686 kWp
## CO2 Avoided: 1.376,5 ton/year


Soekarno-Hatta Jakarta 1.741 kWp


Kualanamu 760 kWp

Ngurah Rai Denpasar 155 kWp


Banyuwangi 30 kWp


## Solar PV Construction Process
## CO2 Avoided: 8.000 ton/year

# AIR NAVIGATION IMPROVEMENT USING PBN AND UPR

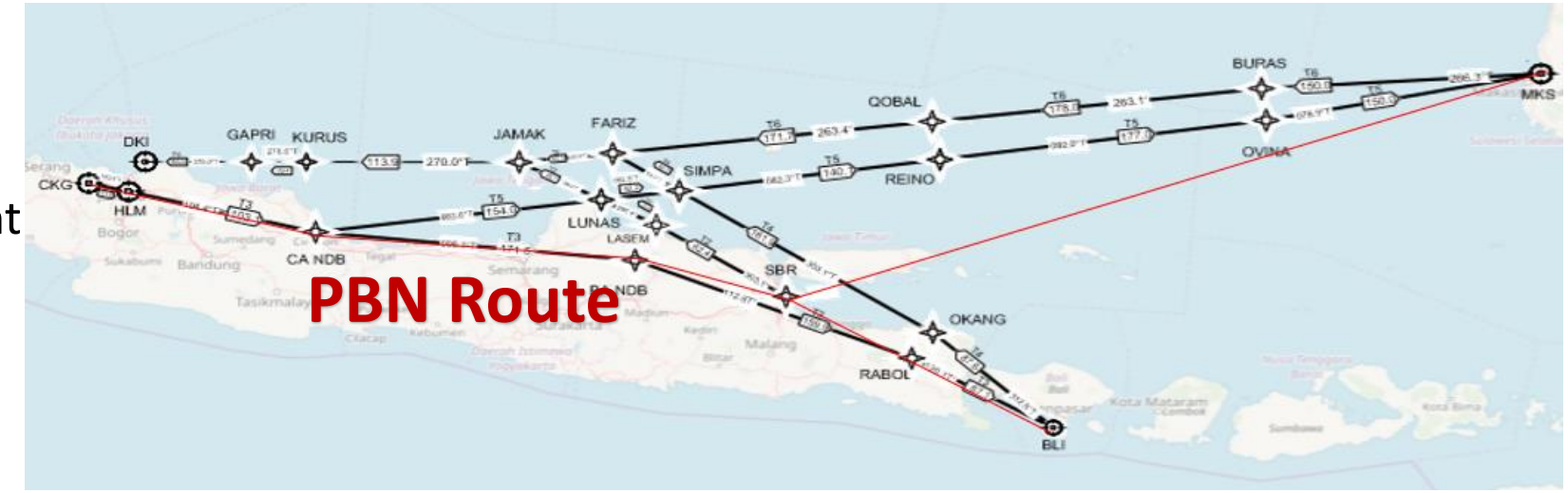
**Performance Based Navigation (PBN)** using satellite-based technology and advanced onboard avionics to define more accurate flight paths and efficient routing to reduced fuel consumption.

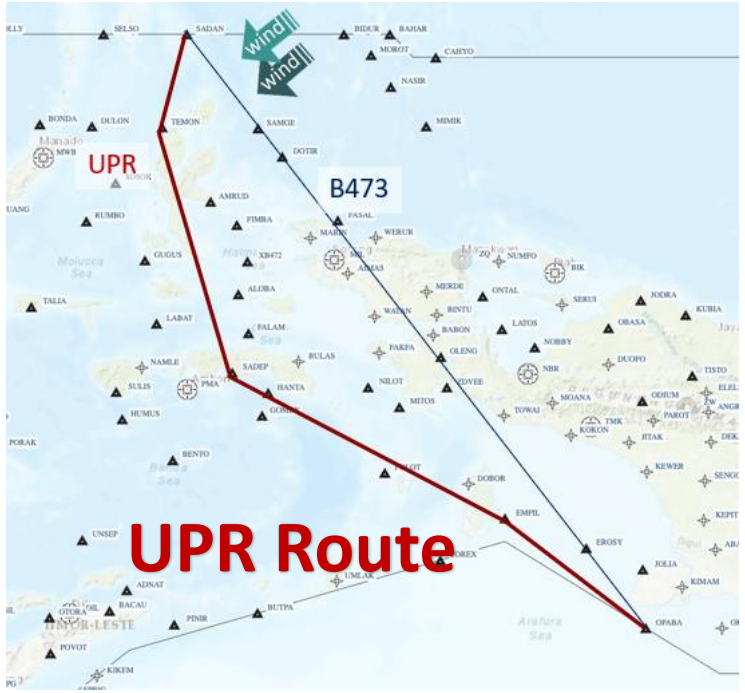
➢ **PBN Implementation in Indonesia:**

- **Enroute**: PBN ATS
- **Terminal and Approach**: PBN SID/STAR, PBN IAP, PBN RNP APCH

➢ **PBN ATS Route RNAV Case:**

- Implemented since 2019
- City pair: Jakarta, Surabaya, Bali, Makassar
- Shorten distance by 10NM
- Saving: 3 minutes flying time
- Reduce fuel 160 Kg/flight (ex. B738)
- **Reduce emission 572 Kg/flight**




**User Preferred Route (UPR)** is a concept based on Free Route Airspace allowing flexibility.

➢ weather conditions, wind direction and speed, air temperature, and aircraft performance are considered to determining efficient route

➢ Trial Implementation since June 2020

➢ **Reduce emissions in 2022 is estimated 94.5 tons**

# INITIATIVE OF SUSTAINABLE AVIATION FUEL DEVELOPMENT

## Bioavtur J2.4
2.4% blending of local feedstock Palm Kernel Oil (PKO) by co-processing method.

## Collaboration
With Ministry of Energy, Fuel Provider, Researcher, Associations, Airlines, MRO

## Production tests
Production using existing facilities in 2020. New facility will be built to increase the capacity

## Laboratory test
chemical and physical characteristic comply the Jet-A1 specifications in ASTM 1655

## Static test
engine test cells using CFM56-3B engine in 2020 and CFM56-7B in 2021, both show good performance

## Ground test & flight test
Test on CN235 military registration aircraft in 2021 and Boeing 737-800 in 2023, both show good performance

## Ceremonial of Commercial Flight
Domestic flight Jakarta-Surakarta vv in Oct 2023 using Boeing 737-800


# CHALLENGE AND OPPORTUNITY TO MOVING FORWARD

## CHALLENGE

- Strong leadership and streamlined coordination among stakeholders
- Financial resource constraint and competing priority
- Harmonization of regulatory frameworks

## OPPORTUNITY

- Rich of natural resources
- Capacity building and technology transfer
- Collaboration and partnership

## MOVING FORWARD

- Expedite SAF development and deployment
- Promote green-airport and utilization of renewable energy
- Enhance efficiency of air traffic management
- Develop effective regulatory framework
- Strengthen collaboration with various stakeholders


Video by PT. Pertamina

# THANK YOU – TERIMA KASIH