



| ICAO | UNITING AVIATION

Sixth Meeting of the Directors General of Civil Aviation of Africa and the Indian Ocean (AFI-DGCA/6)

INTERNATIONAL CIVIL AVIATION AND THE ENVIRONMENT

Presented by the Secretariat

Brazzaville, Congo.

2 - 4 November, 2016



Environmental Protection

Minimize the adverse environmental effects of civil aviation activities

Minimize the adverse environmental effects of civil aviation activities. This Strategic Objective fosters ICAO's leadership in all aviation-related environmental activities and is consistent with the ICAO and UN system environmental protection policies and practices.

Protection de l'environnement :

Limiter au minimum les effets néfastes des activités d'aviation civile sur l'environnement.

Cet Objectif stratégique renforce le rôle de chef de file de l'OACI dans toutes les activités concernant le rapport entre aviation et environnement, et est conforme aux politiques de l'OACI et du système des Nations Unies en matière de protection de l'environnement.



- **Environmental Protection A39 Resolutions**

A39-1 Consolidated statement of continuing ICAO policies and practices related to environmental protection – General provisions, noise and local air quality

A39-1 Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement — Dispositions générales, bruit et qualité de l'air locale

A39-2 Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate change

A39-2: Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement – Changements climatiques



- **Environmental Protection A39 Resolutions**

A39-3 Consolidated statement of continuing ICAO policies and practices related to environmental protection – Global Market-based Measure (MBM) Scheme

A39-3 Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement – Régime mondial de mesures basées sur le marché (MBM)

ICAO and the United Nations Sustainable Development Goals (SDGs)

Read more at: <http://www.icao.int/about-icao/aviation-development/Pages/SDG.aspx>

ICAO STRATEGIC OBJECTIVES

SAFETY

CAP/EFF

SEC/FAL

ECON
DEV

ENV

| Goal | Goal Description | SAFETY | CAP/EFF | SEC/FAL | ECON DEV | ENV |
|---------|--|--------|---------|---------|----------|-----|
| Goal 1 | End poverty in all its forms everywhere | | | | ● | |
| Goal 2 | End hunger, achieve food security and improved nutrition and promote sustainable agriculture | | | | | |
| Goal 3 | Ensure healthy lives and promote well-being for all at all ages | ● | | ● | ● | ● |
| Goal 4 | Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all | ● | ● | ● | ● | ● |
| Goal 5 | Achieve gender equality and empower all women and girls | ● | ● | ● | ● | ● |
| Goal 6 | Ensure availability and sustainable management of water and sanitation for all | | | | | |
| Goal 7 | Ensure access to affordable, reliable, sustainable and modern energy for all | | | | | ● |
| Goal 8 | Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all | | | ● | ● | |
| Goal 9 | Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation | ● | ● | | ● | ● |
| Goal 10 | Reduce inequality within and among countries | ● | ● | ● | ● | ● |
| Goal 11 | Make cities and human settlements inclusive, safe, resilient and sustainable | | | | | |
| Goal 12 | Ensure sustainable consumption and production patterns | | | | ● | ● |
| Goal 13 | Take urgent action to combat climate change and its impacts | | ● | | ● | ● |
| Goal 14 | Conserve and sustainably use the oceans, seas and marine resources for sustainable development | | | | | |
| Goal 15 | Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss | | | ● | | ● |
| Goal 16 | Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels | | | ● | | |
| Goal 17 | Strengthen the means of implementation and revitalize the global partnership for sustainable development | ● | ● | ● | ● | ● |



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Environmental Protection

Main areas of activity

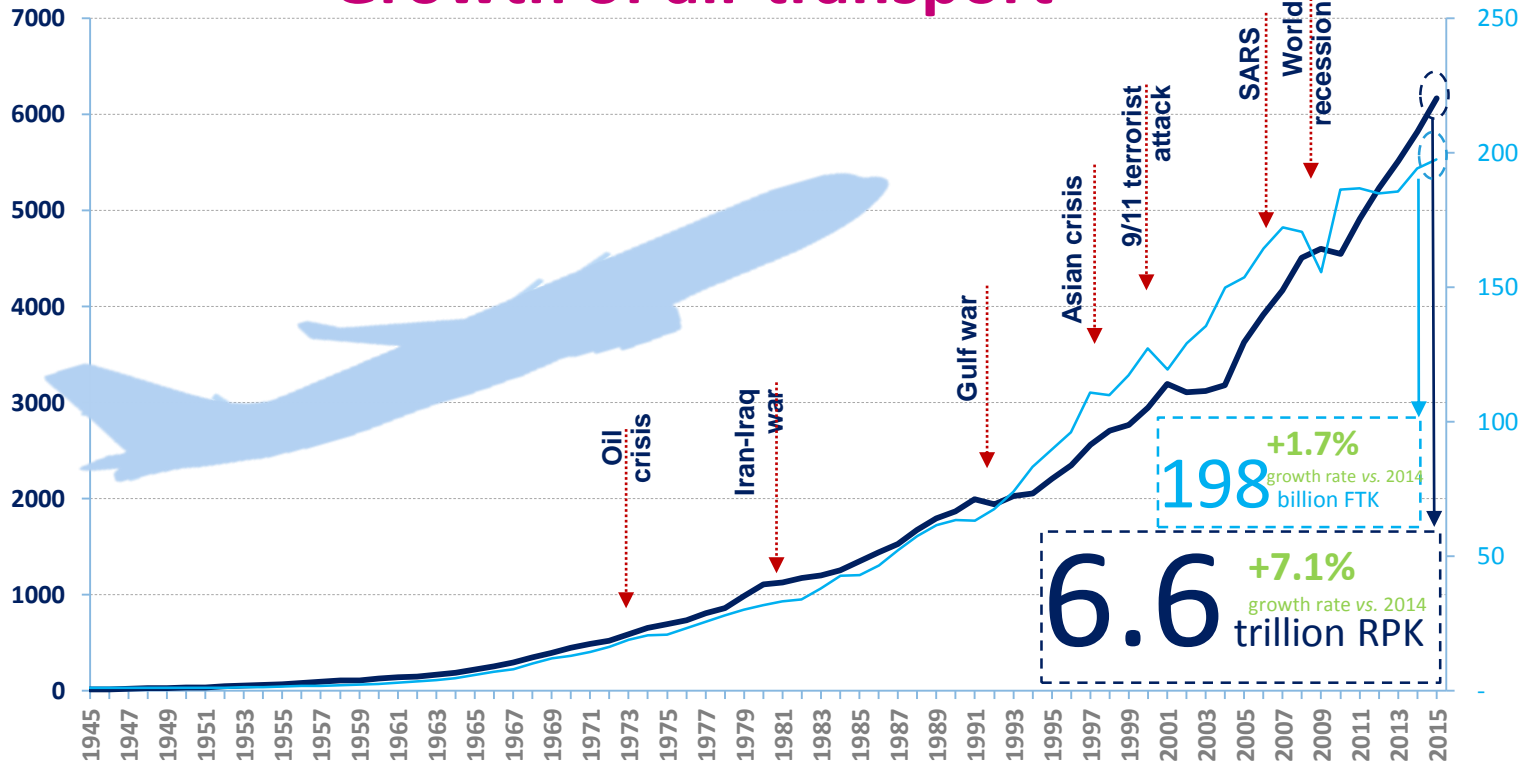
Aircraft Noise

Aircraft Emissions: Local Air Quality

Aircraft Emissions: Greenhouse gases / Climate Change

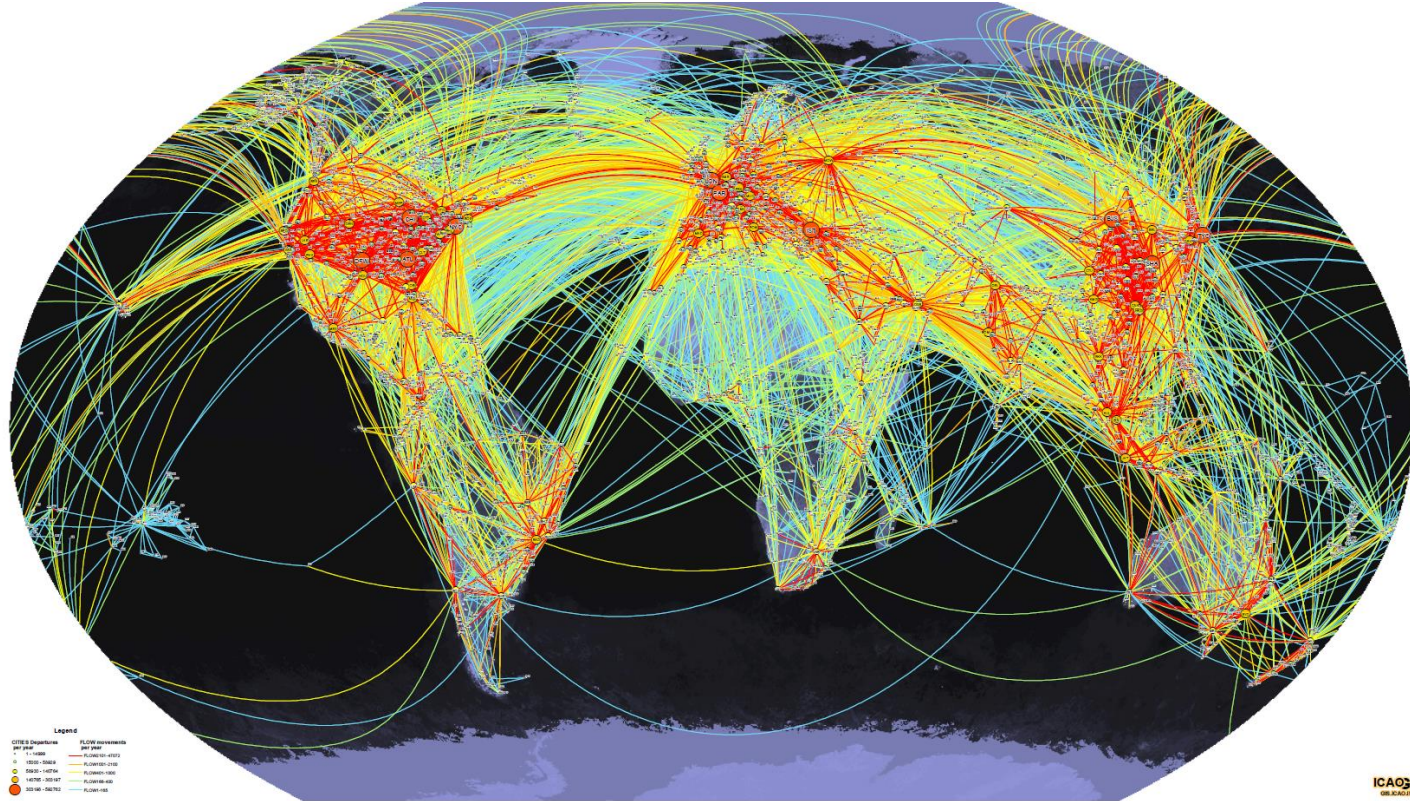
Growth of air transport

Revenue Passenger-Kilometres
(billion)



Freight Tonne-Kilometres
(billion)

Air route network 2015





OUTLINE

PROGRESS ON THE ICAO BASKET OF MEASURES

- Technological improvement
- Operational Measures
- Sustainable alternative fuels
- Global Market-Based Measure

STATE ACTION PLANS AND CAPACITY-BUILDING

COOPERATION WITH THE UNFCCC

- COP21
- CDM Methodologies





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PROGRESS ON THE ICAO BASKET OF MEASURES





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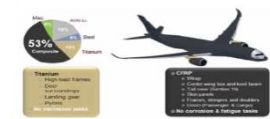
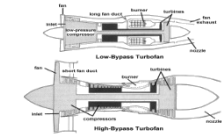
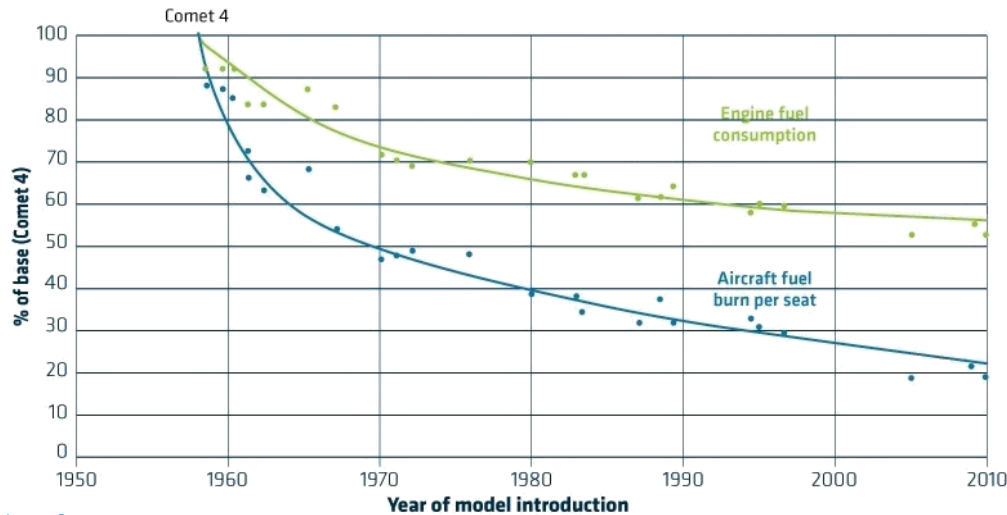


AIRCRAFT TECHNOLOGY





- Historic trends show that aircraft entering today's fleet are ~80% more fuel efficient than in the 1960s.



- Image Sources:
- <http://www.ecomagination.com/portfolio/genx-aircraft-engine>
 - <http://machinedesign.com/archive/fewer-trips-fuel-truck>
 - <http://www.airlinereporter.com/>

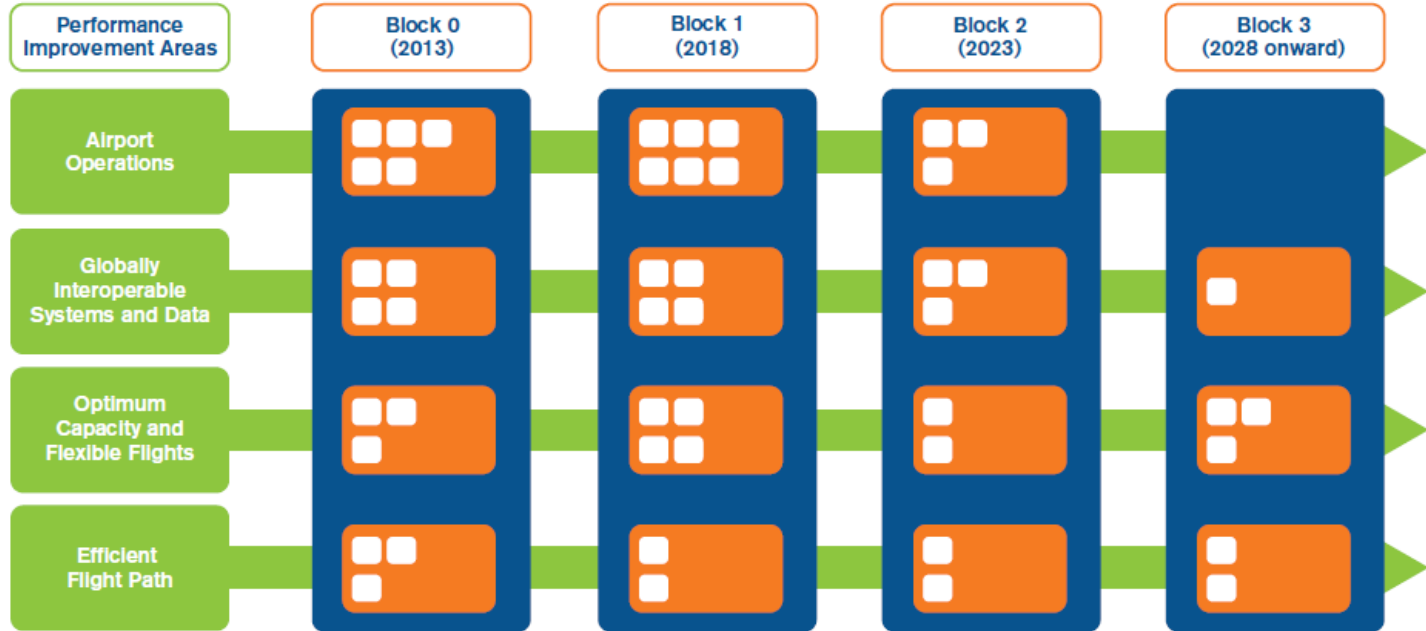


- The ICAO CO₂ Standard is the first global design Standard for CO₂ emissions of any sector.
- It will apply to
 - new aeroplane type designs from 2020
 - aeroplane type designs that are already in-production in 2023
 - In-production aeroplanes that do not meet the standard from 2028 can no longer be produced
- Widest range of aeroplane masses types covered
 - especially stringent for larger aeroplanes, which account for more than 90% of international aviation emissions.



OPERATIONAL MEASURES: Aviation System Block Upgrades (ASBUs)



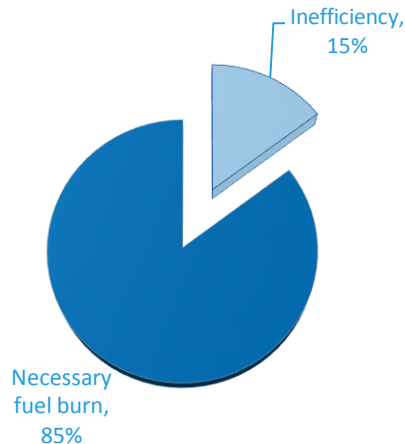




Operational Efficiency in a Static ATM System up to 2040

If no ATM improvements are made, system efficiency will degrade by 2% every decade.

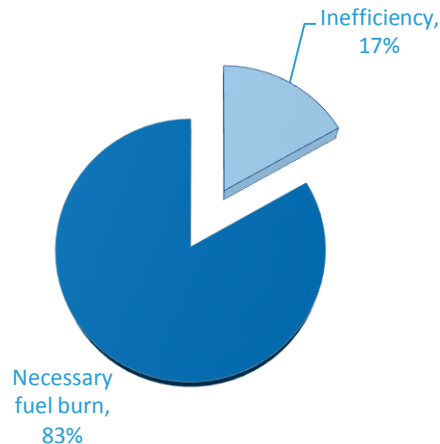
2020



1.7x 2010 Operations

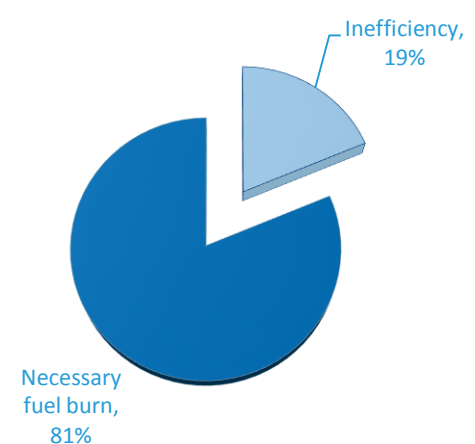
Source: IEOGG 2013 and CAEP/9 Forecast

2030



2.7x 2010 Operations

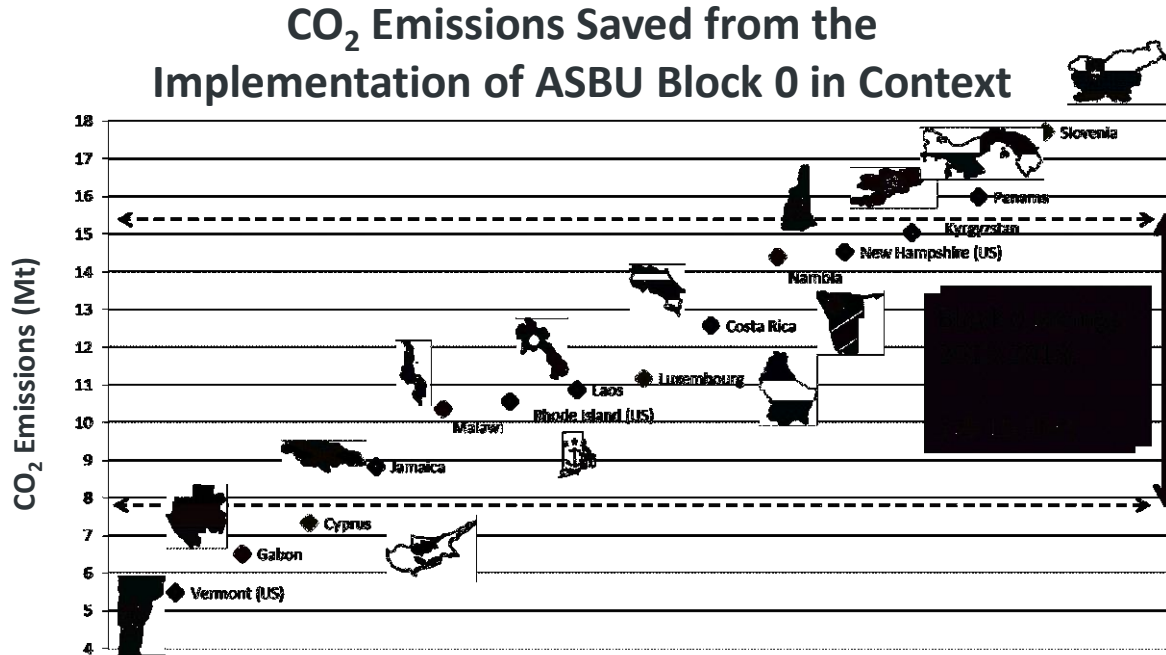
2040



4.0x 2010 Operations



Full implementation of ASBU Block 0 could achieve 0.7 to 1.4% fuel/CO₂ emissions savings in 2018 compared to 2013.





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SUSTAINABLE ALTERNATIVE FUELS





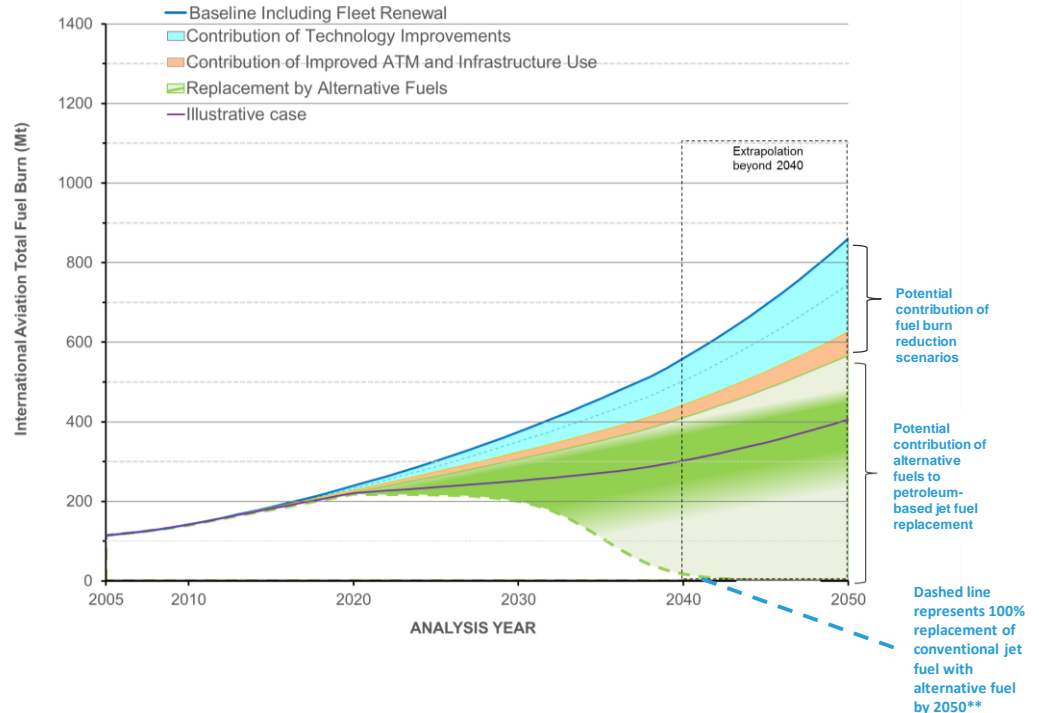
- The technical feasibility of drop-in alternative jet fuels is proven.
- Five alternative fuel pathways certified for aviation
 - Fischer-Tropsch Synthetic Kerosene with Aromatics (FT-SKA);
 - Fischer-Tropsch Synthetic Paraffinic Kerosene (FT-SPK);
 - Hydroprocessed Esters and Fatty Acids (HEFA-SPK);
 - Hydroprocessed Fermented Sugar-Synthetic Isoparaffins (HFS-SIP); and
 - Alcohol to Jet Synthetic Paraffinic Kerosene (ATJ-SPK).
- More than **2,200 commercial flights** operated since 2011 **growing to 5,500** by the end of 2016
- Alternative jet fuels are a reality.





The future development and use of alternative fuels will highly depend on the policies in place

Contribution of the Basket of Measures on International Aviation Fuel Burn





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GLOBAL MARKET-BASED MEASURE





- ➔ **Agreement on a global MBM scheme - Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).**
 - ➔ CORSIA complements the broader package in the basket of measures designed to help achieve ICAO's global aspirational goal of carbon neutral growth from 2020.
 - ➔ Phased-in implementation approach:
 - ➔ pilot phase from 2021 through 2023
 - ➔ first phase from 2024 through 2026,
 - ➔ second phase from 2027 through 2035;
 - ➔ For the first two phases, participation is voluntary.



- **65 States (> 86.5% of international traffic) announced voluntary participation in the CORSIA from 2021.**
- **The ICAO Assembly agreement on the CORSIA complements the ambition of the 2015 UNFCCC Paris Agreement and constitutes the most significant climate agreement since adoption of the former.**
- **Time for Implementation: development of SARPs and guidance for monitoring, reporting and verification (MRV) system etc., and capacity building and assistance to States**



Traffic rankings in 2014-15

International Scheduled Revenue Tonne-Kilometres (RTK)

| Rank | State of AOC | RTK 2014 | RTK share (%) | Cumulative (%) |
|------|----------------------|----------------|---------------|----------------|
| 1 | China (1) | 62,661,657,151 | 11.76083% | 11.76083% |
| 2 | United States | 62,359,064,486 | 11.70404% | 23.46486% |
| 3 | United Arab Emirates | 46,892,720,885 | 8.80119% | 32.26605% |
| 4 | United Kingdom | 30,158,001,753 | 5.66029% | 37.92634% |
| 5 | Germany | 28,814,799,214 | 5.40819% | 43.33453% |
| 6 | Republic of Korea | 20,764,711,405 | 3.89728% | 47.23181% |
| 7 | Singapore | 18,511,391,369 | 3.47436% | 50.70617% |
| 8 | France | 17,732,411,000 | 3.32816% | 54.03433% |
| 9 | Netherlands | 15,962,395,348 | 2.99595% | 57.03028% |
| 10 | Japan | 14,581,032,148 | 2.73668% | 59.76696% |
| 11 | Qatar | 14,293,445,230 | 2.68271% | 62.44967% |
| 12 | Turkey | 13,771,403,581 | 2.58472% | 65.03439% |
| 13 | Canada | 11,983,608,812 | 2.24918% | 67.28357% |
| 14 | Ireland | 11,868,967,019 | 2.22766% | 69.51123% |
| 15 | Russian Federation | 11,802,890,290 | 2.21526% | 71.72649% |
| 16 | Malaysia | 9,593,485,831 | 1.80058% | 73.52707% |
| 17 | Australia | 8,855,781,434 | 1.66212% | 75.18919% |
| 18 | Thailand | 8,473,871,575 | 1.59044% | 76.77963% |
| 19 | Spain | 7,995,446,551 | 1.50065% | 78.28028% |
| 20 | India | 6,510,575,876 | 1.22196% | 79.50223% |

| Rank | State of AOC | RTK 2015 | RTK share (%) | Cumulative (%) |
|------|----------------------|----------------|---------------|----------------|
| 1 | China (1) | 70,403,245,196 | 12.42421% | 12.42421% |
| 2 | United States | 61,944,119,667 | 10.93141% | 23.35562% |
| 3 | United Arab Emirates | 52,100,507,516 | 9.19429% | 32.54991% |
| 4 | United Kingdom | 31,065,034,269 | 5.48211% | 38.03203% |
| 5 | Germany | 30,507,251,927 | 5.38368% | 43.41571% |
| 6 | Republic of Korea | 21,802,605,943 | 3.84755% | 47.26326% |
| 7 | Singapore | 18,615,753,428 | 3.28516% | 50.54842% |
| 8 | France | 18,295,414,100 | 3.22863% | 53.77705% |
| 9 | Qatar | 17,359,871,880 | 3.06353% | 56.84059% |
| 10 | Netherlands | 15,732,743,524 | 2.77639% | 59.61698% |
| 11 | Turkey | 15,587,345,360 | 2.75073% | 62.36771% |
| 12 | Japan | 15,527,311,664 | 2.74014% | 65.10785% |
| 13 | Ireland | 13,165,546,390 | 2.32335% | 67.43120% |
| 14 | Canada | 13,040,382,256 | 2.30126% | 69.73246% |
| 15 | Russian Federation | 11,635,019,200 | 2.05326% | 71.78572% |
| 16 | Australia | 9,368,848,020 | 1.65334% | 73.43906% |
| 17 | Spain | 9,215,837,003 | 1.62634% | 75.06540% |
| 18 | Thailand | 9,113,598,830 | 1.60830% | 76.67370% |
| 19 | Malaysia | 8,966,590,598 | 1.58235% | 78.25605% |
| 20 | India | 6,994,194,840 | 1.23428% | 79.49033% |



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VOLUNTARY STATE ACTION PLANS AND CAPACITY BUILDING





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Action Plan on Emissions Reduction





States' Action Plans to reduce aviation CO₂ emissions

- **For States**

Opportunity to identify and communicate measures to address CO₂ emissions from international aviation as well as any assistance needs to implement the measures



- **For ICAO**

Assess the global progress towards the achievement of aspirational goals and address specific assistance needs of States.

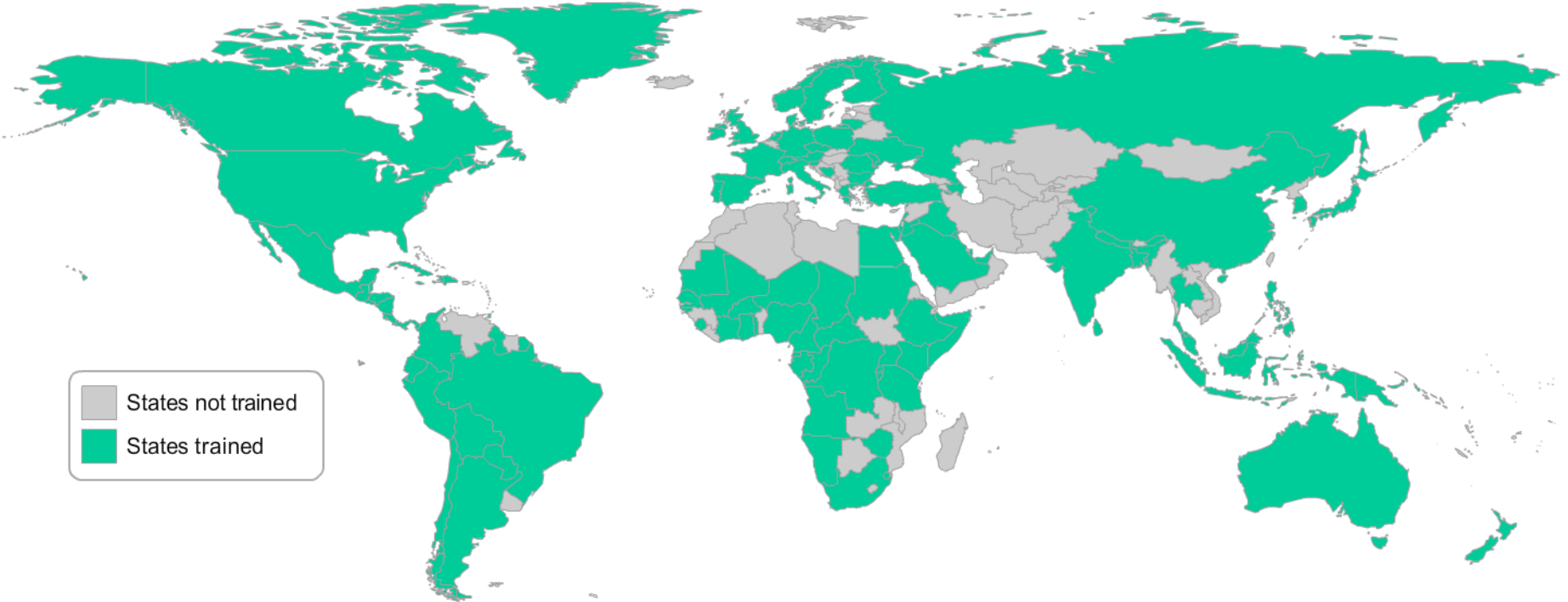


States' Action Plans – ICAO Capacity Building Programme

- **ICAO Guidance Document on the Development of States' Action Plans (Doc 9988)**
- **ICAO Interactive Web-Interface – APER website**
- **Environmental Benefits Tool (EBT) to support CO₂ emissions calculation**
- **Hands-on Training seminars in all ICAO Regions and over 400 Teleconferences and Meetings with States' Focal Points**
- **Support provided by ICAO Regional Offices and Technical Cooperation Bureau**



States that have been trained in the development of action plans





95 States, representing approximately 88.1% international RTK have submitted an action plan as of end of June 2016

RTK with no
Action Plan
11.9%



5TK from States
who have
Submitted an
Action Plan (94
States)
88.1%



States' Action Plans - Key Achievements

- 116 States trained, 95 States' Action Plans submitted.
- Substantial engagement by States in developing Action Plans
- Better understanding of the sector's emissions by States
- Synergies for action through the involvement of different stakeholders
- Mainstreaming of policies and stakeholders' buy-in for policy decisions

States are invited to update and submit their action plans to ICAO once every three years to fully deploy their benefits.



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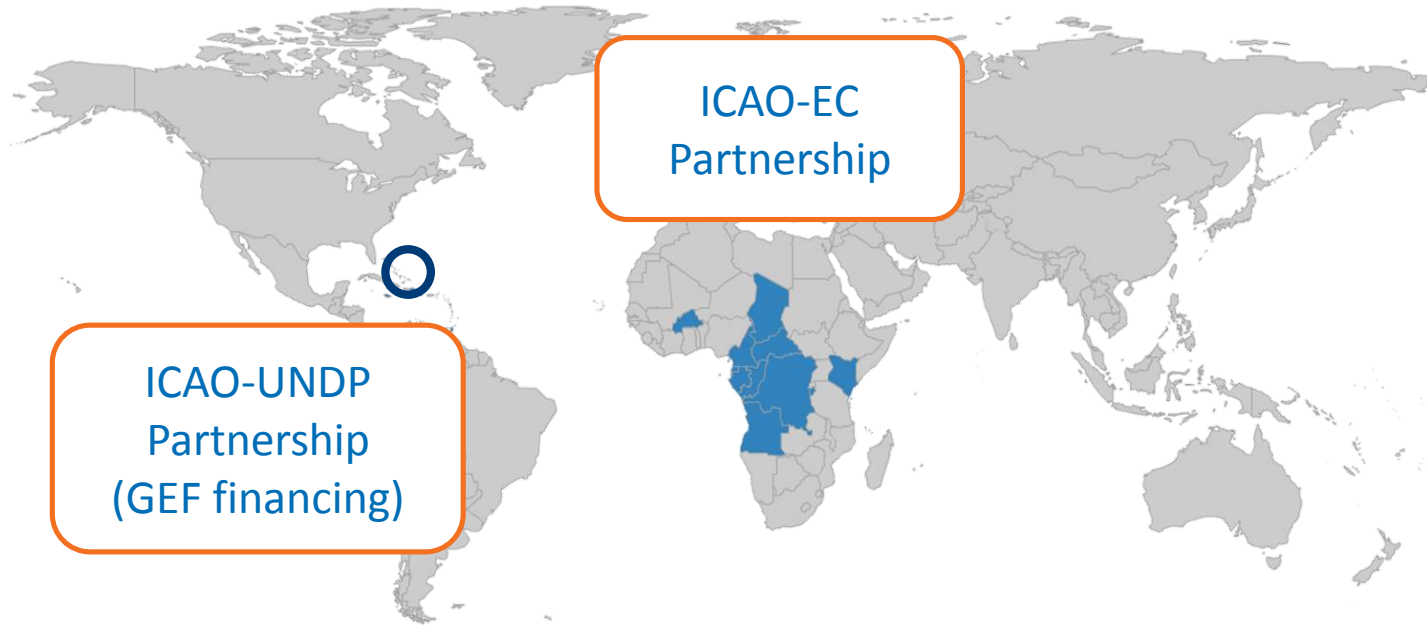


CAPACITY BUILDING





Partnerships to Deliver Assistance to States

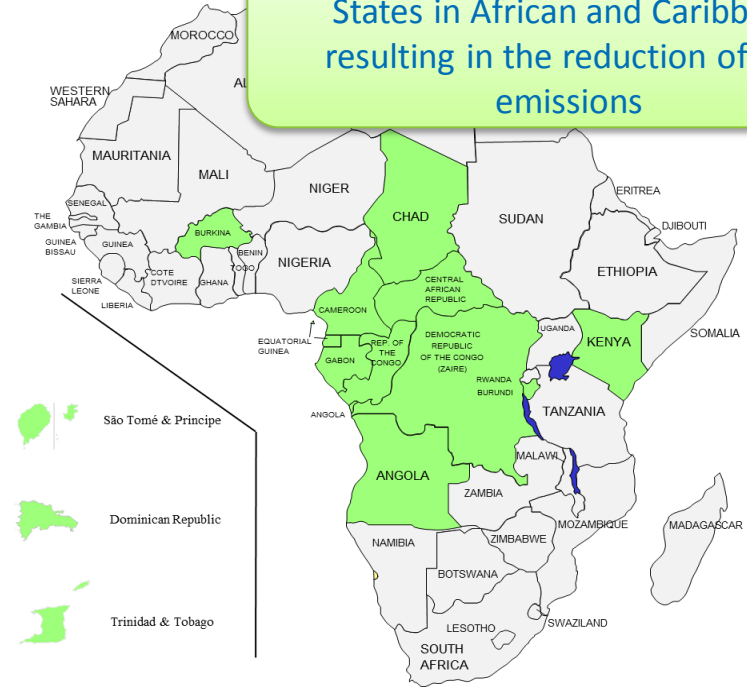




ICAO-EC partnership to assist Member States – 6.5 Million Euros

To provide assistance to Selected States in African and Caribbean resulting in the reduction of CO₂ emissions

| ICAO African Region | ICAO Caribbean Region |
|---------------------|-----------------------|
| 10 ECCAS States | Dominican Republic |
| Burkina Faso | Trinidad and Tobago |
| Kenya | |



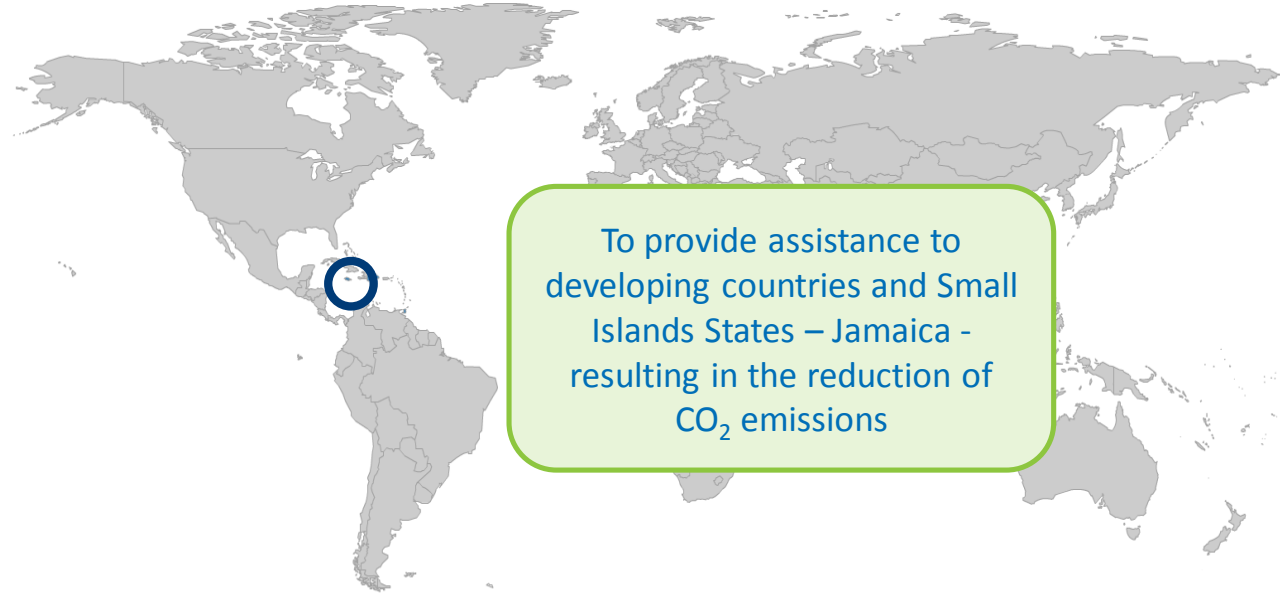


ICAO UNDP Partnership (with GEF financing)

Replicable clean,
renewable energy pilot
project



Map data ©2014 Google



To provide assistance to
developing countries and Small
Islands States – Jamaica -
resulting in the reduction of
CO₂ emissions



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COOPERATION WITH THE UNFCCC





The 21st Conference of the Parties (COP21) – December 2015

- **18 November 2015:** ICAO Council's Declaration on International Aviation and Climate Change



The President of the Council and Secretary General conveyed, through more than 20 bilateral meetings with high-level representatives, as well as through the organization and participation in high-profile side events, the message of the ICAO Council Declaration in relation to climate change negotiations.

- **March 2016:** 207th Session of the Council decided on follow-up actions after the adoption of the Paris Agreement and associated decision.



Adoption of the first two aviation-related CDM Methodologies

Approved in October 2015

Methodology covers the use of systems that allow aircraft to taxi while the main engines are shut down.



<http://www.passengerterminaltoday.com/viewnews.php?NewsID=36516>

Approved in May 2016

Methodology covers the installation of solar panels to provide power and pre-conditioned air at gate.



5.6 kg CO₂/min saved



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The AFI DGCA/6 Meeting is invited to:

- a) Support ICAO's work for Environmental protection
- b) Encourage States to apply and follow ICAO's policies and guidance in the Environmental field
- c) Coordinate with ICAO in meeting States needs of implementing Action Plans
- d) Invite the States to actively Implement the Resolutions of A39



谢谢, Xie Xie

Thank You

شكرا, Shukran

Merci

Спасибо, Spasiba

Gracias



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North American
Central American
and Caribbean
(NACC) Office
Mexico City

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