



ICAO

ENVIRONMENT

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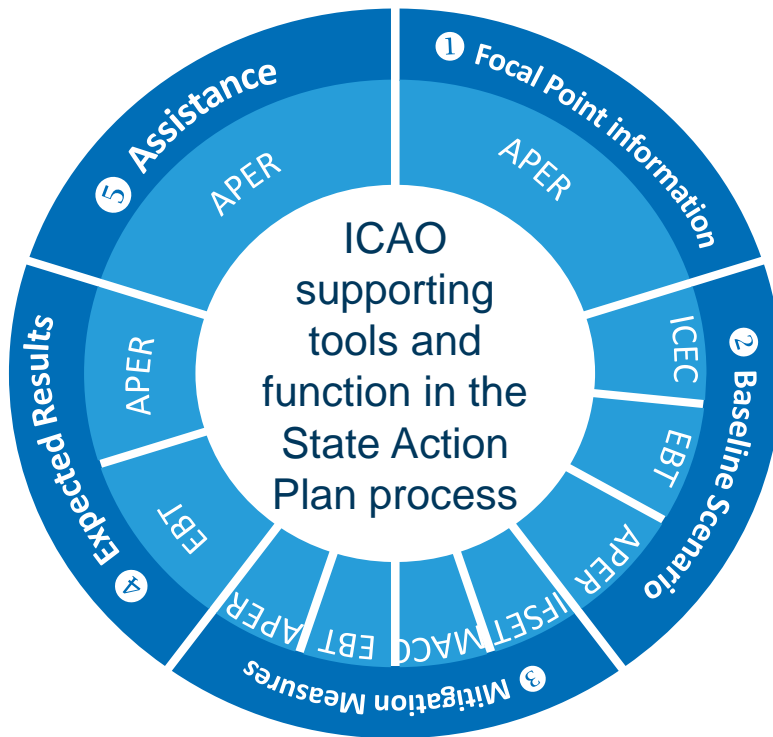


# ICAO Supporting Tools – Not publicly available





## ICAO Environmental Tools





## Other ICAO tools \*

Developed for specific uses and for specific users.

- Environmental Benefits Tool ( EBT)
- Marginal Abatement Cost Curve
- ICAO Online Training course – UNITAR
- Aviation Environmental System (AES)



# Environmental Benefits Tool (EBT)

**Action Plan  
on Emissions  
Reduction**



Available on the  
APER Website

**WELCOME TO THE ENVIRONMENTAL BENEFIT TOOL (EBT)**

This tool helps States to develop their Action Plan (Baseline, Mitigation Measures, Expected Results)

A tutorial has been developed

The tutorial (text and video) can be accessed at all times by clicking on the button depicted below.

**HELP**

Please select a State below :

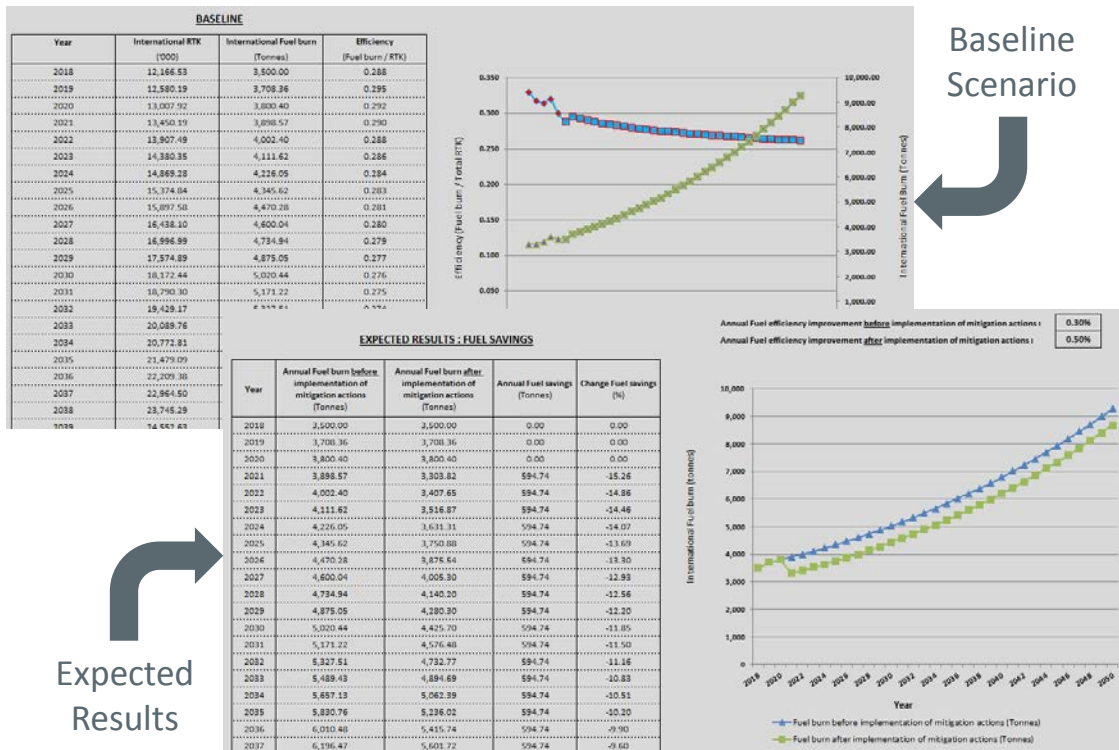
[Continue](#)

[Go to the tutorial](#) [Skip the tutorial](#)



# Environmental Benefits Tool (EBT)

- Description:
- The EBT is a tool developed for supporting States in the development of their State Action Plan.
- This tool allows easily generating a baseline scenario, estimating the impact of mitigation measures and finally generating expected results.







# Marginal Abatement Cost Curve (MACC)

Action Plan  
on Emissions  
Reduction



Available on the  
APER Website



## CARBON EMISSION REDUCTION

[INTRODUCTION](#)[20 MEASURES](#)[GLOBAL MAC CURVE](#)[CUSTOMIZE MAC CURVES](#)

The **Carbon Emission Reduction** tool allows ICAO Member States to conduct a cost-benefit analysis of the most popular mitigation measures included in the ICAO basket of measures to reduce CO<sub>2</sub> emissions from international aviation. It is simple to use and requires a limited amount of information from the user.

The results of the analysis performed by the tool will assist the Civil Aviation Authorities and National Action Plan Teams in the selection and prioritization of mitigation measures to be included in their State Action Plan on Emissions Reduction by presenting a brief overview of potential for CO<sub>2</sub> emissions reduction and associated costs for low carbon technologies in a given scenario. The tool includes the selection of relevant measures by the user, the input of State-related data, and the automatic computation of a Marginal Abatement Cost (MAC) curve with different time horizons.

The methodology of the tool is based on a comprehensive **Carbon Emission Reduction** report developed by ICAO and UNDP joint project "Transforming the Global Aviation Sector: Emissions Reductions from International Aviation".

This tool has been developed as part of the ICAO and European Union Assistance Project "Capacity Building for CO<sub>2</sub> mitigation from international aviation" – EuropeAid/DCI-ENV/2013/322-049. For additional information, please visit [https://www.icao.int/environmental-protection/Pages/ICAO\\_EU.aspx](https://www.icao.int/environmental-protection/Pages/ICAO_EU.aspx)



This online tool has been developed under the International Civil Aviation Organization (ICAO) - European Union (EU) Assistance Project: "Capacity Building for CO<sub>2</sub> Mitigation from International Aviation" - EuropeAid/Development Cooperation Instrument DCI-ENV/2013/322-049. This project, funded by the European Union and implemented by ICAO, has the overarching objective of contributing to international, regional and national efforts to address growing CO<sub>2</sub> emissions from international aviation.

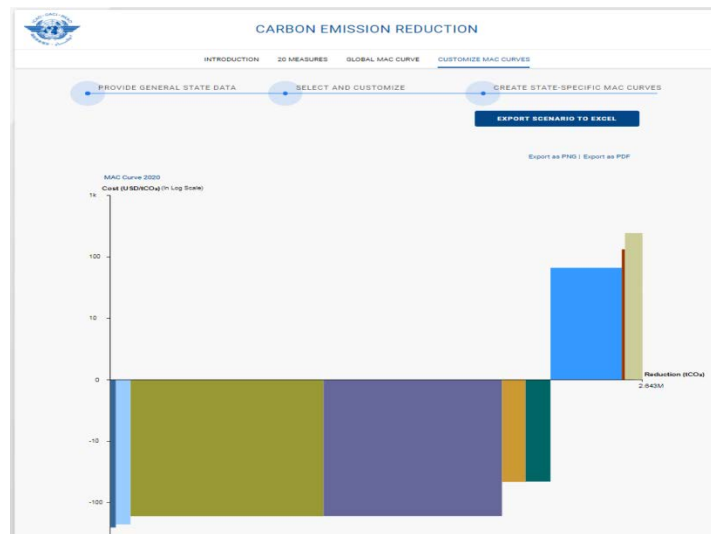
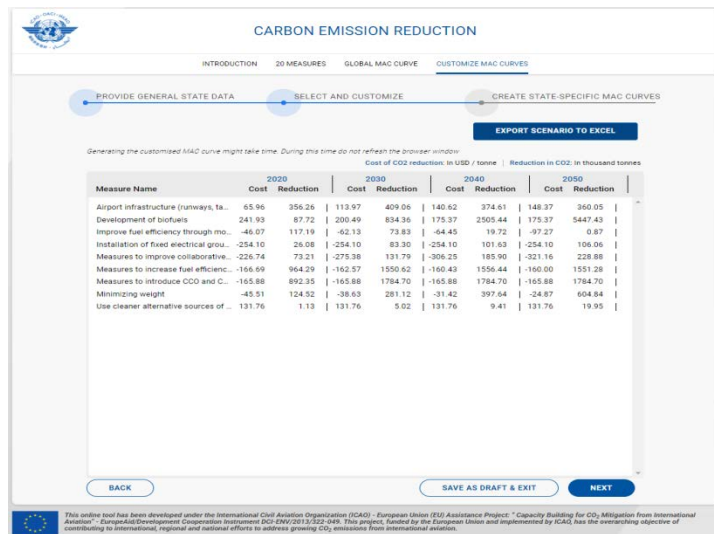


# Marginal Abatement Cost Curve (MACC)

## Description:

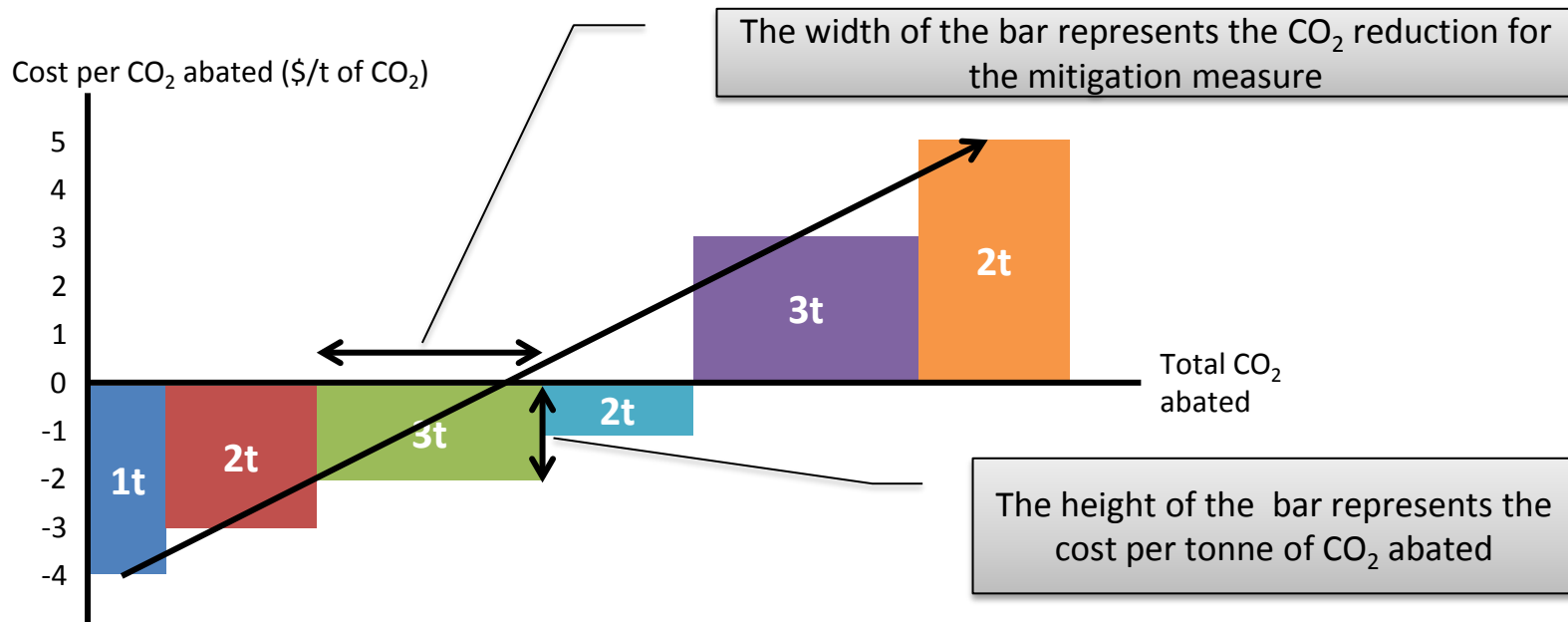
This tool offers the possibility to States to identify and rank up to 20 mitigation measures in order to facilitate decision-making.

The tool includes a user-friendly interface and is fully customizable to fit the State's situation





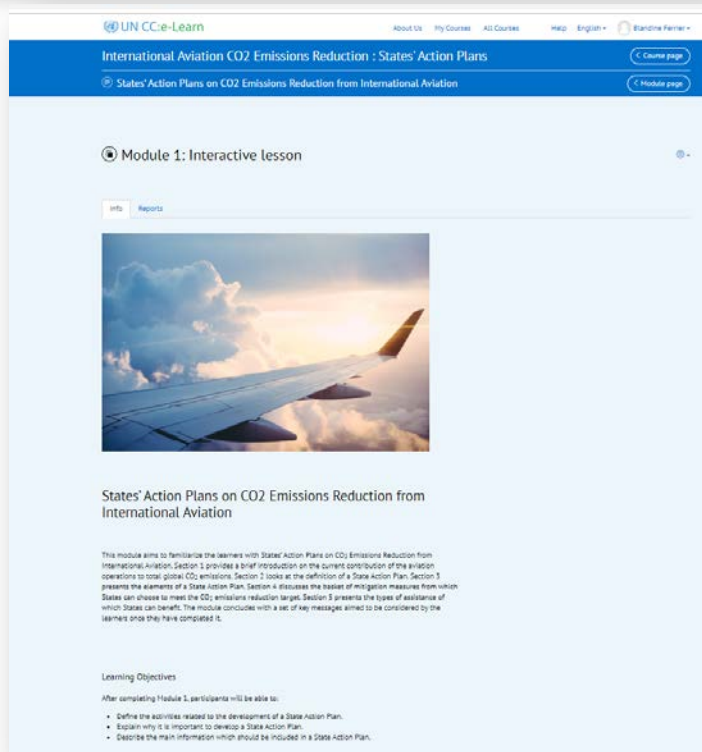
## How to read a MAC curve?







# ICAO – E-Learning Training Course on States Action Plan



The screenshot shows the UN CC:e-Learn interface. At the top, there's a navigation bar with 'UN CC:e-Learn', 'About Us', 'My Courses', 'All Courses', 'Help', 'English', and 'Random Partner'. Below this, the course title 'International Aviation CO2 Emissions Reduction : States' Action Plans' is displayed with links to 'Course page' and 'Module page'. The main content area shows 'Module 1: Interactive lesson' with tabs for 'Info' and 'Reports'. A large image of an airplane wing flying over clouds is featured. Below the image, the title 'States' Action Plans on CO2 Emissions Reduction from International Aviation' is shown. A paragraph describes the module's aim: 'This module aims to familiarize the learners with States' Action Plans on CO2 Emissions Reduction from International Aviation. Section 1 provides a brief introduction on the current contribution of the aviation operations to total global CO2 emissions. Section 2 looks at the definition of a State Action Plan. Section 3 presents the elements of a State Action Plan. Section 4 discusses the basis of mitigation measures from which States can choose to meet the CO2 emissions reduction target. Section 5 presents the types of assistance of which States can benefit. The module concludes with a set of key messages aimed to be considered by the learners once they have completed it.' At the bottom, 'Learning Objectives' are listed: 'After completing Module 1, participants will be able to: • Define the activities related to the development of a State Action Plan. • Explain why it is important to develop a State Action Plan. • Describe the main information which should be included in a State Action Plan.'



<https://unccelearn.org>

This tool has been developed as part of the ICAO and European Union Assistance Project “Capacity Building for CO<sub>2</sub> mitigation from international aviation” – EuropeAid/DCI-ENV/2013/322-049.



# ICAO Online Training Tool

## MODULE 1

### STATES' ACTION PLANS ON CO<sub>2</sub> EMISSIONS REDUCTION FROM INTERNATIONAL AVIATION



This module describes the main components of the States' Action Plans on CO<sub>2</sub> Emissions Reduction from International Aviation. By the end of this module, you will be able to:

Define the activities to carry out for the development of a State Action Plan

Explain why it is important to develop a State Action Plan

Describe the main information which should be included in a State Action Plan

## MODULE 2

### BASELINE SCENARIO CALCULATION



This module aims to provide the necessary information to enable the States to calculate their baseline. By the end of this module, you will be able to:

Define the baseline scenario of CO<sub>2</sub> emissions from international aviation

Estimate international aviation fuel burnt, CO<sub>2</sub> emissions, and International Revenue Tonnes Kilometer (RTK)

Calculate the baseline using the ICAO Environment Benefits Tool (EBT)

## MODULE 3

### MITIGATION MEASURES



This module provides an overview of mitigation measures to limit or reduce CO<sub>2</sub> emissions from international aviation and case-studies of low emissions aviation measures implemented in States. By the end of this module, you will be able to:

Understand the elements of ICAO's Basket of Measures to reduce CO<sub>2</sub> emissions

Identify relevant measures that can be taken by a State to reduce CO<sub>2</sub> emissions from the international aviation sector

## MODULE 4

### SELECTION, PRIORITIZATION AND IMPLEMENTATION OF MITIGATION MEASURES



This module aims to provide the necessary information to enable States to select, prioritize and implement mitigation measures. By the end of this module, you will be able to:

Analyse the benefits and effectiveness of mitigation measures in relation to the costs involved

Analyse the additionality of projects

Carry out a risk analysis in the process of implementing mitigation measures

## MODULE 5

### TOOLS AND EXPECTED RESULTS



This module presents the tools that allow the Civil Aviation Authorities (CAA) to calculate, as well as to monitor CO<sub>2</sub> emissions from international aviation at the State level. By the end of this module, you will be able to:

Use the ICAO tools to calculate CO<sub>2</sub> emissions reduction and fuel savings

Use the ICAO Environmental Benefits Tool (EBT) to calculate the expected results from the selected mitigation measures

Use the Aviation Environmental System (AES) to monitor CO<sub>2</sub> emissions from the aviation sector, if available in the State



UN CC:e-Learn

Think, Talk, Act Climate



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## MODULE 1: STATES' ACTION PLANS ON CO<sub>2</sub> EMISSIONS REDUCTION FROM INTERNATIONAL AVIATION

### LEARNING OBJECTIVES

By the end of this module, you should be able to:

- Define the activities related to the development of a State Action Plan;
- Explain why it is important to develop a State Action Plan;
- Describe the main information which should be included in a State Action Plan.

### INTERNATIONAL AVIATION EMISSIONS REDUCTION: STATES' ACTION PLANS

#### E-LEARNING COURSE

This e-book aims to familiarize you with the various ICAO tools which can be used to support the development of a State Action Plan.



## MODULE 2: STATES' ACTION PLANS: BASELINE CALCULATION

### LEARNING OBJECTIVES

By the end of this module, you should be able to:

- Define the Baseline;
- Estimate international aviation fuel by means CO<sub>2</sub> emissions, and International Revenue Scheme (IRS);
- Calculate the baseline using the Environment Benefit Tool (EBT).

### INTERNATIONAL AVIATION EMISSIONS REDUCTION: STATES' ACTION PLANS

#### E-LEARNING COURSE

This e-book aims to familiarize you with the methodology to develop the baseline in the process of developing a State Action Plan on CO<sub>2</sub> Emissions Reduction Activities for International Aviation.

This e-book was produced with the financial assistance of the European Union. The views expressed herein are in no way intended to reflect the official opinion of the European Union.

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## MODULE 3 STATES' ACTION PLANS: MITIGATION MEASURES

### LEARNING OBJECTIVES

By the end of this module, you should be able to:

- Identify measures that can be taken by a State to reduce the CO<sub>2</sub> emissions from the international aviation sector.

### INTERNATIONAL AVIATION EMISSIONS REDUCTION: STATES' ACTION PLANS

#### E-LEARNING COURSE

This e-book provides information on the various ICAO tools which can be used to support the development of a State Action Plan.



## MODULE 4 STATES' ACTION PLANS: SELECTION, PRIORITIZATION AND IMPLEMENTATION OF MITIGATION MEASURES

### LEARNING OBJECTIVES

By the end of this module, you should be able to:

- Analyze the benefits and effectiveness in relation to the costs involved;
- Analyze the additivity of projects;
- Carry out a risk analysis in the process of implementing mitigation measures.

### INTERNATIONAL AVIATION EMISSIONS REDUCTION: STATES' ACTION PLANS

#### E-LEARNING COURSE

This e-book aims to provide the necessary information to enable States to select, prioritize and implement mitigation measures.

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## MODULE 5: STATES' ACTION PLANS: TOOLS AND EXPECTED RESULTS

### LEARNING OBJECTIVES

By the end of this module, you should be able to:

- Use the ICAO tools to calculate CO<sub>2</sub> emissions and fuel savings;
- Use the Environmental Benefit Tool (EBT) to calculate the expected results from the selected mitigation measures;
- Use the Aviation Environmental System (AES) to monitor CO<sub>2</sub> emissions from international aviation, if installed in the State.

### INTERNATIONAL AVIATION EMISSIONS REDUCTION: STATES' ACTION PLANS

#### E-LEARNING COURSE

This e-book aims to present the various ICAO tools which can be used to support the development of a State Action Plan.

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# Aviation Environmental System (AES)

## ICAO-European Union Project

This tool has been developed as part of the ICAO and European Union Assistance Project “Capacity Building for CO<sub>2</sub> mitigation from international aviation” – EuropeAid/DCI-ENV/2013/322-049.

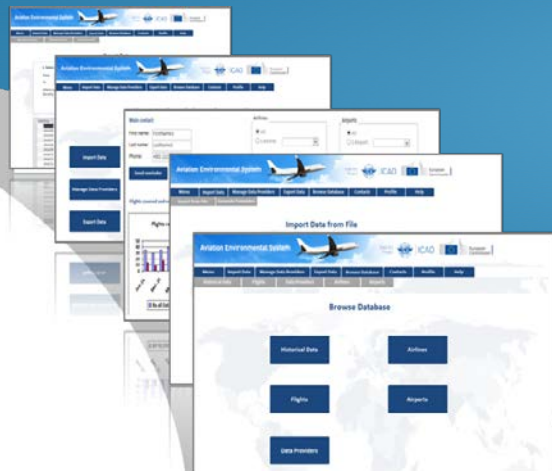


## Aviation Environmental System (AES)

**A tool** developed in the scope of the ICAO-European Union Joint Assistance Project



**AES – Installed in the 14 beneficiary States**

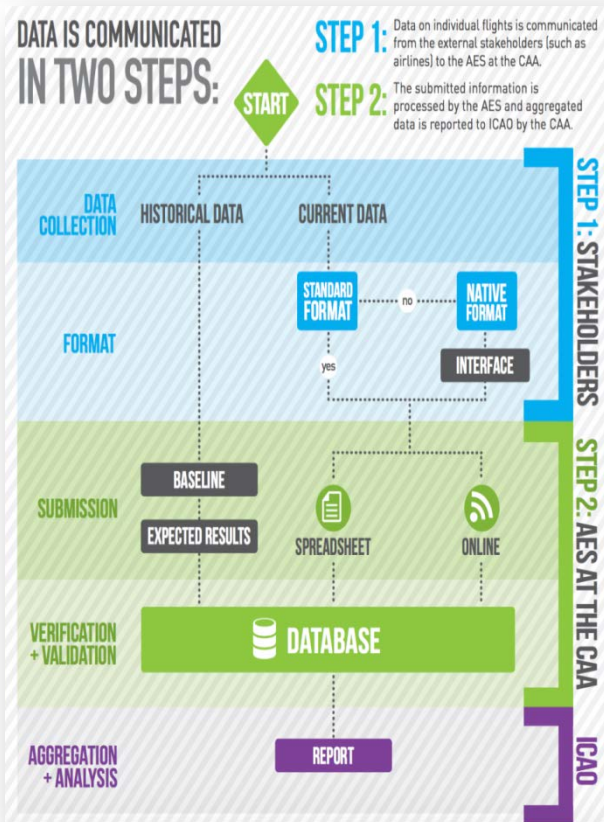


1. Provide a user-friendly tool to allow Civil Aviation Authorities (CAA) to monitor CO<sub>2</sub> emissions from international aviation at the State level
2. Enforce the adoption of a single uniform format (Form ENV1) for data collection in all States
3. Automatize the data reporting to ICAO





## Aviation Environmental System (AES)



Step 1: Stakeholders report data on individual flights to the Civil Aviation Authority (CAA), where it is imported into the AES.

Step 2: The CAA submits to ICAO aggregated data automatically generated by the AES.

For more information: [icao-eu-project@icao.int](mailto:icao-eu-project@icao.int)





# Aviation Environmental System AES



States are able to create  
**Monthly Reports** of CO<sub>2</sub>  
emission by routes, flights or  
airlines

## MONTHLY AVIATION CO<sub>2</sub> REPORT

May-16

Kenya

### KEY METRICS FOR INTERNATIONAL AVIATION

FLIGHTS	RTK (km)	FUEL BURN (L)	CO <sub>2</sub> EMISSIONS (t)	FUEL EFFICIENCY (L/km)
3,378	78,074,849	35,074,354	88,668	0.449

### TRENDS

MONTH-TO-MONTH	May-16	Apr-16	% CHANGE	6 MONTHS TREND
RTK (km)	78,074,849	67,629,826	↑ 15%	
FUEL BURN (L)	35,074,354	32,770,048	↑ 7%	
CO <sub>2</sub> EMISSIONS (t)	88,668	82,843	↑ 7%	
FUEL EFFICIENCY (L/km)	0.449	0.483	↓ -7%	

YEAR-TO-YEAR	May-16	May-15	% CHANGE	1 YEAR TREND
RTK (km)	78,074,849	68,242,919	↓ -21%	
FUEL BURN (L)	35,074,354	44,382,507	↓ -21%	
CO <sub>2</sub> EMISSIONS (t)	88,668	112,199	↓ -21%	
FUEL EFFICIENCY (L/km)	0.449	0.452	↓ -1%	

Revenue Tonnes Kilometers (RTK)



Fuel Burn and Efficiency



Most Fuel Efficient Routes



Fuel Burn Trends



Comments:



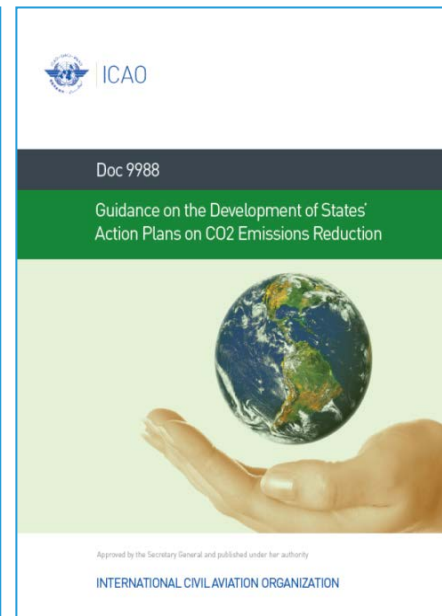
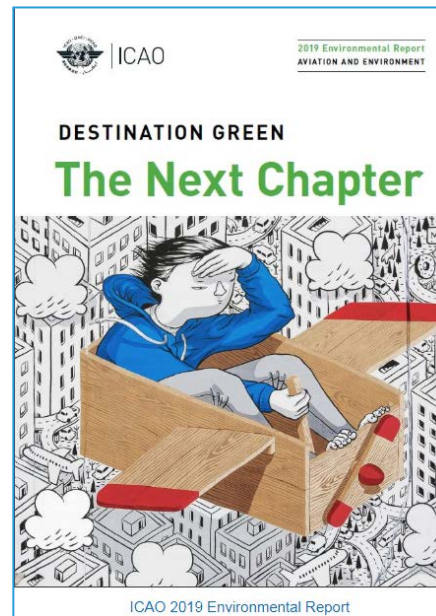
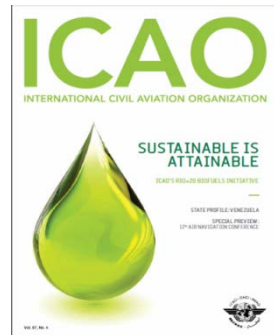
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## Additional Information



For more information, please visit our website: <http://www.icao.int/env>



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South American  
(SAM) Office  
Lima

ICAO  
Headquarters  
Montréal

Western and  
Central African  
(WACAF) Office  
Dakar

European and  
North Atlantic  
(EUR/NAT) Office  
Paris

Middle East  
(MID) Office  
Cairo

Eastern and  
Southern African  
(ESAF) Office  
Nairobi

Asia and Pacific  
(APAC) Sub-office  
Beijing

Asia and Pacific  
(APAC) Office  
Bangkok



THANK YOU