

Supporting
European
Aviation



Climate Change and Aviation – Decarbonisation and Adaptation

UC Davis Aviation Noise & Emissions Symposium 2020

Rachel Burbidge

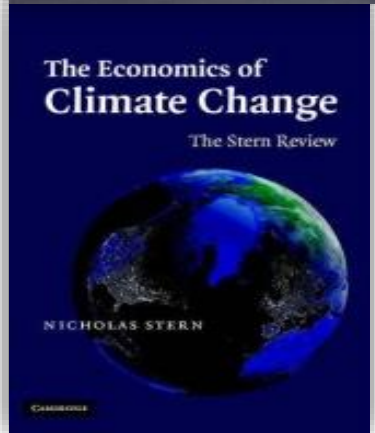
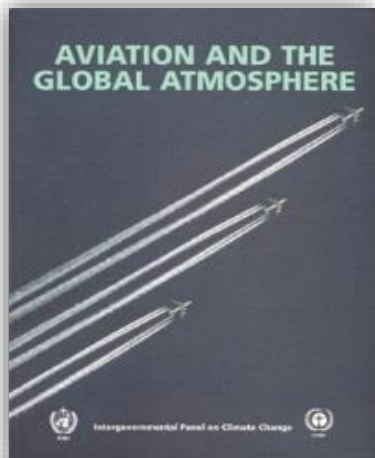
Senior Policy Officer, Environment and Climate Change

3rd March 2020



Climate Change – What does it mean?

Climate change is potentially the most serious environmental threat to livelihood, welfare and economic development...



Monday 8 October 2018

Global warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

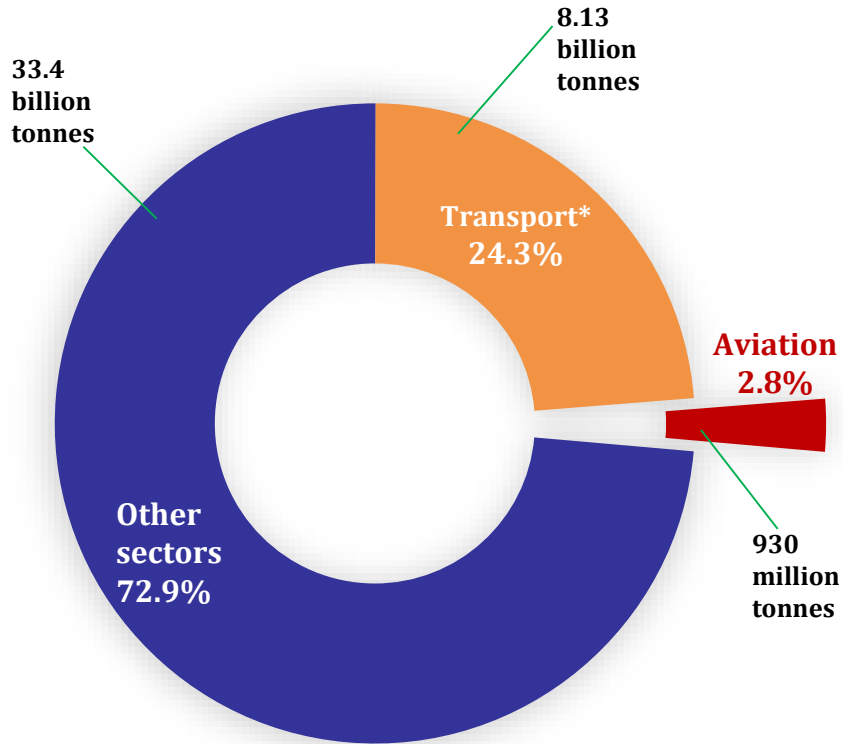
Thelma Krug
IPCC Vice-Chair

ipcc
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

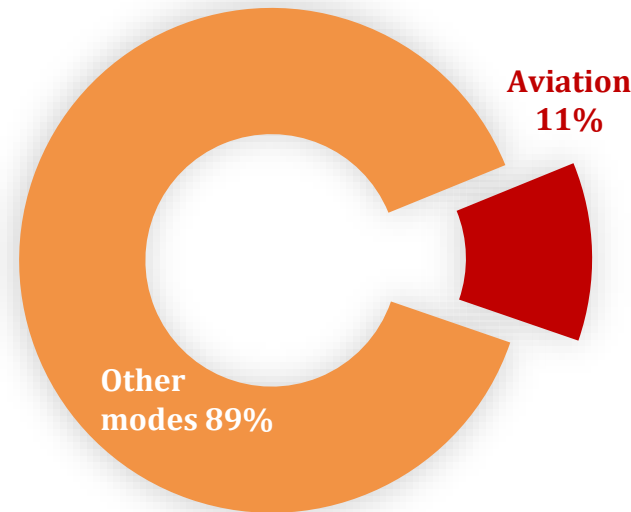
WHO UNEP

CO₂ EMISSIONS FROM FUEL COMBUSTION THE GLOBAL PICTURE (2018)

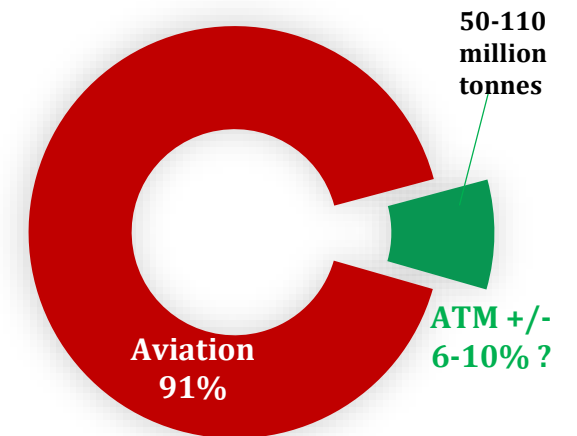
Global CO₂ emissions



CO₂ emissions from transport



CO₂ emissions from aviation and air traffic management



*Excluding aviation

Sources

Global: <https://www.iea.org/>

Transport/aviation: <https://www.iea.org/tc>

Note that IATA reports 905Mt for 2018 (<https://www.iata.org/publications/economics/Reports/Industry-Econ-Performance/Airline-Industry-Economic-Performance-Jun19-Report.pdf>, p4.)

ATM: ATM is estimated to influence approximately 6-12% of aviation emissions



GLOBAL AVERAGE ANNUAL GROWTH RATE 2017-2040



2017 → 2040

US 20.6%	CHINA 18.8%
CHINA 13.9%	US 14.8%
JAPAN 3.8%	INDIA 6.3%



REGIONAL CONTRIBUTION TO INTERNATIONAL PASSENGER TRAFFIC GROWTH 2017-2040



AVIATION'S LONG-TERM ENV PERFORMANCE



METRIC	PERFORMANCE
Reduction in CO ₂ emissions per seat kilometre since first jets	-80%
Reduction in perceived noise since first jets	-75%
CO ₂ emissions avoided since 1990	10 billion tonnes
Fuel burn per 100 passenger km flown (latest jets)	< 3 litres / 100 km
Fuel efficiency improvement 2006-2016	2.1% annual average

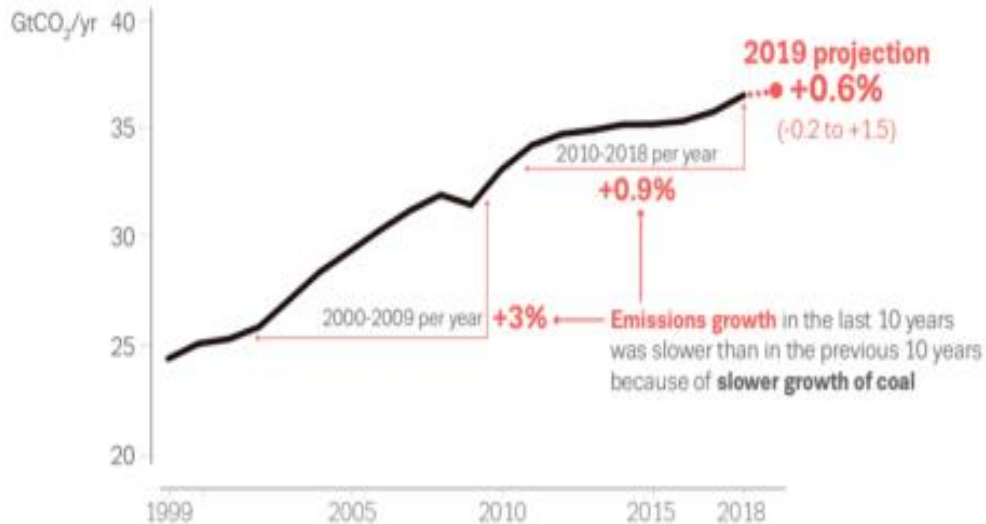
- Are we doing enough?



Global Carbon Budget 2019

CO₂ emissions grow amidst slowly emerging climate policies

Fossil CO₂ emissions grow more slowly... but do not yet decline



CO₂ emissions need to decline rapidly to net-zero around mid-century to pursue the Paris Agreement 1.5°C goal



Greta Thunberg
@GretaThunberg

"Since the Paris agreement was set out in 2015, CO₂ emissions have risen by 4%."



Carbon emissions edge up as coal use falls
Emissions of CO₂ have risen in 2019, say researchers, as oil and gas use continues to grow.
bbc.com

THE CLIMATE ISSUE

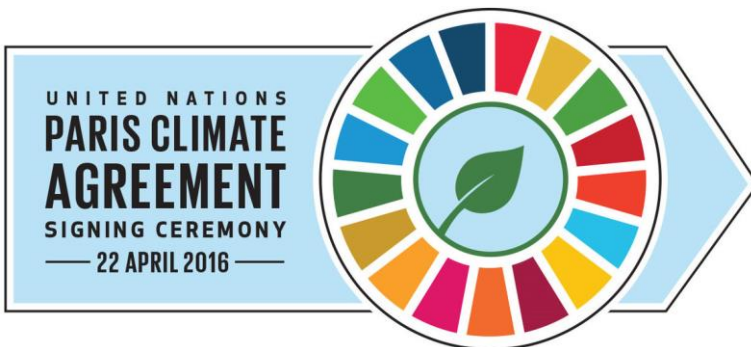
Occupying the Global Media Space



- Increasing democratisation
- More active and vocal opposition
- Fuelled by social media
- Public bodies do respond

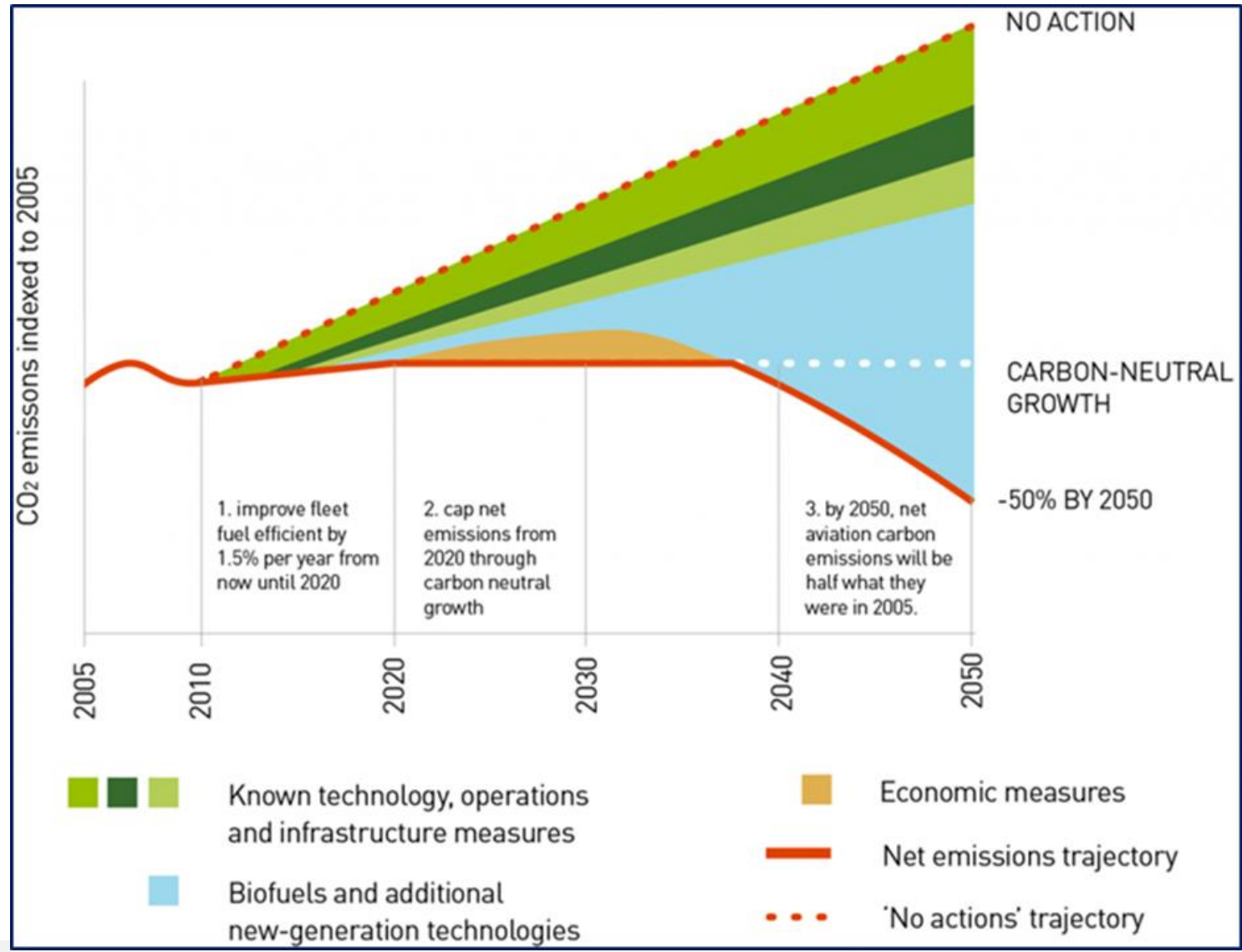


Specific advice on aviation and net zero carbon.



GETTING FROM HERE TO THERE

Aviation's Basket of Measures



Source: ATAG

CORSIA



- First single industry sector global market-based measure in the field of climate action
- Forecast to mitigate around 2.5 billion tonnes of CO₂ between 2021 and 2035
- Started on 1st January 2019 (baseline period)
- Objective: carbon neutral growth from 2020

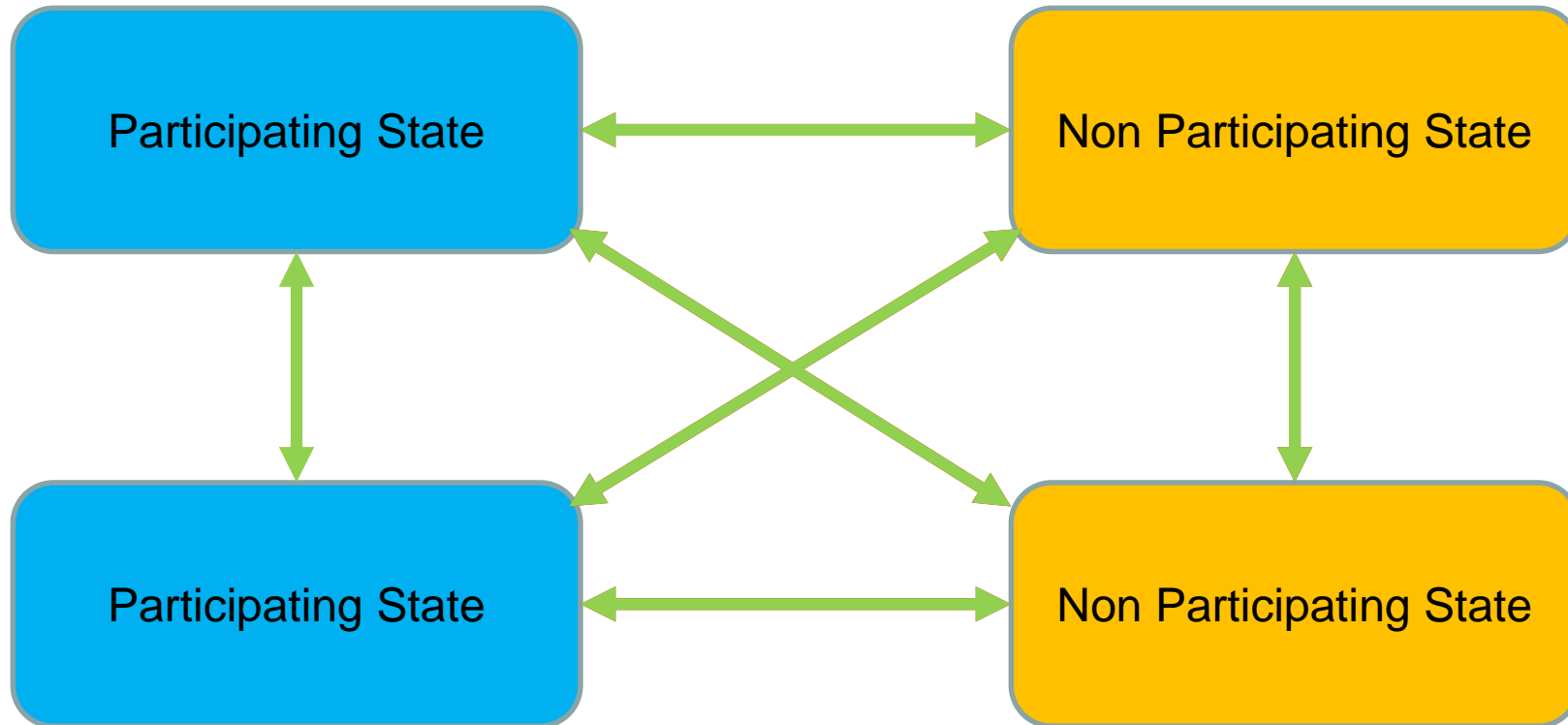
CORSIA: A phased approach



- Participation of States in the pilot phase (2021 to 2023) and first phase (2024 to 2026) is voluntary.
- For the second phase from 2027, all States with an individual share of international aviation activity in year 2018 above 0.5% of total activity or whose cumulative share reaches 90% of total activity, are included. Least Developed Countries, Small Island Developing States and Landlocked Developing Countries are exempt unless they volunteer to participate.

As of 16 July 2019, **81 States, representing 76.63%** of international aviation activity, intend to voluntarily participate in CORSIA from its outset.

CORSIA: A route-based approach



Fuel consumed on ALL international civil aviation flights must be monitored

DECARBONISATION - FIVE TOP THINGS TO DO

1

Change the ~~European~~ ATM Network

2

Fund transition to Sustainable Aviation Fuels

3

Develop highly-efficient, large-capacity, short-haul aircrafts

4

Undertake a total fleet renewal by 2050

5

Hybridisation acting as a bridge to electrification of the fleet*

*Especially short-haul aircraft

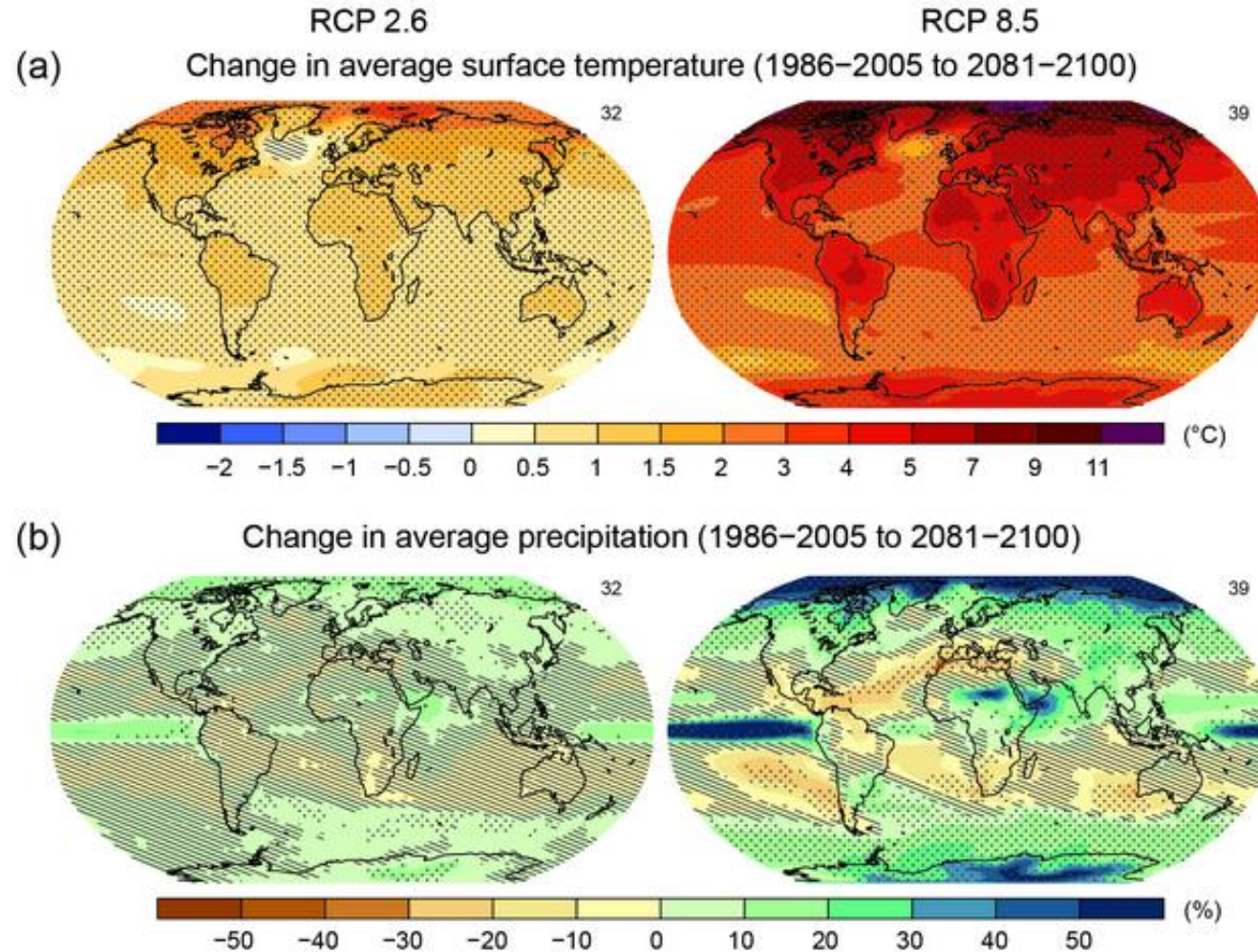
Impacts OF Climate Change ON aviation





Climate Change making extreme events more likely...

Aviation is used to disruptive weather – but if it's going to get worse?



We need to adapt and build resiliency

Key impacts for aviation

Climate risk	Impact	Actors
 Precipitation change	<ul style="list-style-type: none"> ■ disruption to operations e.g. airfield flooding, ground subsidence ■ reduction in airport throughput ■ inadequate drainage system capacity ■ inundation of underground infrastructure (e.g. electrical) ■ inundation of ground transport access (passengers and staff) ■ loss of local utilities provision (e.g. power). 	
 Temperature change	<ul style="list-style-type: none"> ■ changes in aircraft performance ■ changes in noise impact due to changes in aircraft performance ■ heat damage to airport surface (runway, taxiway) ■ increased heating and cooling requirements ■ increased pressure on local utilities e.g. water and power (for cooling). 	
 Sea-level rise	<ul style="list-style-type: none"> ■ loss of airport capacity ■ impacts on en-route capacity due to lack of ground capacity ■ loss of airport infrastructure ■ loss of ground transport access 	
 Wind changes	<ul style="list-style-type: none"> ■ convective weather: disruption to operations ■ convective weather: route extensions ■ jet stream: potential increase in en-route turbulence ■ local wind patterns: potential disruption to operations and changes to distribution of noise impact 	
 Extreme events ²	<ul style="list-style-type: none"> ■ disruption to operations, route extensions ■ disruption to ground transport access ■ disruption to supply of utilities 	

Summary

- Urgent need for all sectors of society to decarbonise – that includes aviation.
- We need operational, technological, and market-based measures combined with SAF to reduce the sector's climate impact.
- We also need to prepare for the impacts of climate change on the sector: develop adaptation and resiliency.

Thank You



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