



THE STATES' ACTION PLANS FOR THE IMPLEMENTATION OF THE BASKET OF MEASURES ON TECHNOLOGY, OPERATIONS, FUELS AND CORSIA

In-person Seminar

Second Phase of the ICAO Assistance Project
with the EU Funding : *“Capacity Building for CO₂
Mitigation from International Aviation –
Development of ICAO States’ Action Plans for 10
States”*

Praia, 28 & 29 July 2022
Cabo Verde

Neil Dickson

Chief, Environmental Standards, ICAO





State Action Plans (SAPs)



A State Action Plan is a living document that defines a State's actions to reduce their CO₂ emissions from international civil aviation.



Within a State it is a planning and coordination tool, and it provides a clear communication route to ICAO.

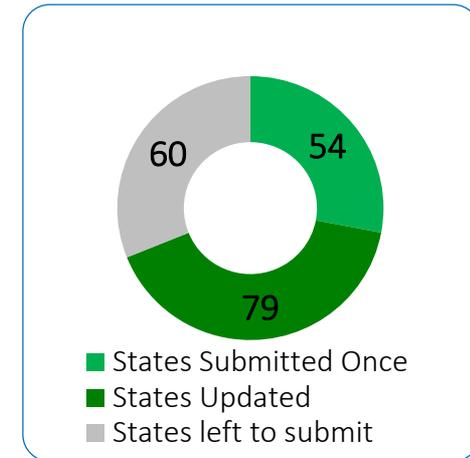


State Action Plan Achievements

133 States representing **98.16% of global RTK**
Have voluntarily submitted their State Action Plan



Global SAP Submissions /Updates





Purpose of the State Action Plans

State

- ✓ to report international aviation CO₂ emissions to ICAO

to outline to ICAO their respective policies and actions

to provide information to ICAO on the basket of measures considered for the emission reduction and on any specific assistance needs

ICAO

- ✓ to compile information in relation to the achievement of the global aspirational goals

- ✓ to facilitate the dissemination of economic and technical studies and best practices related to aspirational goals

- ✓ to provide guidance and other technical assistance for the preparation of States' action plans

- ✓ to identify and respond to States' needs and provide assistance



Benefits of Developing State Action Plan

State

Action Plans give ICAO Member States the ability to:

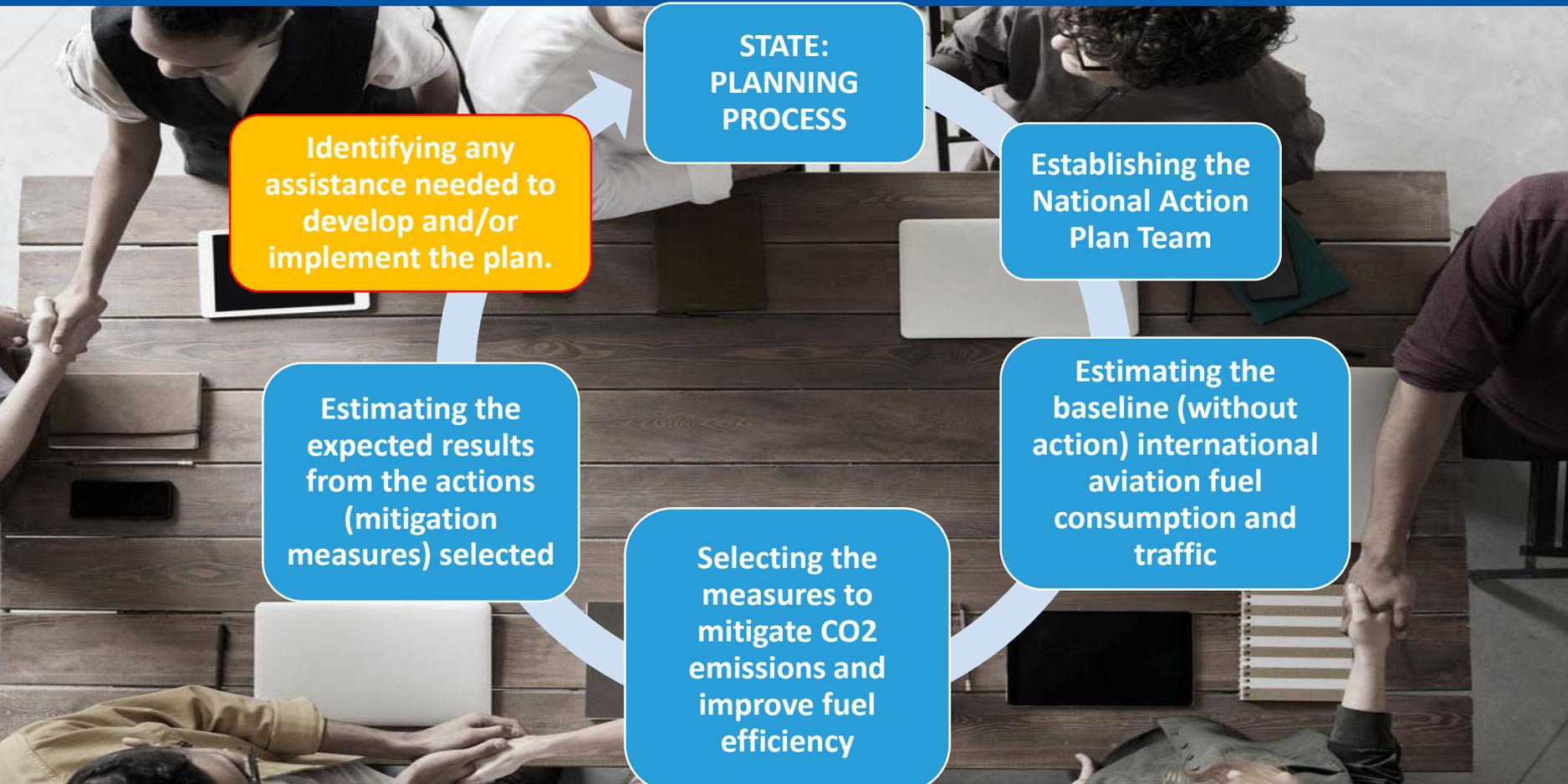
- ✓ Promote cooperation
- ✓ Establish partnerships
- ✓ Facilitate technology transfer
- ✓ Obtain assistance

ICAO

They provide an organized means for the State to:

- ✓ Submit a plan which highlights their commitment to addressing environmental challenges
- ✓ Outline their respective policies and actions

State Action Plan Process





What is next after Action Plan Submission?

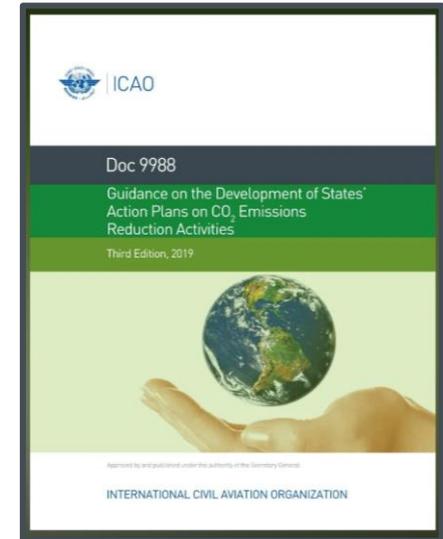


IMPLEMENTATION AND ASSISTANCE



State Action Plan Process

- The development and submission of an action plan is not the end goal!
- Key points:
 - State need to set in motion a process to implement the relevant measures in the action plan
 - Continuous consultation and coordination between the various stakeholders is essential for implementation
 - ✓ State need to monitor the implementation of all activities
 - ✓ State need to continue to work closely with ICAO





State Action Plan Process as a Source Of Assistance

- Action plans create the possibility of:
 - ✓ partnerships, cooperation, capacity building, technology transfer and assistance
- External organizations are creating potential funding opportunities
- SAPs can be used to demonstrate States' commitment to the implementation of climate change policies and mitigation measures





State Action Plan Process as a Source Of Assistance

- States should clearly define the assistance needed to implement mitigation measures and to achieve the expected results
 - ✓ Technical,
 - ✓ Financial,
 - ✓ Research,
 - ✓ Training
 - ✓ Feasibility Studies
 - ✓ Pilot Projects
 - ✓ Capacity Building
- Could facilitate support from other government entities, financial institutions, potential future ICAO assistance projects



ICAO's Assistance and Support



ICAO developed an integrated and comprehensive strategy to support States



facilitate access to financial resources
build partnerships,
develop guidance documents,
technical material, and capacity building activities

ICAO Capacity Building and Assistance Projects

ICAO-EU project Capacity Building for CO₂ Mitigation from International Aviation Phase I



ICAO | **European Union**

14 SELECTED STATES

ICAO HQ
RACC
DOMINICAN REPUBLIC
TRINIDAD AND TOBAGO
BURKINA FASO
EQUATORIAL GUINEA
SAO TOME and PRINCIPE
GABON
CONGO
CHAD
CENTRAL AFRICAN REPUBLIC
REPUBLIC OF CONGO
ANGOLA
KENYA
BURUNDI

PROJECT OFFICES
Santo Domingo, Yaoundé and Nairobi

ICAO Headquarters & Regional Offices
• North American, Central American and Caribbean (NACCI) Office
• Eastern and Southern African (ESAFA) Office
• Western and Central African (WACAFA) Office

"The project has been essential to create synergies and enhance coordination of the relevant stakeholders."

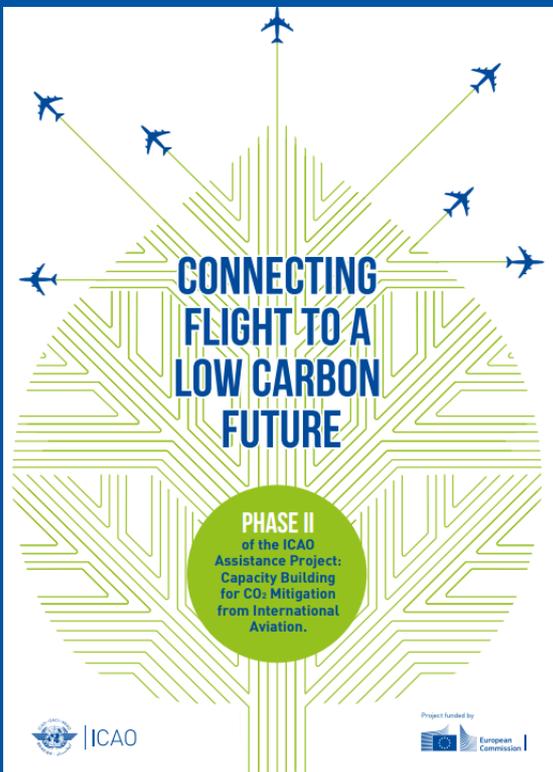
TRINIDAD AND TOBAGO

SUSTAINABLE DEVELOPMENT GOALS The ICAO-European Union Assistance Project contributes to 10 out of the 17 United Nations SDGs

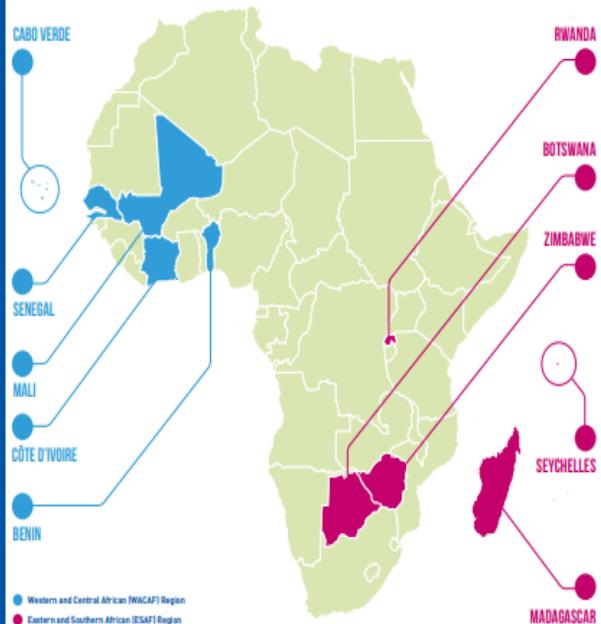
3, 4, 5, 7, 8, 9, 10, 12, 13, 15, 17

ICAO Capacity Building and Assistance Projects

ICAO-EU project Capacity Building for CO₂ Mitigation from International Aviation Phase II



10 BENEFICIARY STATES



3 MAIN OBJECTIVES

OBJECTIVE
1

Capacity building

Improve national capacity of the participating States to develop, update and implement their Action Plans on CO₂ emissions reduction from international aviation in accordance with ICAO recommendations

OBJECTIVE
2

Action Plans Development

Assist the participating States in developing and submitting their State Action Plans on emissions reduction.

OBJECTIVE
3

Implementation of Mitigation Measures

Assess the mitigation measures selected by the participating States and evaluate their feasibility.



Next Steps

State

To consider new innovative measures within the ICAO Basket of Measures

- activities are arising which could further reduce aviation emissions
- Focused on assessing the three in-sector emissions reductions measures

ICAO

To further engage with States to support the submission of quantified State Action Plans

- **State Action Plans could also feed into ICAO's work on long-term aspirational goal (LTAG) for international aviation for implementation**

Update ICAO Doc 9988, the APER website and the other ICAO tools.

Continue to explore means to facilitate States' access to financial resources through new possible partnerships



WORK ON THE LONG-TERM ASPIRATIONAL GOAL (LTAG) FOR INTERNATIONAL AVIATION CO₂ EMISSIONS REDUCTIONS

In-person Seminar

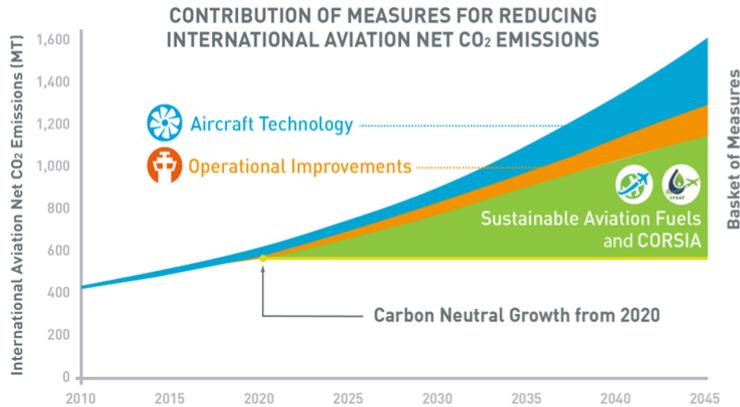
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2019

ICAO Assembly requested the ICAO Council to:

- explore the feasibility of a long-term global aspirational goal (LTAG)

2010

ICAO adopted two Global Aspirational Goals

- 2% annual fuel efficiency improvement through 2050
- Carbon neutral growth from 2020 (CNG2020)



2022

**LTAG High-Level Meeting (HLM)
41st ICAO General Assembly**

- Results of the feasibility of LTAG will be presented.



Resolution A40-18, paragraph 9 requested the LTAG work

Task

The Assembly... Requests the Council to continue to explore the feasibility of a long term global aspirational goal for international aviation, through conducting detailed studies assessing the attainability and impacts of any goals proposed, including the impact on growth as well as costs in all countries, especially developing countries, for the progress of the work to be presented to the 41st Session of the ICAO Assembly. [2022]

How to do the task

Assessment of long term goals should include information from Member States on their experiences working towards the medium term goal.

Timeline

Consideration



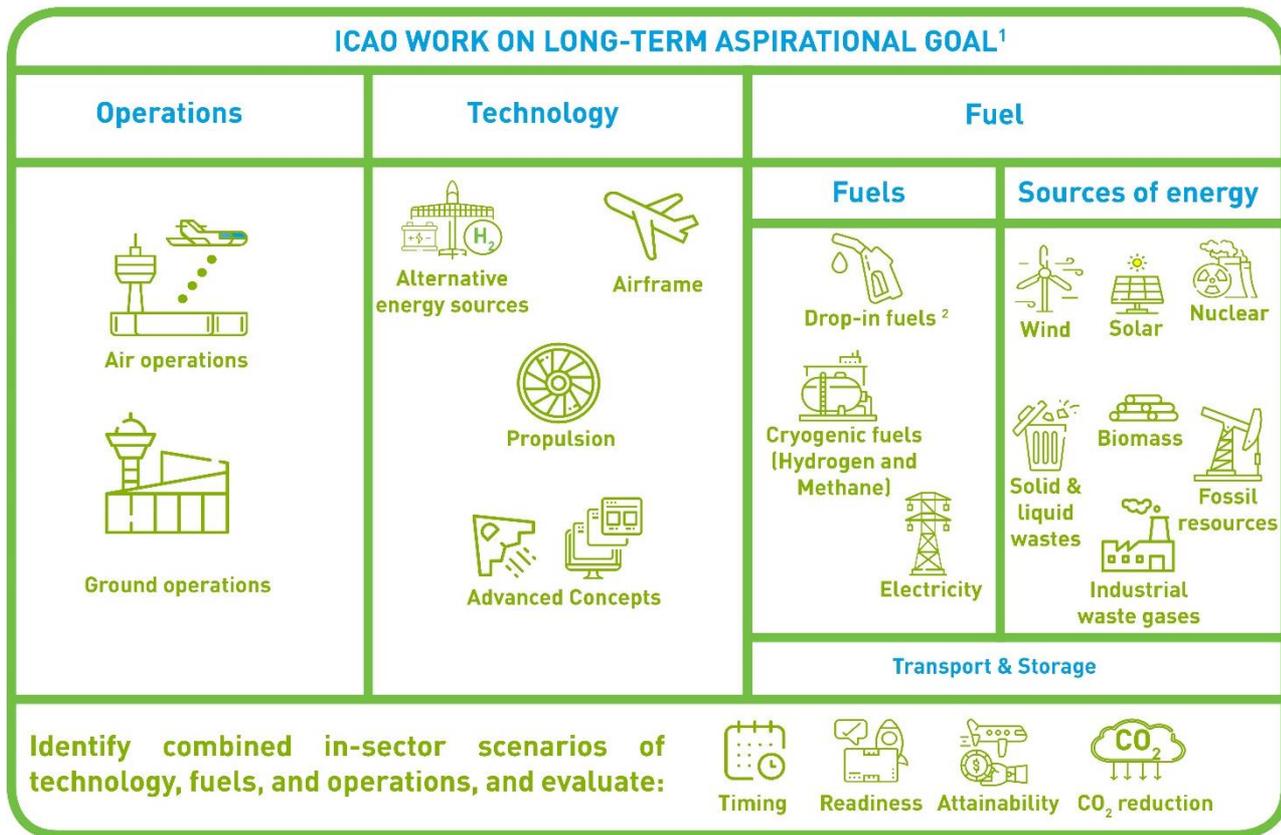
Open, transparent and inclusive:



Innovations:



In-sector focused:





2019
Assembly
Request

2020

2021

2022

we are here

Stocktaking Started

Data gathering, workshops and Stocktaking: Technology, Operations, Fuels, Climate Science

Outreach

2021 LTAG GLADs

2021 Stocktaking

Scenario development

Final analysis

CAEP Technical Work

Outreach

2022 LTAG GLADs

2022 Stocktaking

High-level meeting

CAEP/12 meeting

Delivery of CAEP work, for Council review

High-level consultation

41st Session of ICAO Assembly

Council report to Assembly

Consideration by ICAO Governing Bodies

CAEP Technical Work Started



The possible building blocks for the LTAG decision making were the basis for the topics discussed during the LTAG GLADs 2022 Day 2:

1) Recognition of scientific understanding

2) Technical feasibility of LTAG scenarios

3) Level of LTAG ambition

4) Means of implementation (e.g. capacity building)

5) Support to States with action plans and roadmaps

6) Monitoring of progress to achieve LTAG





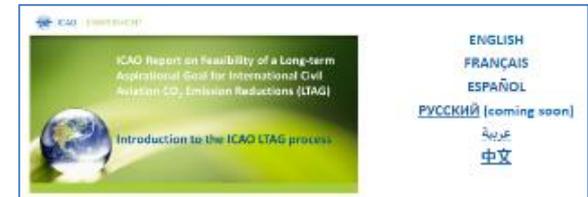
Following the Council decision, LTAG report now available on the ICAO Website, **in all the six ICAO Languages:** <https://www.icao.int/environmental-protection/Pages/LTAG.aspx>

including:

- **Council briefing on LTAG report**



- **Videos on LTAG Report introduction**



Appendix B1
Background
(18 pages)



Appendix R1
Summary Sheets
(61 pages)



Appendix R2
Comparison of Trends
(8 pages)



Appendix R3
Results in the Climate
Science Context
(10 pages)



Appendix S1
Climate Science Context
(24 pages)



Appendix M1
Overview of the Modelling
Approaches
(99 pages)



Appendix M2
COVID-19 Forecast
Scenario Development
(8 pages)



Appendix M3
Technology
(181 pages)



Appendix M4
Operations
(12 pages)



Appendix M5
Fuels
(84 pages)

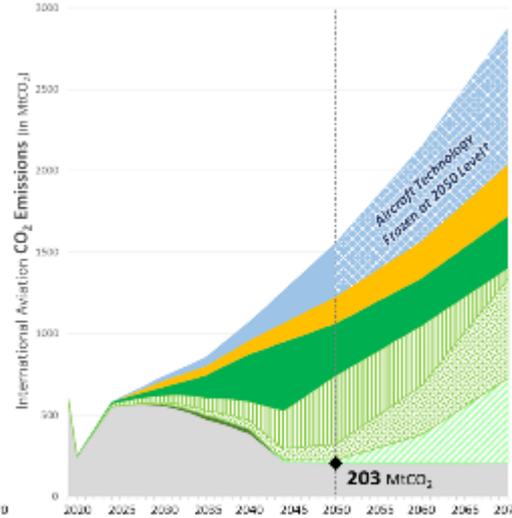
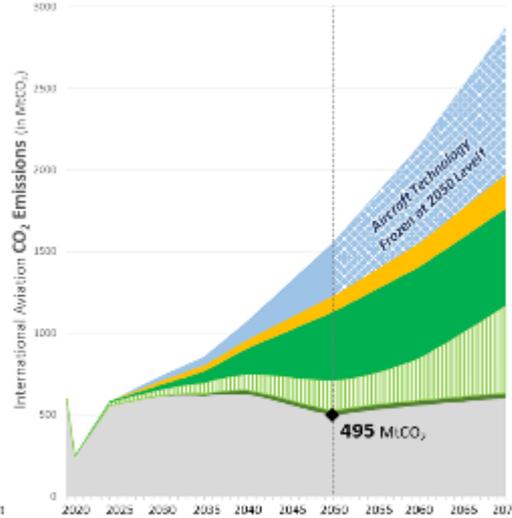
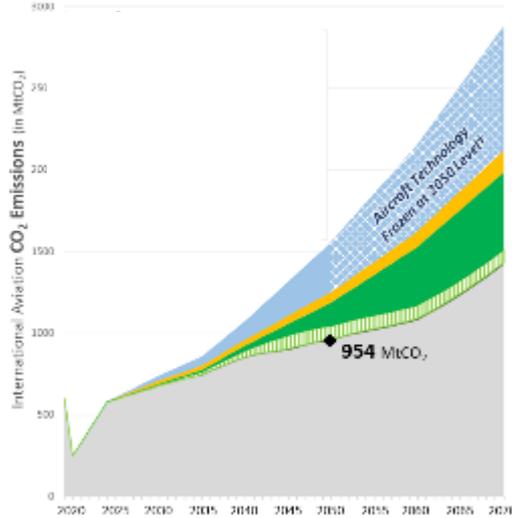


IS1 LTAG Integrated Scenario 1

IS2 LTAG Integrated Scenario 2

IS3 LTAG Integrated Scenario 3

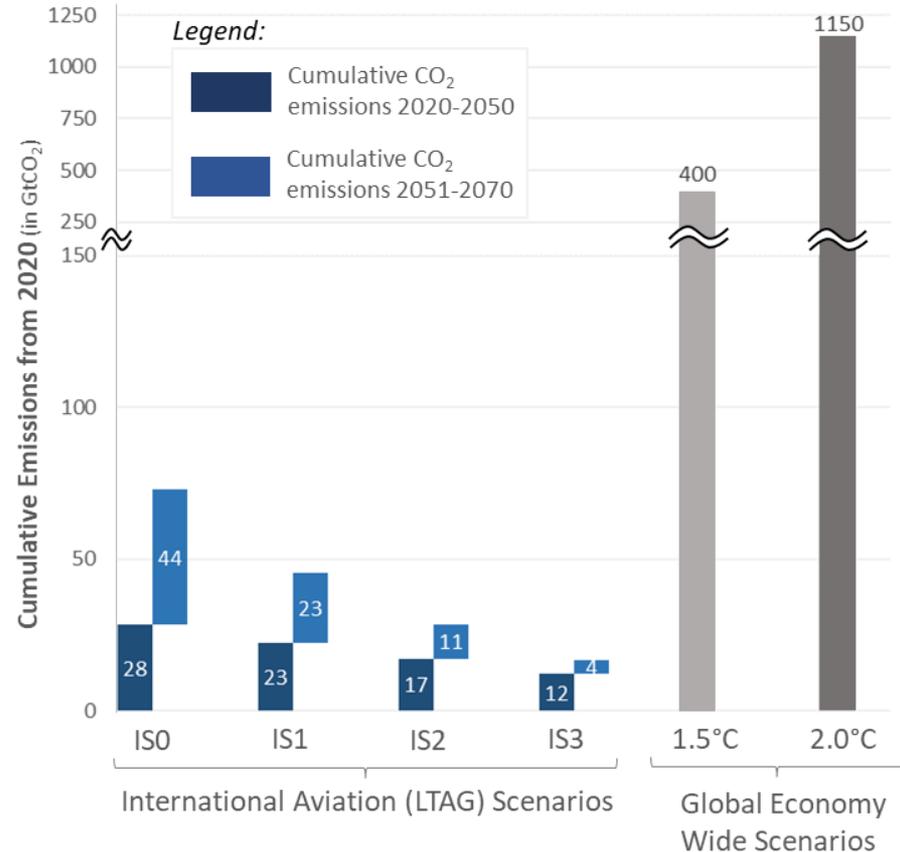
- Legend:**
- Aircraft Technology
 - Operations
 - LTAG-SAF Biomass based fuel
 - LTAG-SAF Gaseous waste based fuels
 - LTAG-SAF Atmospheric CO2 based fuels
 - Non drop in fuels: Cryogenic Hydrogen
 - LTAG-LCAF: Lower carbon petroleum fuels
 - Residual CO2 Emissions



Metrics	IS1	IS2	IS3
CO ₂ Emissions in 2050 after Reductions	≈950 MtCO ₂ in 2050 (160% of 2019 CO ₂ emissions)	≈500 MtCO ₂ in 2050 (80% of 2019 CO ₂ emissions)	≈200 MtCO ₂ in 2050 (35% of 2019 CO ₂ emissions)
Reduction in 2050 from the Baseline	39% total through: Technologies - 20%, Operations - 4%, Fuels - 15%	68% total through: Technologies - 21%, Operations - 6%, Fuels - 41%	87% total through: Technologies - 21%, Operations - 11%, Fuels - 55%
Cumulative residual Emissions from 2020 to 2070	23 GtCO ₂ (2020 to 2050) 23 GtCO ₂ (2051 to 2070)	17 GtCO ₂ (2020 to 2050) 11 GtCO ₂ (2051 to 2070)	12 GtCO ₂ (2020 to 2050) 4 GtCO ₂ (2051 to 2070)



- **Estimated cumulative residual global anthropogenic CO₂ emissions from the start of 2020 to limit global warming to 1.5°C is 400 GtCO₂ at 67% probability.**
 - International aviation share ~4.1-11.3%
- **For a warming limit of 2°C, the remaining allowed carbon emissions are estimated to be 1150 GtCO₂ at 67% probability.**
 - International aviation share ~1.4-3.9%





- **High-Level Meeting on LTAG – held on 19 to 22 July 2022**
 - Objective: consider the CO₂ emissions reduction scenarios, options for LTAG, as well as means of implementation and the monitoring of progress, before concluding with recommendations.
- **ICAO Council (late August 2022):**
 - To be held after the High-Level Meeting (HLM) on LTAG;
 - Objectives: consider the outcomes of the HLM, and deliberate on the Assembly Working Paper on LTAG.
- **ICAO 41st Assembly (from 27 September 2022):**
 - The ICAO Assembly will consider the progress of the work on exploring the feasibility of a long-term global aspirational goal for international aviation. (Ref.: SA 41/2 – 22/21).



BEST PRACTICES FOR THE IMPLEMENTATION OF THE MITIGATION MEASURES

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Implementation of Performance Based Navigation (PBN) in Nigeria

- ✓ improve air navigation facilities and air traffic management systems
- ✓ reduced flight times, terminal delays, fuel consumption, and distance flown
- ✓ increase in flight efficiency and reduction in fuel burn and CO2 emissions

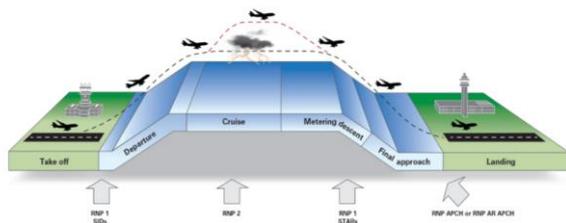


FIGURE 1: Application of PBN in the Nigerian Airspace

TABLE 1: New PBN RNAV10 Routes with Savings in Distance, Fuel and Emissions

S/No	Route Designator	Type of Route	Routing	FIRs Involved	Distance Savings (nm)	Fuel Savings (kgs)	CO ₂ Savings (kgs)
1	UQ300	New Route RNAV10 IATA Request	KOKAM – NLY – ILBAS – EDGOT	Brazzaville, Kano	29	179	566
2	UY604	RNAV10 New, Nigerian Request	POT-BIPIV	Kano, Brazzaville	30	193	610
3	UQ181	New Route RNAV10 IATA Request	BIPIV – TENTU	Brazzaville, Kano, Accra	44	550	1750
4	UQ400	New Route RNAV10 IATA	BIPIV – NANOS	Brazzaville, Kano, Niamey	30	179	566
5	UQ324	New Route RNAV10 IATA Request	NY-GULEN-KELAK	Niamey, Kano, Ndjamen, Khartoum	50	618	1953
6	UY333	RNAV10 New, Nigerian request	KIGRA-OPDOL-UBEVA	Kano, Niamey, Algiers, Tunis	44	550	1730
7	UY87	New Route RNAV10	TYE-KIDKI	Kano, Accra, Abidjan	15	91	287
8	UY57	New Route RNAV10 ACCRA Request	LIREX-SESIG	Kano, Accra, Abidjan	7	39	123
9	UQ200	New Route RNAV10 IATA Request	ADDIS – LAGOS (GWZ) – GADUV	Addis, Khartoum, Ndjamen, Brazzaville, Kano	95	950	3002
10	UY87	New Route RNAV10	TYE-KIDKI	Kano, Accra, Abidjan	15	91	287



Capital Infrastructure of Kotoka International Airport phase 3 development project in Ghana

- ✓ use of renewable energy sources in the upgrade of airport facilities
- ✓ use of LED energy serving for electrical facilities
- ✓ installing equipment at gates to reduce the use of auxiliary power units





SAF Production in Madagascar

- ✓ the New Energy Policy (NPE) is oriented towards the massive distribution of renewable energies
- ✓ regional potential
- ✓ Would support the reduction of national and international emissions



REGIONS	SUPERFICIE TOTALE (ha)	ZONES A EXCLURE (ha)	ZONES EXPLOITABLES SOUS CONDITION (ha)	ZONES EXPLOITABLES (ha)
ALAOTRA-MANGORO	2 739 447	1 495 130	533 481	710 836
AMORONT MANIA	1 653 974	495 266	257 404	901 304
ANALAMANGA	1 732 802	692 365	288 444	751 993
ANALANJIROFO	2 182 659	2 146 667	2 911	33 081
ANDROY	1 872 739	985 417	628 019	259 303
ANOSY	2 963 548	1 031 393	330 234	1 601 922
ATSIMO-ANDREFANA	6 672 468	3 826 473	1 615 735	1 230 260
ATSIMO-ATSINANA	1 654 642	844 390	387 840	422 412
ATSINANANA	2 205 407	1 362 156	661 919	181 331
BETSIBOKA	2 953 465	509 602	650 175	1 793 688
BOENY	3 030 371	1 172 364	1 666 583	191 424
BONGOLAVA	1 798 294	134 601	927 470	736 223
DIANA	2 008 227	1 140 243	394 854	473 131
HAUTE MATSLATRA	2 088 330	495 929	929 569	662 831
IHOROMBE	2 610 774	702 455	529 779	1 378 539
ITASY	644 416	196 526	133 991	313 899
MELAKY	4 088 130	943 711	2 145 615	998 805
MENABE	4 901 656	1 701 624	1 883 893	1 316 139
SAVA	2 373 566	1 915 979	299 178	158 409
SOFIA	5 125 808	2 533 665	1 595 819	996 324
VAKINANKARATRA	1 805 046	569 394	472 698	762 954
VATOVAVY-FITOVINANY	2 074 179	684 830	1 052 283	337 066
TOTAL	59 179 951	25 580 181	17 387 895	16 211 876

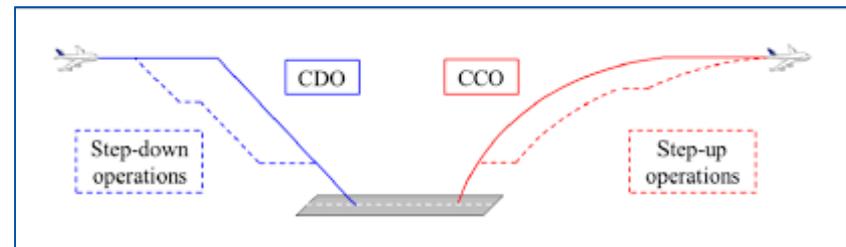
Table 8: "Area potential by region"1



Fuel-Efficient Departure and Approach Procedures in Cabo Verde

Design and implementation of CCO and CDO procedures at all international airports

- ✓ allow the operators to fly a profile that is as close as possible to the optimum profile with continuous climb or descent during their approach for the international airport
- ✓ enables to attain initial cruise climb FL at an optimum air speed and engine thrust reducing fuel burn and emission and noise reduction





Implementation of measures to exploit the full capacity of Mali's airspace

This measure aims to implement measures to fully exploit the capacities of the airspace to allow aircraft to optimize their performance according to the ergonomics of the airspace and the flexibility offered by it.

- ✓ fuel savings: 2096.45 tonnes / year





Solar Energy at Kenyan Airports

- ✓ cut CO2 emissions by switching to renewable energy
- ✓ focus on solar energy for lighting purposes
- ✓ replacement of electricity water pump with a solar water pump
- ✓ solar power plant at JKIA will save 25% in terms of revenue expenditure on electricity

International Airports	Power Consumption in kW/h per month	Power Consumption in kW/h per Year	Expected solar power generation (mw)
1. Jomo Kenyatta International Airport (JKIA)	2,600,000	2,600	3.00
2. Moi International Airport (MIA)	350,000	350	2.00
3. Wajir International Airport (WIA)	12,000	12	0.50
4. Eldoret International Airport (EIA)	60,000	60	1.00
			6.50





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THANK YOU