



| ICAO

ENVIRONMENT

CAPACITY BUILDING FOR CO₂ MITIGATION FROM INTERNATIONAL AVIATION

PROJECT FUNDED BY



European Union



“Whilst we have been implementing measures to improve fuel efficiency and reduce CO₂ emissions for some time, we have experienced challenges with a robust data collection system to monitor their effective progress. This gap has been addressed with the AES developed under the ICAO-EU project”

KENYA

OBJECTIVE 1
ACTION PLANS DEVELOPMENT:
 Improved capacity of the National Civil Aviation authorities to develop an Action Plan on CO₂ emissions reduction from international aviation in accordance with ICAO recommendations

OBJECTIVE 2
AVIATION ENVIRONMENTAL SYSTEMS (AES):
 Efficient CO₂ emissions monitoring system for international aviation developed in each selected Member State

OBJECTIVE 3
IMPLEMENTATION OF MITIGATION MEASURES:
 Priority mitigation measures identified, evaluated and partly implemented

“Our new Action Plan, prepared under the ICAO-EU project, is an important step to promote a comprehensive strategy to address climate change in the country within the aviation sector.”

DOMINICAN REPUBLIC

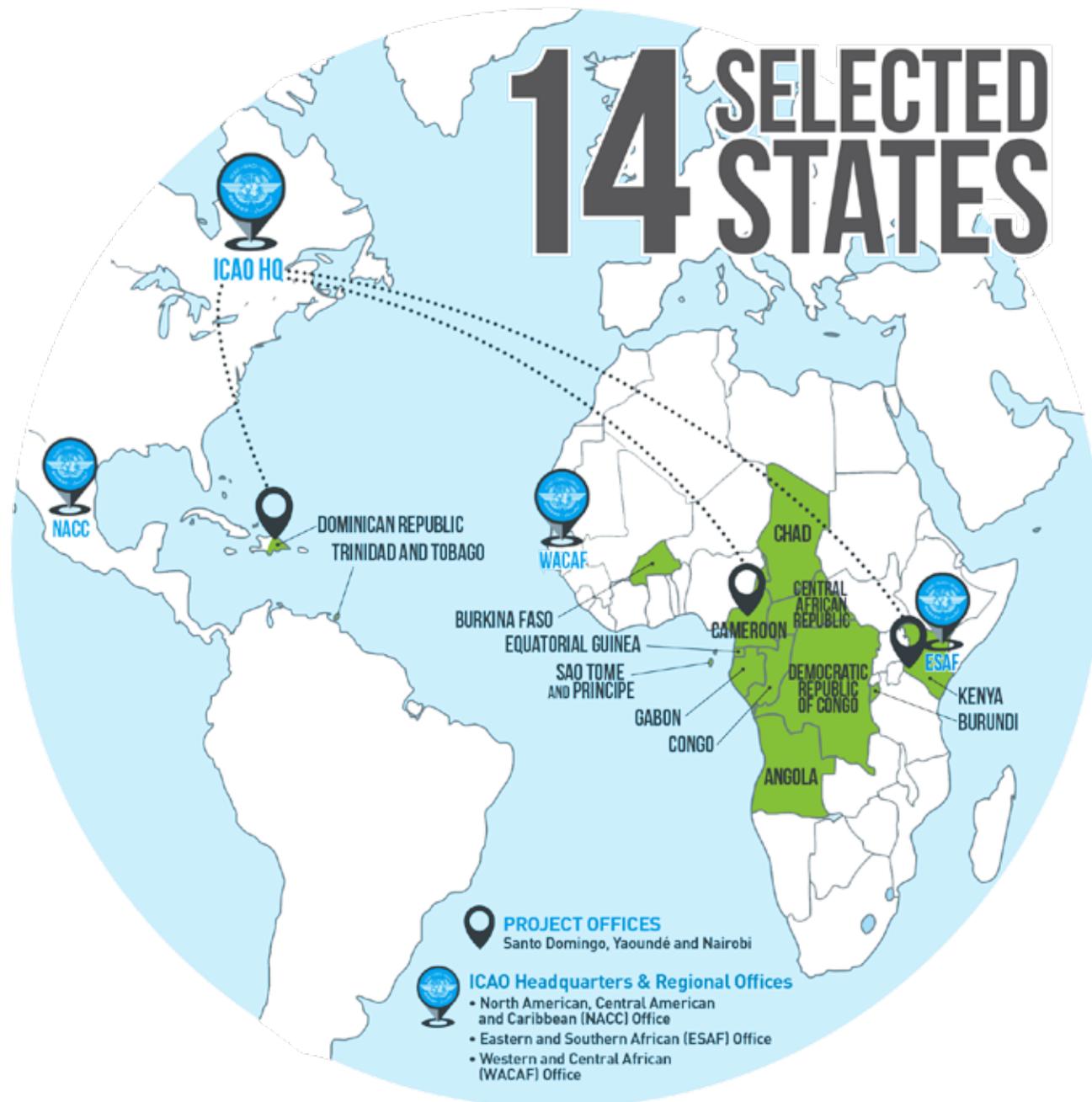
“This project gave us the opportunity to pave the way in this area, to strengthen the regional cooperation on it and to trigger interest in neighbouring national civil aviation authorities to get more involved in CO₂ emissions reduction at their national level.”

BURKINA FASO

“This project is a great example of the ICAO initiative “No Country Left Behind” and such an assistance project should be definitely replicated in other groups of countries.”

CAMEROON





PROJECT OVERVIEW

Since 2010, the International Civil Aviation Organization (ICAO) has been working on a comprehensive strategy to strengthen national capacities on environment and, specifically, to reduce the impact of international aviation on the global climate. Many of ICAO's Member States wanted to take action, but were unsure of how or where to start. In response, the States' Action Plans on CO₂ Emissions Reduction from International Aviation have become one of the key elements of ICAO's environmental strategy.

Building on these achievements, ICAO and the European Union (EU) signed an agreement on 17 December 2013 to implement an assistance project: **Capacity Building for CO₂ Mitigation from International Aviation**.

Fourteen States from Africa and the Caribbean were selected to participate in this 5-year programme. Funded by the European Union, this 6.5 million Euros initiative was successfully implemented by ICAO from 2014 to 2019, achieving all expected results and exceeding initial targets.

The first objective of the ICAO-EU project was to create national capacities for the development of action plans. Supported by the project, all the selected States submitted action plans fully compliant with ICAO's guidelines. The Aviation Environmental System (AES) is a tool developed under the project's second objective to collect and monitor environmental data. The AES is being used consistently by all the selected States to

report their CO₂ emissions from international aviation on a monthly basis.

Pilot projects were also executed with project funding in the beneficiary States to assist in the implementation of mitigation measures, including two "solar-at-gate" projects to power aircraft with solar energy while parked at the gate in Cameroon and Kenya; and enhanced air traffic management procedures in Burkina Faso and Gabon. In addition, the selected States implemented 90 other mitigation measures, which had been included in their action plans within the project timeframe. All the mitigation measures implemented within the project timeframe in the selected States represent **an annual reduction of 107,849 tCO₂ emissions** from international aviation.

The ICAO-EU project has facilitated a greater understanding of environmental protection in the aviation sector in the selected States. Increased awareness of the role of aviation for taking actions to address climate change, has translated into States' support to the international initiatives on environment. Consequently, following the approval of the Carbon Offsetting Reduction Scheme for International Aviation (CORSIA) by the ICAO Assembly in 2016, seven of the project States (Burkina Faso, Cameroon, Democratic Republic of Congo, Dominican Republic, Equatorial Guinea, Gabon, and Kenya) voluntarily joined CORSIA from its onset.



The **Capacity Building for CO₂ Mitigation from International Aviation** assistance project was established to provide assistance in the development and implementation of action plans to ensure that all Member States can participate in the collective efforts for the achievement of ICAO's aspirational goal of blue carbon neutral growth from 2020 onwards.

This project is a concrete example of ICAO's efforts to achieve the objectives of the **"No Country Left Behind"** initiative in the area of environmental protection.

OBJECTIVE 1

ACTION PLANS DEVELOPMENT

Improved capacity of the national civil aviation authorities to develop a State Action Plan on CO₂ emissions reduction from international aviation in accordance with ICAO recommendations

The first objective of the ICAO-EU project was to create national capacities for the development of action plans. ICAO organized specific training seminars, directed the establishment of National Action Plan Teams in the selected States, and assisted each Civil Aviation Authority directly in the preparation of their action plans.

By June 2016, the 14 selected States had developed action plans fully compliant with ICAO's guidelines, including robust historical data and a reliable baseline scenario. A **total of 218 measures to reduce fuel consumption and CO₂ emissions were proposed in the action plans**, including aircraft technology, operational measures, and sustainable aviation fuels.

The National Action Plan Teams have changed the way the States work towards environment in aviation by triggering synergies amongst national stakeholders (i.e. civil aviation authorities, ministry of environment, ministry of transport, airports, airlines, air navigation services providers and fuel suppliers), facilitating the decision-making process and securing the financial and political support for the implementation of mitigation measures.

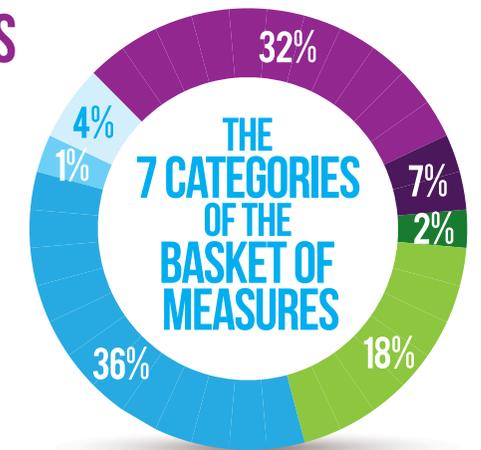
The project's capacity building strategy has therefore enabled a shift in institutional culture towards the environment in the selected States, which have taken ownership and gained greater awareness of environmental issues and are enthusiastic to undertake concrete action.

This ICAO assistance project has prepared the States and set the stage for the implementation of mitigation measures and feasibility studies in selected States. A mitigation measure is an activity selected by a State to improve fuel efficiency and reduce CO₂ emissions from international aviation.



THE 218 MITIGATION MEASURES ARE DISTRIBUTED IN:

CAT 1	Aircraft related technology
CAT 2	Alternative fuels
CAT 3	Improved Air Traffic Management
CAT 4	More efficient operations
CAT 5	Economic/market-based measures
CAT 6	Regulatory measures
CAT 7	Airports improvements



OBJECTIVE 2

AVIATION ENVIRONMENTAL SYSTEMS (AES)

Efficient CO₂ emissions monitoring system for international aviation developed in each selected State

One of the main objectives of the ICAO project was to establish, in the civil aviation authority of each selected State, an efficient CO₂ emissions monitoring system to facilitate the preparation of robust emissions inventories and the periodic reporting to ICAO of CO₂ emissions from international aviation.

Lack of reliable aviation environmental data in developing States, such as the amount of CO₂ emissions produced by the aviation sector, is one of the challenges for assessing the impact of aviation on the global climate and developing national strategies for environmental sustainability.

The ICAO-EU project developed a tool – the Aviation Environmental System (AES), to establish data collection processes for environmental information, including CO₂ emissions from

international aviation, and also to automate the organization and reporting by the civil aviation authorities. To date, all the beneficiary States have the capacity to use the AES to collect the relevant data from their aviation stakeholders and can generate monthly and yearly CO₂ emissions reports for their aviation sector.

In addition, the AES can be used to generate reports for national purposes (e.g. reporting to the ministry of environment) and for compliance with ICAO's requirements (e.g. automatic generation of ICAO's tools and for compliance with ICAO's reporting requirements and recommendations).

The AES has proven to be particularly useful to monitor the implementation of the States Action Plans for CO₂ emissions reduction in the selected States and to assess the actual results in terms of CO₂ emissions reduction compared to the baseline scenario and the expected results forecasted in the action plan.



OBJECTIVE 3

IMPLEMENTATION OF MITIGATION MEASURES

Priority mitigation measures identified, evaluated and partly implemented

In agreement with the European Union, and based on their carbon reduction potential and replicability, **ICAO selected four pilot mitigation measures and five feasibility studies to be executed** with project funding in the beneficiary States.

- Two “solar-at-gate” projects, which consist of a solar farm and airport gate electric equipment, to power aircraft with solar energy during ground operations at the international airports of Douala, Cameroon, and Mombasa, Kenya. The combination of electricity generated by the solar facility and the use of gate electrification equipment eliminates the CO₂ emissions while the aircraft is parked at the gate running the pre-departure procedures before departing for the next flight. The installed capacity of

these projects is of 1,25MWp and 500kWp respectively, and they will eliminate over 4,000 tonnes of CO₂ per year and will serve more than 7,500 flights per year.

- Design and implementation of Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) at the international airports of Ouagadougou, Burkina Faso and Libreville, Gabon. With these new procedures, aircraft can operate without altitude restrictions during the departure or arrival phase, and thus optimize their flight profile. As a result, there is less noise exposure, and reductions in fuel burn and greenhouse gas emissions.



PILOT MITIGATION MEASURES

The pilot mitigation measures selected by the States showcased concrete actions that may be replicated by other Member States to contribute to the achievement of ICAO’s aspirational goal for CO₂ emissions reduction from international aviation.

SOLAR PANELS

Provide clean power to the airport grid

GATE ELECTRIFICATION SYSTEM

Provides ground power and pre-conditioned air to the aircraft at the gate

IMPLEMENTATION OF CCO/CDO

Continuous Climb Operations (CCO) / Continuous Descent Operations (CDO)

CAMEROON
DOUALA INTERNATIONAL AIRPORT

KENYA
MOMBASA INTERNATIONAL AIRPORT

BURKINA FASO

GABON

CO₂ REDUCTION
3,875
TONNES/YEAR

CO₂ REDUCTION
1,368
TONNES/YEAR

FEASIBILITY STUDIES



Five feasibility studies on the use of renewable energy and sustainable aviation fuels in Burkina Faso, Dominican Republic, Kenya and Trinidad and Tobago provided these governments with policy advice to unveil new opportunities through innovation for a sustainable aviation sector.

The feasibility studies aimed at conducting a comprehensive analysis in each State on the use of drop-in sustainable aviation fuels associated with the reduction of CO₂ emissions, and also at assessing opportunities to develop solar projects on airport property and to use the power to supply electricity to the airport terminal.



ONLINE COURSE

INTERNATIONAL AVIATION: STATES' ACTION PLANS TO REDUCE CO₂ EMISSIONS

An online course “**International Aviation: States' Action Plans to reduce CO₂ emissions**” was developed by ICAO in partnership with the United Nations Institute for Training and Research (UNITAR).

This online training course is a self-paced tutorial to train environment focal points from civil aviation authorities and stakeholders of the aviation sector in the preparation and implementation of Action Plans on Emissions Reduction in accordance with ICAO's guidance documents and best practices.

The training course is composed of **5 modules** addressing the different components of the Action Plan:



To register in the online course visit:

<https://unccelearn.org/course/view.php?id=26&page=overview>



In addition to the pilot **mitigation measures** and **feasibility studies** executed directly with project funding, the beneficiary States implemented **90 mitigation measures** which had been included in their action plans developed under the project within the project timeframe.

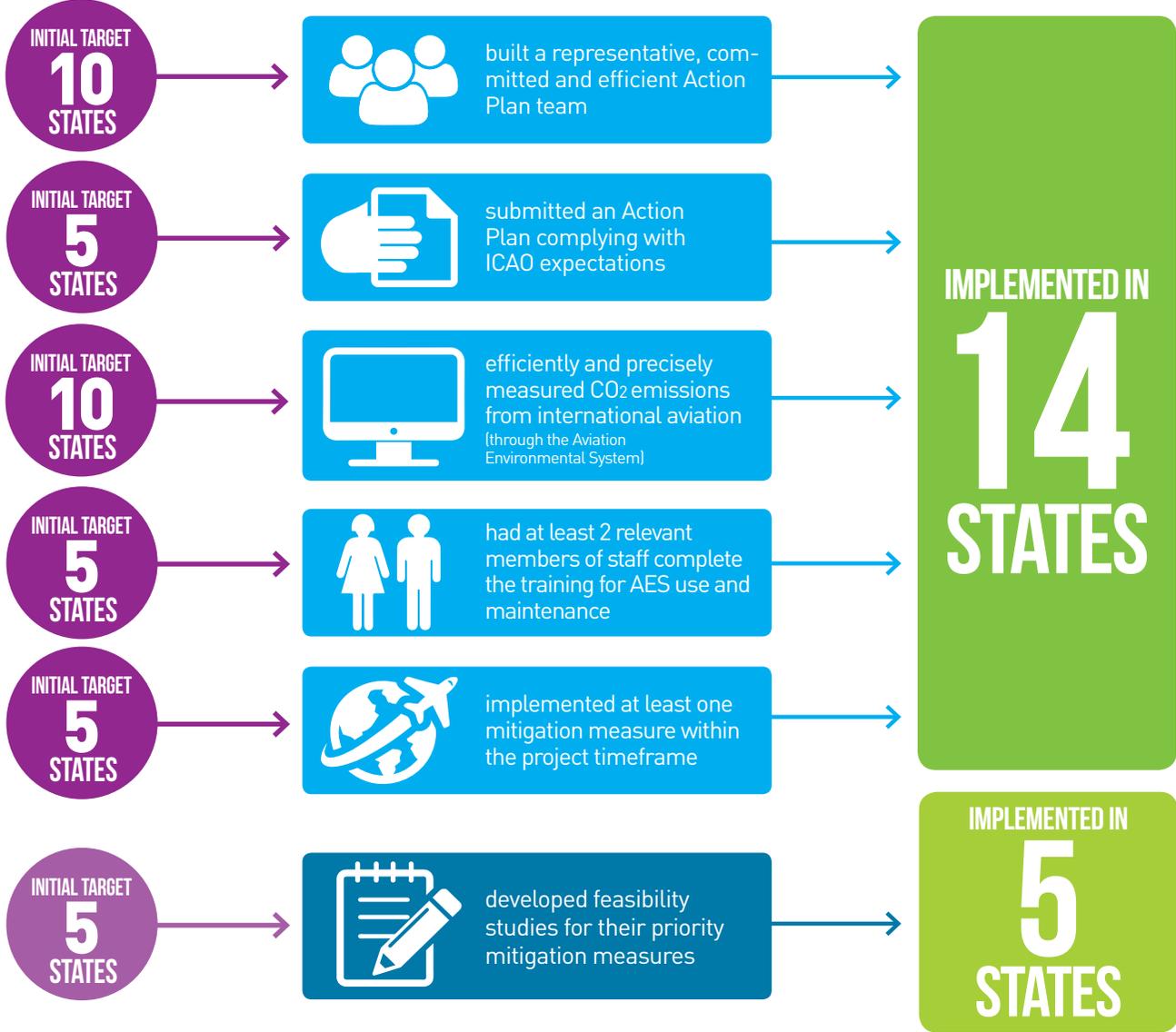
The environmental benefits of the implementation of these mitigation measures have been quantified in a total of **107,849 tCO₂ emissions reduction per year**.

With the support provided by the ICAO-EU project, **ICAO has succeeded in transforming the organizational culture towards environmental protection in the beneficiary States**. An issue that was not regarded as a priority before has now become relevant for these States. The establishment of environmental units with dedicated staff in the civil aviation authorities along with the

voluntary decision of seven selected States of the project to join the Carbon Offsetting Reduction Scheme for International Aviation (CORSIA) from its outset is a testimony of the increased awareness and political will for climate action, as a result of the ICAO-EU project. This gives confidence to ICAO that the results achieved will be sustainable in the future.

Capacity building and assistance on environment will continue to be required for the transformation of policy into concrete actions at the national level. Many States have officially communicated their interest to participate in similar assistance initiatives and replicate the positive results of the ICAO-EU project. The availability of further funding will allow ICAO to extend the benefits of this successful project to other Member States so that **“No Country is Left Behind”**.

KEY ACHIEVEMENTS



This project was implemented by ICAO Environment, Air Transport Bureau, with the support of ICAO Environment Officers and the ICAO Secretariat. We wish to express our sincere gratitude for their support throughout the project implementation and for their commitment to its success.

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For more information, please visit the project website at:

https://www.icao.int/environmental-protection/Pages/ICAO_EU.aspx



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