



ICAO

ENVIRONMENT

Subsidiary Body for Implementation (SBI 44) Technical Expert Meeting (TEM) on Mitigation

Policies and practices to improve the efficiency of international aviation and reduce CO₂ emissions



ICAO Secretariat

23 May 2016





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International Civil Aviation Organization

UN specialized agency

Established by the “Chicago Convention” in 1944

Forum for cooperation in all fields of civil aviation

191 Contracting States

Standards, policies & guidance for environmental protection since 1960's

Focus on aircraft noise, local air quality and global climate





SOCIETY

3.5 billion passengers
per year carried
worldwide¹ (2015)

62.7 million jobs
supported by aviation
worldwide²

ECONOMY

2.7 trillion USD global
economic impact (2014)²

Up to **3.5% of global GDP**
supported²

35% of world trade by
value carried²

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2% of global CO₂
emissions³

65% of this 2% are from
international aviation
(**≈1.3%**)

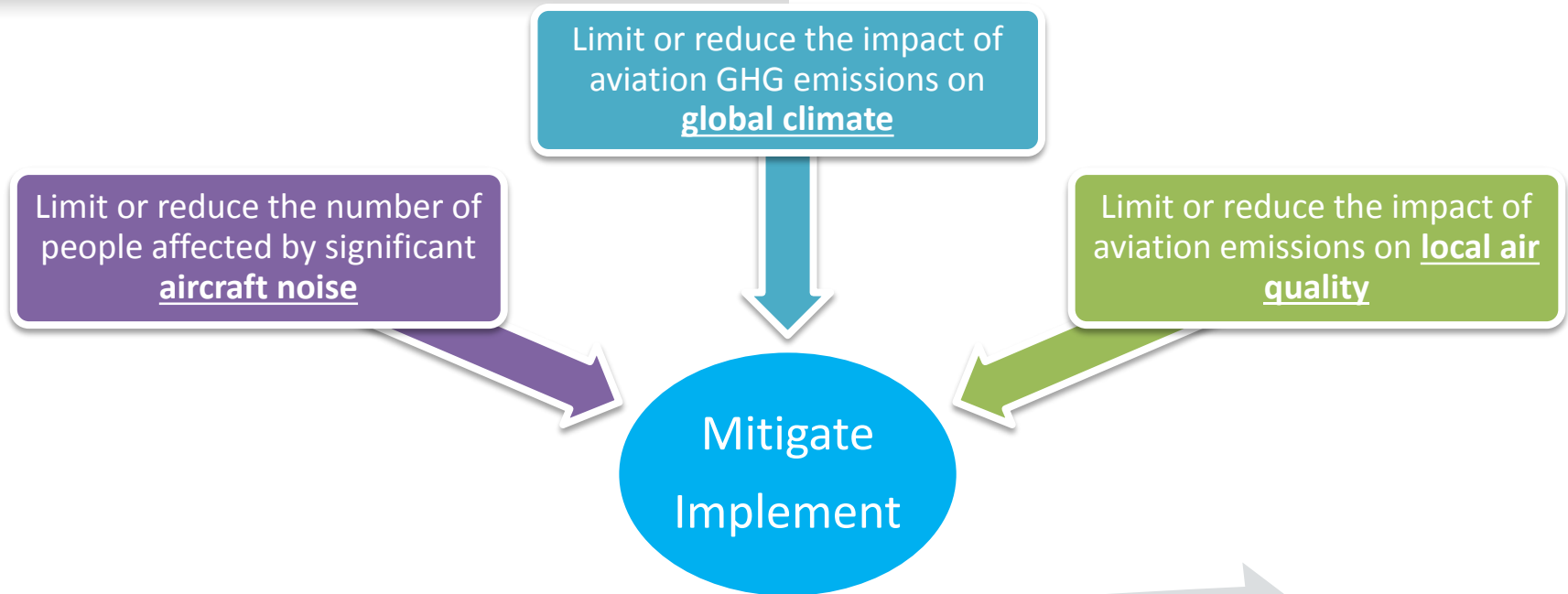
**Fast, reliable, and
safe mode of
transport**

**No comparative
alternatives for long
haul passenger
transport**





ICAO Environmental Goals

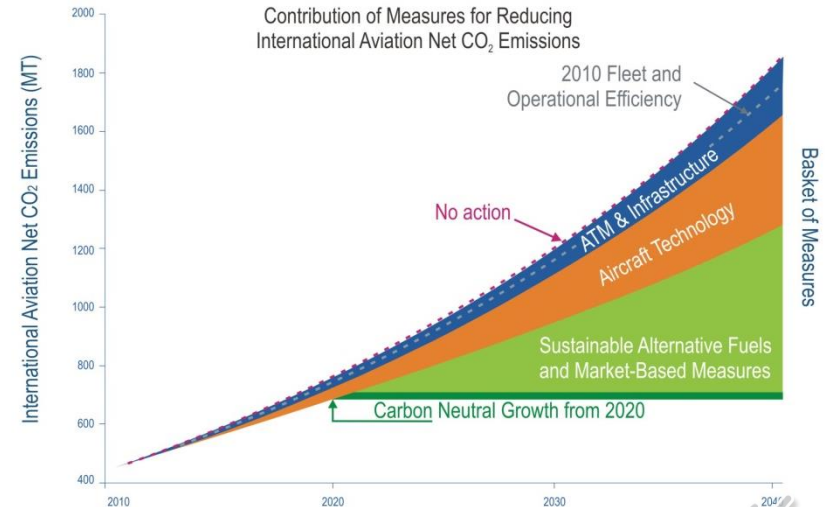


Minimize the adverse effect of global civil aviation on the environment



Basket of Measures to reduce aviation emissions

- Aircraft-related technology development
- Improved air traffic management and infrastructure use
- More efficient operations
- Market-based measures (MBMs)
- Sustainable alternative Fuels





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Aircraft Technologies



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

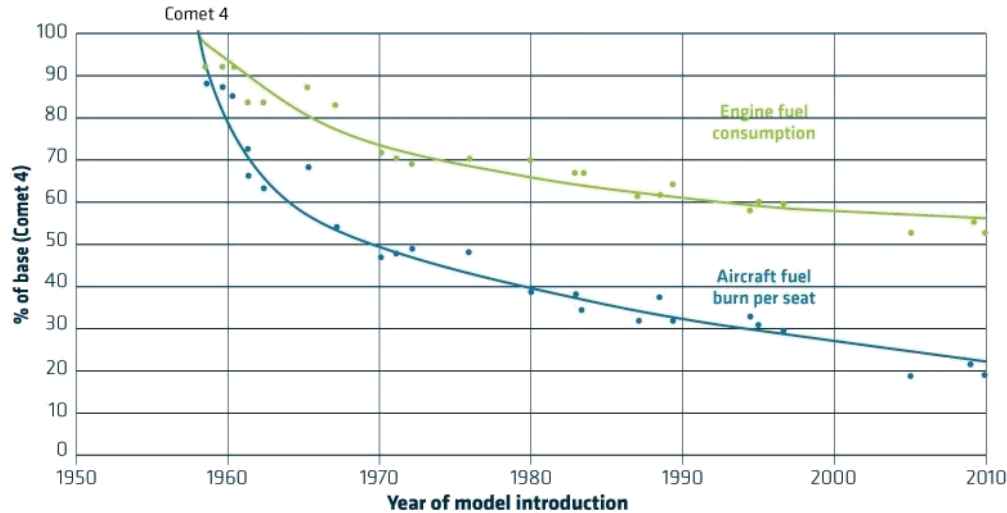
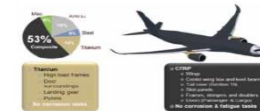
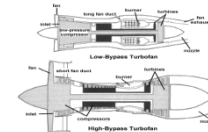
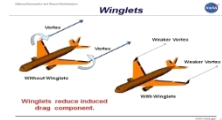


Image Sources:

- <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.





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Sustainable Alternative Fuels





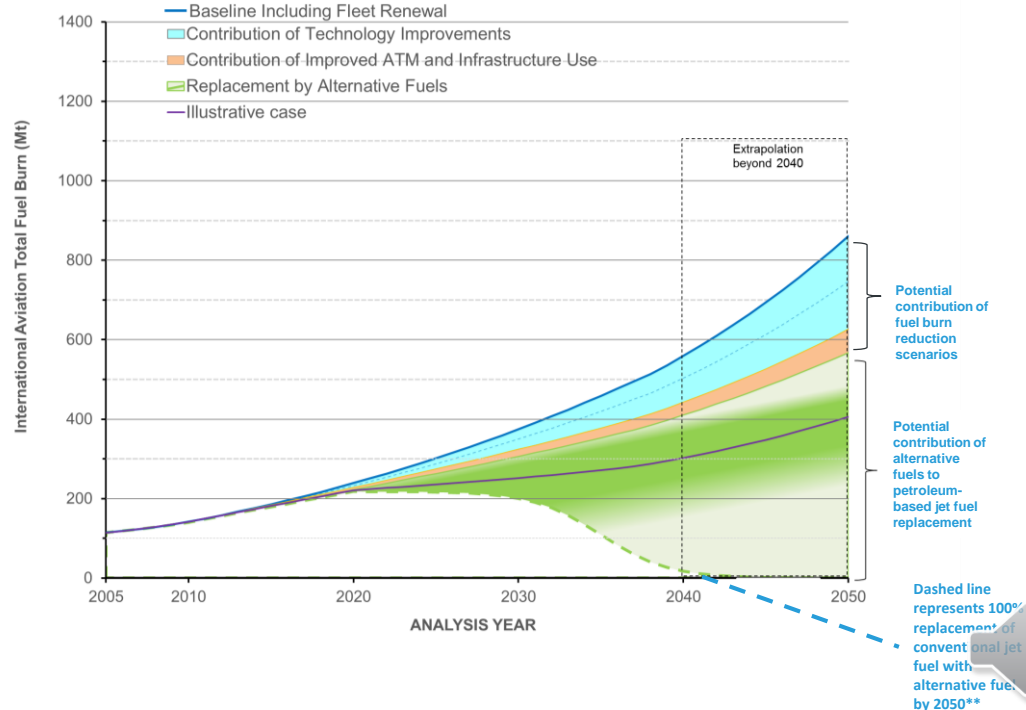
- The technical feasibility of drop-in alternative jet fuels is proven.
- Five alternative fuel pathways certified for aviation
 - Fischer-Tropsch Synthetic Kerosene with Aromatics (FT-SKA);
 - Fischer-Tropsch Synthetic Paraffinic Kerosene (FT-SPK);
 - Hydroprocessed Esters and Fatty Acids (HEFA-SPK);
 - 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



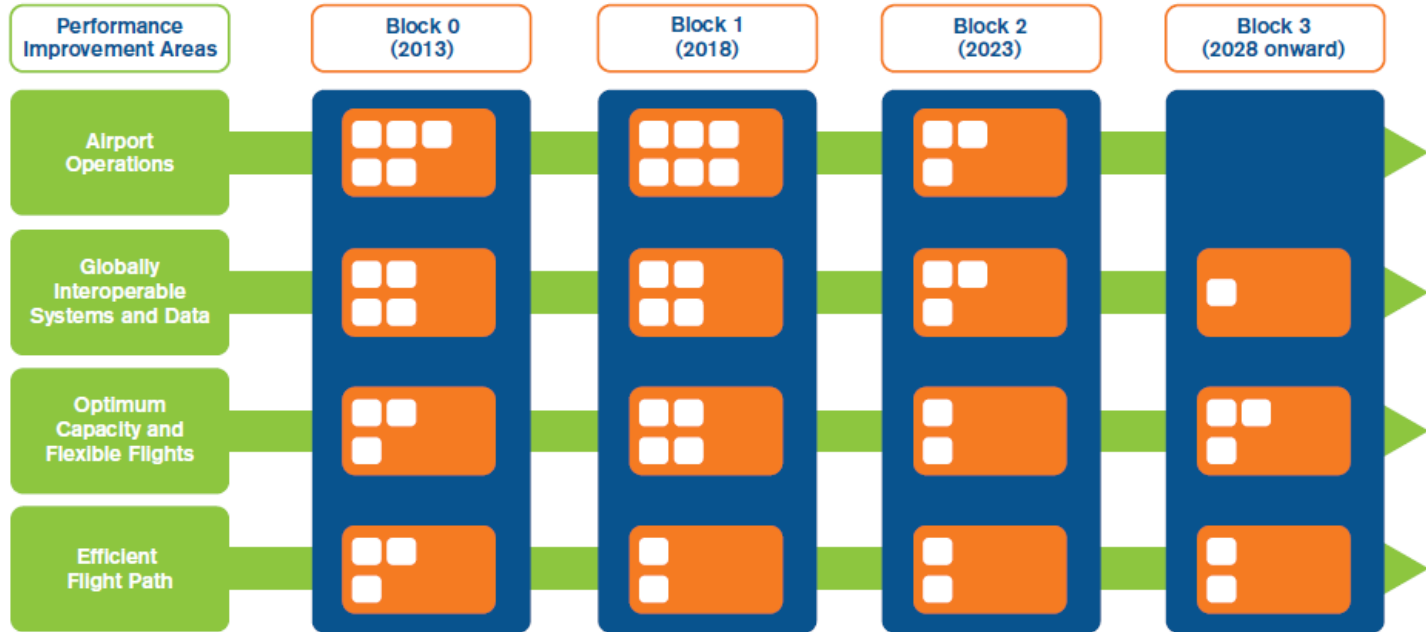


Operational Measures: Aviation System Block Upgrades (ASBUs)





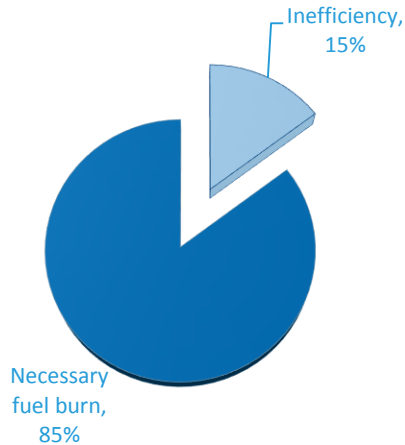
Aviation System Block Upgrades (ASBUs)



Operational Efficiency in a Static ATM System up to 2040

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

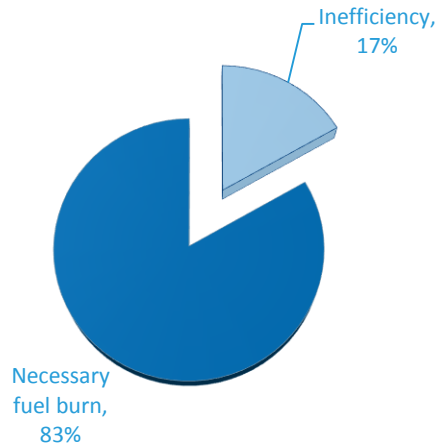
2020



1.7x 2010 Operations

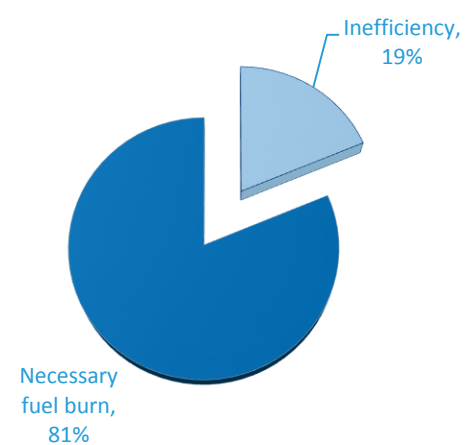
Source: IEOGG 2013 and CAEP/9 Forecast

2030



2.7x 2010 Operations

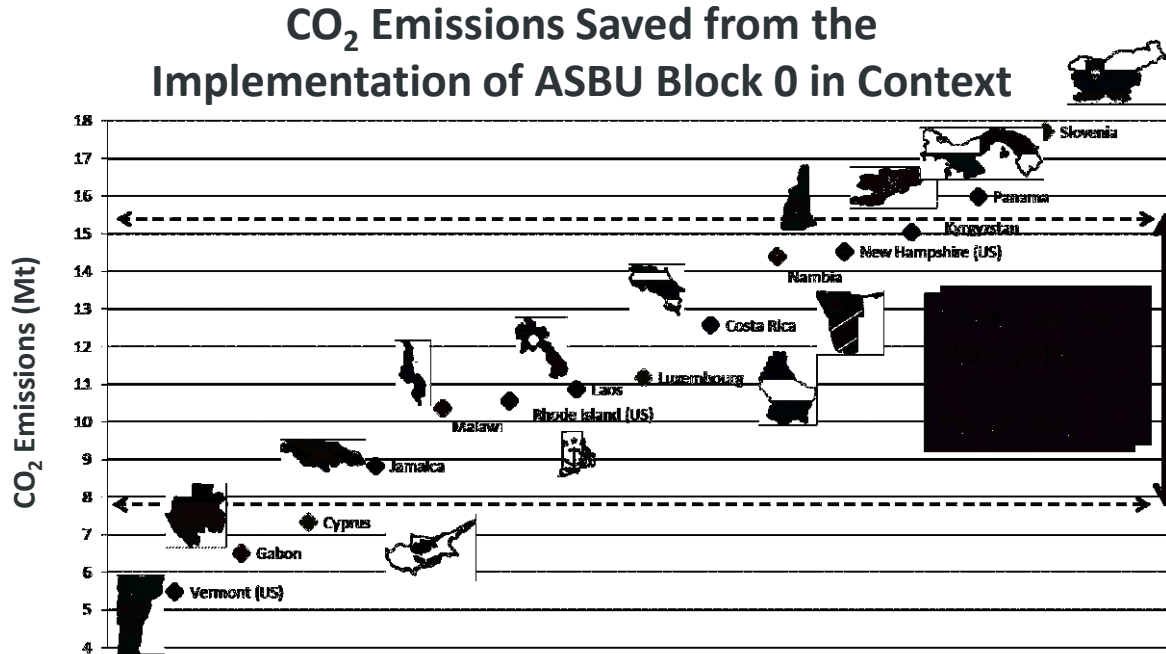
2040



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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Clean Development Mechanism (CDM) methodologies



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



Assistance to States

European Union Project

Allowed 14 States to develop action plans and initiate implementation

6.5 Million Euros
42-months

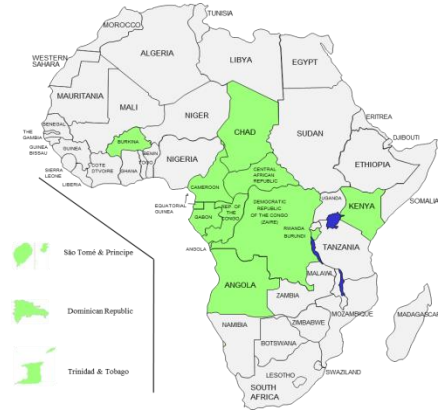
The project

States in Africa and Caribbean

Assistance

First agreement for assistance in the area of ENV at ICAO

Green Funding



UNDP/GEF Project

Replicable clean, renewable energy pilot project





- Beyond the initiatives highlighted, the environmental future for aviation is bright with many advances on the horizon.

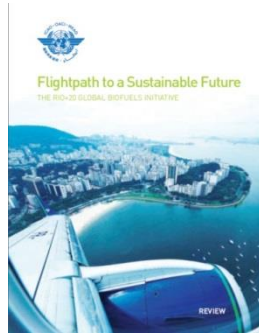
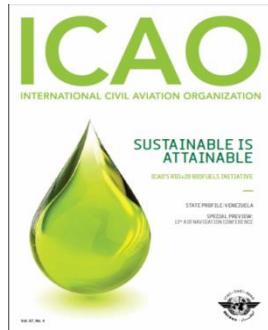
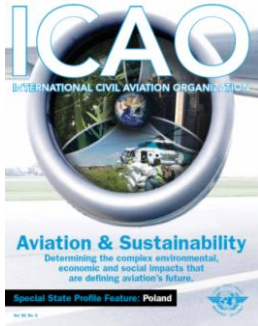
Improved efficiency

Clean, renewable energy

- ICAO has developed Standards, policies & guidance for environmental protection since the 1960s and will continue to do so.

ICAO is committed to achieving sustainable air transport for generations to come





For more information on our activities, please visit www.icao.int/env

