



**EASA**  
European Aviation Safety Agency



# State Action Plan: the first step into the environmental aviation dimension

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- What is it? I do not know, but I really would like to be trained accordingly
  - I am curious, why not? The others have managed...why not my country
    - It is getting interesting...I can help my country.. If I plan and programme well in advance
      - We really need to act like a team
        - ▶ Like a team we plan our future, we protect our skies, we protect us





**Action Plan  
on Emissions  
Reduction**

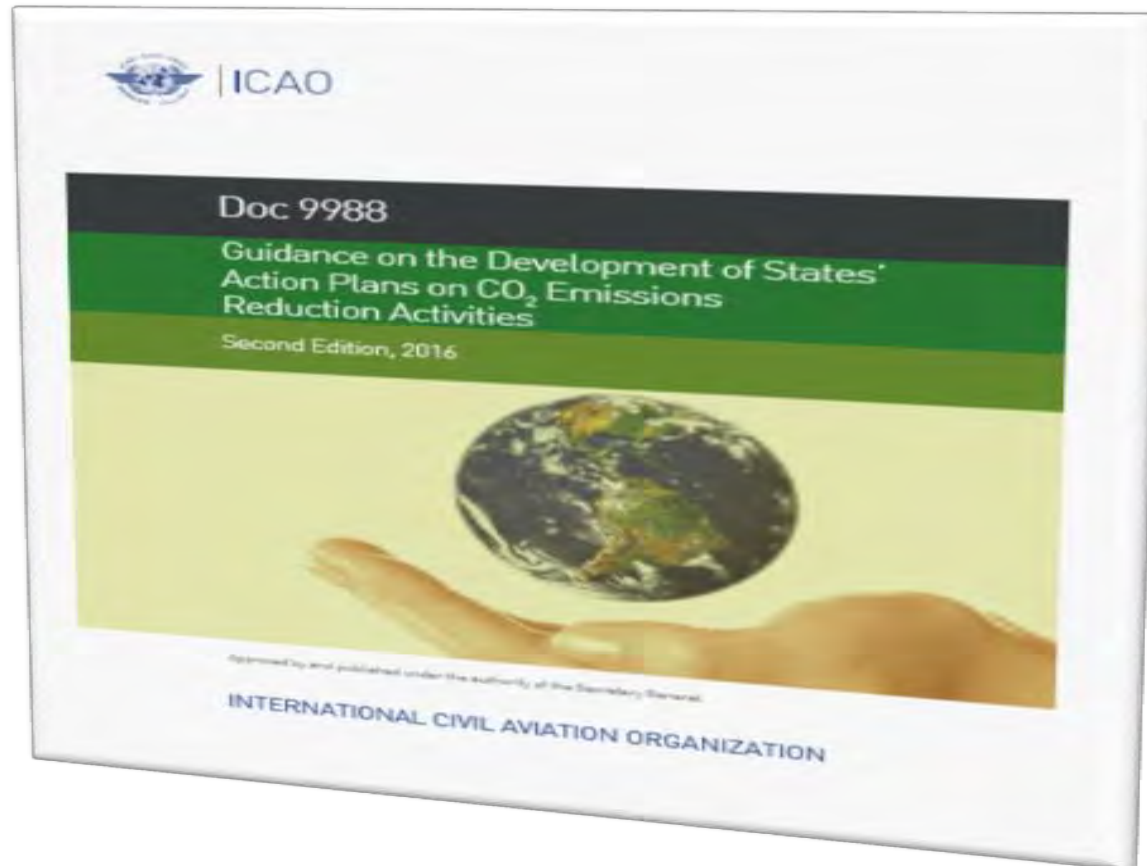


# Guidance Material for the Development of States' Action Plans

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*Towards the Achievement of ICAO's Global Climate Change Goals*









## ➤ **WHAT IS STATE ACTION FOR CO2 EMISSIONS?**

A document aimed at pointing out information on activities aimed at CO2 emissions reduction in the aviation sector.

## **WHAT SHALL THE STATE ACTION PLAN INCLUDE?**

- 1) National actions
- 2) Activities implemented regionally
- 3) Activities implemented on a global scale in the framework of bilateral/regional/multilateral agreement



## ► IMPORTANT

Keep in mind that not all emissions from the aviation sector shall be included in the state action plan, and **not all mitigation actions** linked to reduce these emissions shall be considered

**INDEED**

Emissions from domestic aviation shall be separated from those of international aviation

**BUT**

At the same time they have to be regarded as a co-benefit to support ICAO in reaching its aspirational goals



➤ DOMESTIC EMISSIONS which might be included are only **those related to AIRPORT and/or GROUND SUPPORT OPERATIONS** which are out of the scope of RES A37-19

**BUT IF YOU WANT TO INCLUDE INTO THE SAP  
YOU HAVE TO:**

- explain principles
- explain strategies beyond the decision





- Difference between domestic and international flights: the pivotal issue to tackle





## WHAT IS A DOMESTIC FLIGHT?

IT IS DEFINED AS THE OPERATION OF AN AIRCRAFT FROM TAKE-OFF AT AN AERODROME OF A STATE OR ITS TERRITORIES AND LANDING AT AN AERODROME OF THE SAME STATE OR ITS TERRITORIES

### ► WHAT IS AN INTERNATIONAL FLIGHT?

IT IS DEFINED AS THE OPERATION OF AN AIRCRAFT FROM TAKE-OFF AT AN AERODROME OF A STATE OR ITS TERRITORIES AND LANDING AT AN AERODROME OF ANOTHER STATE OR ITS TERRITORIES



## OTHER DEFINITIONS

### IPCC

**They are based on whether the departure and arrival airports for a specific flight are in the same or in different countries(i.e. mainly used for reporting of GHG emissions from domestic and international aviation under the UNFCCC.)**



# UNFCCC negotiation process





	ICAO	IPCC
WHAT IS INCLUDED?	<ul style="list-style-type: none"> <li>-Differentiation between domestic and international flights</li> <li>-Commercial scheduled and non-scheduled flights</li> <li>-National carriers</li> <li>-Carriers registered in the State</li> <li>-Carriers whose principal business is in the State</li> </ul>	<ul style="list-style-type: none"> <li>-Differentiation between domestic and international flights</li> <li>-All commercial flights(scheduled, non-scheduled, on demand etc.)</li> <li>-All carriers irrespective of where they are registered</li> </ul>
WHAT IS NOT INCLUDED?	<ul style="list-style-type: none"> <li>-Carriers registered in other States</li> <li>-Commercial on-demand flights</li> </ul>	
COMPATIBILITY	<ul style="list-style-type: none"> <li>-ICAO Fuel Form</li> <li>-ICAO statistical information system</li> </ul>	<ul style="list-style-type: none"> <li>-Reporting requirements under the UNFCCC</li> <li>-CAEP work on MBMs</li> </ul>

SOURCE: ICAO, Characteristics of the ICAO and IPCC definitions for domestic and international aviation




**Form A** - This form is for the reporting of 'Traffic of commercial air carriers' of their scheduled and/or non-scheduled flights. The statistics to be reported on this form should exclude air taxi, commercial business aviation or other on-demand revenue flights. Form A should be completed on either a monthly or an annual basis

**Form C** - This form is for the 'Traffic by flight stage (TFS) for scheduled services (Revenue) of international operations', i.e., by aircraft operators who have international scheduled air services. This form should include aggregated data for the twelve months of the calendar year

# Form M –

- This form is used to report **fuel consumption and traffic statistics by aircraft type for each of their commercial air carriers that operates scheduled and/or non-scheduled flights.**
- The fuel consumed, tonne-kilometres performed and tonne-kilometres available shall be calculated and reported separately for each aircraft type.
- Data should be reported for the total fleet operated by the air carrier for commercial air transport broken down by aircraft type.** Total services (international and domestic scheduled and non-scheduled, excluding on-demand flights), which include international total and domestic total services.
- Domestic services include domestic flight stages performed on scheduled and non-scheduled services. Should there be a problem of data availability for total services (international and domestic scheduled and non-scheduled, excluding on-demand flights), reporting for this part is not obligatory. **Any surface transportation of passengers and freight arranged by the aircraft operator in connection with an air journey should not be included in the data.**
- The share of biofuels in total fuel uplift should be given for total services** (international and domestic, scheduled and non-scheduled excluding on-demand flights). It can be calculated, for instance, from the fuel purchase records, which indicate the biomass fraction and net calorific value of the fuel



IT IS ADVISABLE THAT AN AVIATION ENVIRONMENTAL DATABASE WILL BE ESTABLISHED AT THE LEVEL OF DGCA's.

## **BENEFITS AND WHY?**

- It will allow to track record for each airline
- It will allow to create the basis for the MRV to be established
- Especially for form M, it will allow to have figures from the fuel used and therefore estimation of CO2 emissions
- It will facilitate the work of DGCA's while working with aggregation data

## **CHALLENGES**

- The environmental management system needs to be designed and IT staff shall be appointed to work at it and the related implementation.
- Dedicated section to be created for each aeroplane operator.
- It will change the approach of dealing with data at aviation level: increase of work for both DGCA's and aeroplane operators, but it will settle the basis for the MRV
- The EMS shall be settled as soon as possible





## HOW IS THE STATE ACTION?

It is **free format template**, but it shall contain at least the following information:

- 1) Contact details of Authority in charge of submission;
- 2) Annual historic and projected consumption fuels and CO<sub>2</sub> emissions 2010-2020-2050 years shall be quoted
- 3) Statement to % and definition of Domestic and international emissions



## HOW IS THE STATE ACTION?

- 4) Statement of the voluntary contribution to ICAO's aspirational goals including base year/baseline
- 5) List of actions to address CO2 emissions from international aviation, pointing out those already in place (if any) and those to be set in the future. The description shall be a detailed one and shall explain how they can contribute to reaching ICAO's aspiration goal
- 6) Description of the needs and requirements to implement the mitigation actions



## WHO SHALL REPORT TO ICAO?

In point 1 of the SAP, the authority is the competent body in charge of reporting

**BUT**

The AP of a State is made of the measures coming from the sector and

**therefore**

it requires a coordinated and a continuous communication process between all involved stakeholders from the sector



WORK TOGETHER...EACH OF YOU HAS A  
ROLE...BUT YOU ARE ALL PART OF A DESIGN:  
YOUR STATE ACTION PLAN







## HOW OFTEN SHALL A STATE REPORT?

State shall provide updated AP with updated mitigation actions every 3 years, by the end of the year.

### THAT IMPLIES

- SAP is an ongoing work to reduce emissions from the aviation sector;
- SAP implies continuous work and communications between involved stakeholders and aviation authority to exchange information on mitigation measures implementation, challenges and problems;
- SAP implies to use climate indicators and targets to monitor mitigation measure progress;



## FIRST STATE ACTION PLAN: NOT SO EASY

To represent the sector through numbers is not so easy as it can appear...and that is why successfully stories from others shall help you.

**CAAT'S representative will explain you the process we did to submit the second state action plan**

**REMINDE: mitigation measures shall be realistic representing concretely how you will work in the next future with GHG emissions reduction.**

**You need to ponder them well, program and plan**





## FIRST STATE ACTION PLAN: NOT SO EASY

To help states in their work with SAP, ICAO has identified minimum information to be reported by State on CO<sub>2</sub> emissions from international aviation:

- 1) Statement on definition on HOW TO DIFFERENTIATE DOMESTIC FROM INTERNATIONAL EMISSIONS
- 2) Total fuel consumption, CO<sub>2</sub> emissions and RTK from international aviation, starting from 2010





# STATE ACTION PLAN IN DETAILS



## **SAP IS COMPOSED MAINLY OF THREE PARTS:**

Section 1 - Background information and contacts

Section 2 - Baseline and expected results

Section 3 - Mitigation measure



## SECTION 1: BACKGROUND INFORMATION

### AND CONTACTS

-Especially for the first state action plan you have to describe your sector in order to allow the reader understanding how you are progressing and how you are planning to deal with GHG emissions reduction.





**WEEKS OF**

**PROGRAMMING  
CAN SAVE YOU  
HOURS OF**

**PLANNING**

# SECTION 1: BACKGROUND INFORMATION AND CONTACTS

This part shall contain the following info:

## **1. BACKGROUND, INFORMATION AND CONTACT**

### **1.0. CONTACT INFORMATION**

#### **1.1. HISTORICAL OVERVIEW OF CAMBODIA AVIATION SYSTEM**

### **1.2. STRUCTURE OF THE AVIATION INDUSTRY IN CAMBODIA**

#### **1.2.1. INSTITUTIONAL STRUCTURE (who is doing what and how involved stakeholders dealing with climate interact with the sectoral one)**

#### **1.2.2. STAKEHOLDERS IN THE AVIATION SECTOR (please describe: i) commercial, cargo, charter airlines and related details in terms of passengers and type of airline; ii) airports international/domestic etc.)**

### **1.3. TRENDS OF THE AVIATION SECTOR IN CAMBODIA-PROBLEMS AND CHALLENGES FOR THE COMING YEARS**

#### **1.3.1. BACKGROUND SITUATION**

#### **1.3.2. PROBLEMS**

#### **1.3.3. CHALLENGES**

# SECTION 1: BACKGROUND INFORMATION AND CONTACTS

## Recommendations:

-State Action plan represents you, your country and how your country is committed in supporting ICAO in reaching its aspirational goals

### THEREFORE:

-PLEASE REPRESENT THE SECTOR AS IT IS REALLY POINTING OUT THE PROBLEMS AND THE CHALLENGES THE SECTOR IS FACING IN YOUR COUNTRY.

This will allow ICAO and other international donors involved in this activity to support you with concrete ACTIONS/TECHNICAL ASSISTANCE in facing the problems.

Moreover, this will allow to justify your position and your level of maturity in the second state action plan where you will have to demonstrate how you have progressed in the reduction of CO2 emissions from the aviation sector

-PLEASE INVOLVE ALL SECTOR STAKEHOLDERS IN THIS SAP EXERCISE

-PLEASE USE GRAPHIC TO REPRESENT THE NUMBER YOU MENTIONED. It will facilitate the work.



## SECTION 2: BASELINE AND EXPECTED RESULTS

This part shall contain at least the following information:

### 2.0. INTRODUCTION

### 2.1. EXISTING AVAILABLE DATA (problems and challenges included)

### 2.2. BASELINE DEFINITION

### 2.3. EXPECTED RESULTS LINKED TO THE INTRODUCTION OF NEW MEASURES



## SECTION 2: BASELINE AND EXPECTED RESULTS

- Baseline has to be regarded as the first step to start planning GHG reduction considering fuel consumption and forecast future scenario aiming at comparing different possible situations.
- Baseline needs to assess the starting point and fix the targets.
- Baseline properly settled allow to have a real picture of the sector and understand how the sector is progressively moving.

## SECTION 2: BASELINE AND EXPECTED RESULTS

### HOW TO CALCULATE CO2 EMISSION?

#### **2 methodologies:**

- Aggregated methodology:** based on the use of aggregate fuel consumption data collected by States and reported to ICAO through the ICAO Fuel Form; and

- Disaggregated methodology:** based on the availability of detailed information for individual flight stages



## AGGREGATED METHODOLOGY:

States are required to report to ICAO total fuel used by each aircraft type in the fleet of individual air carriers according to the following categories:

- 1) international scheduled services;
- 2) international non-scheduled services (excluding on-demand flights); and 3) international total (scheduled and non-scheduled, excluding on-demand flights).

States should report the mass of fuel uplifted in metric tonnes for all aircraft in each aircraft type in an air carrier's fleet. (no distinction between fuel types).

Fuel uplift can be determined based on the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices. Alternatively, fuel uplift can also be established using aircraft onboard measurement systems.

The data should also include fuel consumed by the auxiliary power units (APU). In addition, States are asked to provide the percentage of biofuel contained in the total fuel used (both international and domestic).

**CO2 emissions for international services can be calculated by:**

- first, estimating the amount of biofuel used (see Box 2 for the treatment of biofuels);
- second, estimating the amount of conventional fuel (e.g., jet fuel) used; and
- third, estimating CO2 emissions by multiplying the fuel consumption figures (biofuel and conventional) by appropriate emission factor values.

## DISAGGREGATED METHODOLOGY:

-It is based on the use of specific fuel consumption data for individual flight stages and could be aggregated for different aircraft types and (if possible) city pairs.

-It requires more resources and effort, compared to the Aggregated methodology, and may be better suited for use by individual air carriers who would then report aggregate data to the national authority responsible for submitting information to ICAO.

-Using such a detailed methodology would enable the identification of large sources of emissions and mitigation opportunities, and the monitoring of progress in the implementation of specific actions.

The methodology would require the following data for individual flight stages:

-Total fuel consumption; and

-Specific fuel characteristics, such as calorific value, carbon content, and type and percentage of biofuel in the total fuel amount.

The calculation of CO<sub>2</sub> emissions for individual flight stages would be based on the disaggregated information collected by air carriers. Once all data have been collected, CO<sub>2</sub> emissions for individual flight stages can be calculated using the same steps as those for the Aggregated methodology.

In the case of Cambodia where it seems that no fuel consumption data is available, Cambodia can obtain a first-order estimate of the total CO<sub>2</sub> emissions from international operations by using information on movements for all city pairs assuming great circle distances and emission factors for specific aircraft (similar to the methodology that has been employed for the ICAO Carbon Emissions Calculator).

–Mr. Pasavi from CAAT will show later how to deal with ICAO's calculator and how the missing data from CAAT have been fixed

## SECTION 3: MITIGATION MEASURES

-Circular 303 ICAO detected a basket of possible feasible measures aimed at reducing fuel consumption of 8%-18%.

ICAO CIRCULAR has to be regarded as **the first real guideline** describing how to detect, identify and develop the most feasible measures capable of minimizing fuel consume and therefore emissions from civil aviation system.



## SECTION 3: MITIGATION MEASURES

The main targets linked to the introduction of these measures are:

- A more appropriate use of efficient fuel by aircrafts during operations;
- Tailored improvements of airport infrastructure system;
- Tailored technical and operative improvements to ATM system;
- Tailored regulatory measures to improve sustainable development in the sector.

## SECTION 3: MITIGATION MEASURES

### THEREFORE:

- This part shall contain the details of the mitigation measures you have agreed to implement with sector stakeholders.
- This is important to remind that when designed the results of the mitigation measures shall be tracked in order to be able to present the reached targets after 3 years when the second state action plan shall be submitted

## ASS. RES A37-19

“The action plan shall include information on the basket of measures considered by state, reflecting their respective national capacities and circumstances, and information of any specific assistance needs”

-once more be realistic with the list of mitigation measures you can program and plan as per your national challenges. Consider those you can really do and are able to produce the first targets after three years of implementation

# CLASSIFICATION OF MBMs as per programme of action on international aviation and climate change

- 1) Aircraft related technology development
- 2) Alternative fuel
- 3) Improved air traffic management and infrastructure use
- 4) More efficient operations
- 5) Economic measures
- 6) Regulatory measures and others
- 7) Airport improvements (BUT....)

# SOME CONCRETE EXAMPLES

## **1) Aircraft related technology development**

- Aircraft minimum fuel efficiency standards
- Aggressive aircraft fuel efficiency standards, setting standards for the future
- Purchase of new aircraft d. Retrofitting and upgrade improvements on existing aircraft
- Optimizing improvements in aircraft produced in the near to mid-term
- Avionics
- Adoption of revolutionary new designs in aircraft/engines

## 2)Alternative fuel

- Development of biofuels
- Development of other fuels with lower lifecycle CO<sub>2</sub> emissions
- Standards/requirements for alternative fuel use



### **3) Improved air traffic management and infrastructure use**

- More efficient ATM planning, ground operations, terminal operations (departure, approach and arrivals), en-route operations, airspace design and usage, aircraft capabilities
- More efficient use and planning of airport capacities
- Installation of airport infrastructure such as Fixed Electrical Ground Power and Pre-Conditioned Air to allow aircraft APU switch-off
- Construction of additional runways and taxiways if used solely to relieve traffic congestion
- Collaborative research endeavors

## 4) **More efficient operations**

- Best practices in operations
- Optimized aircraft maintenance (including jet engine cleaning/washing)
- Selecting aircraft best suited to mission

## 5) Economic/market based measures

- Voluntary inclusion of aviation sector in emissions trading scheme
- Incorporation of emissions from international aviation into regional or national emissions trading schemes, in accordance with relevant international instruments
- Establishment of a multilateral emissions trading scheme for aviation which allows trading permits with other sectors, in accordance with relevant international instruments
- Establishment of a framework for linking existing emissions trading schemes and providing for their extension to international aviation, in accordance with relevant international instruments
- Emissions charges or modulation of landing/take-off (LTO) charges, in accordance with relevant international instruments
- Positive economic stimulation by regulator: research programs, special consideration and government programs/legislation and accelerated depreciation of aircraft
- Accredited offset schemes. Explore extension of CDM
- Taxation of aviation fuel, in accordance with relevant international instruments

## **6) Regulatory measures and others**

- Airport movement caps / slot management
- Enhancing weather forecasting services
- Requiring transparent carbon reporting
- Conferences / workshops

## SUGGESTIONS

- Be ambitious, but keep in mind that you have to implement and not only design measures.
- Keep in mind that a good mix of different actions will allow Cambodia moving towards a “greener” aviation sector, and it will strongly reduce costs for the aeroplane operators in the long period
- Try to link aviation sector with other ongoing programs/plans dealing with RES and EE in order to program a common approach to the fight against fossil fuel solutions

## EXPERIENCE FROM OTHER ASEAN MSs

- Thailand:** a good mix of different categories of mitigation measures. RES are not considered yet, however, Thailand has designed the SAP considering short, medium and long term measures. (Mr. Pasavi will give you additional details)
- Indonesia:** a good mix of Policy, procedures & capacity building, Operational efficiency, Alternative fuels , Aircraft modernization ,ATM improvement & PBN implementation ,Eco-airport implementation ,Implementation of CORSIA



# EXAMPLE OF TEMPLATE TO BE USED FOR MITIGATION MEASURES

Category:-	
Measure:-	
Action:-	
Start Date	
End Date	
Title	
Description	
INDICATOR	
BASELINE	
EXPCTED BENEFITS IN TERMS OF CO2 AND GHG REDUCTION	
Date of full implementation	
Economic cost	
Currency	
Reference to existing legislation	
Legislation is proposed	
Assistance needed	
List of stakeholders involved	
INTERMEDIATE REPORTING OUTPUTS in terms of CO2 and GHG (AFTER 1.5 YEAR)	
QA/QC	
FINAL REPORTING OUPTPUTS in terms of CO2 and GHG	

-Parts in red are the suggested one,  
but they are strongly recommended as they will  
allow using an MRV approach at the level of state  
action plan. This will be hard at the beginning,  
especially for countries not familiar with MRV and  
M&E procedures, but it will ease the work in the  
submission of the other state action plan.

DO NOT FEEL ALONE. LOOK WHAT OTHER COUNTRIES ARE DOING



# EXAMPLES OF MITIGATION MEASURES FROM OTHER ASEAN COUNTRIES

- Thailand case (better explained by Mr. Pasavi)
- Indonesia case (third state action plan to be submitted by the end of this year).

From the first state action plan they trace the path to become more and more environmental friendly including a roadmap

- Malaysia submitted 2 state action plans
- Singapore submitted 2 state action plans
- ALL THESE STATES HAVE INCLUDED CORSIA AS MKT BASED MEASURES AND THEY ARE COMMITTED TO JOIN CORSIA FROM THE PILOT PHASE

## CAMBODIA???

- That is only the first workshop...a strong work shall be conducted starting from January 2019 ....
- Stakeholder consultations shall take place
- Time Horizon shall be considered
- Analysis of the sector shall take place and in the meantime possible mitigation measures shall be discussed with involved stakeholders
- You will be supported...do not worry
- CAAT can show what we did together



**EASA**  
European Aviation Safety Agency



**SAP---NOW YOU KNOW...AND  
PROPERLY SUPPORTED YOU CAN  
MANAGE...**

THANKS A LOT FOR YOUR ATTENTION  
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