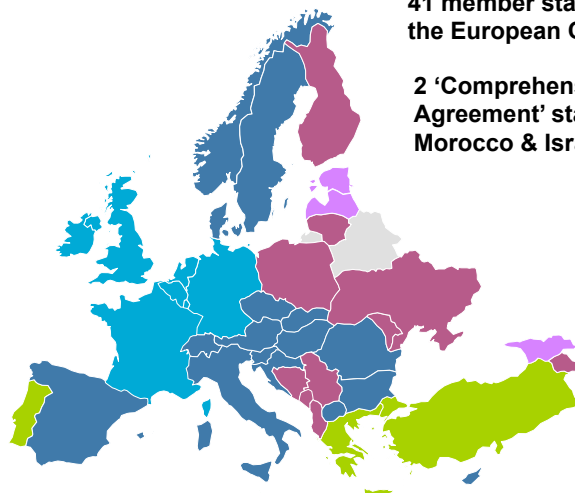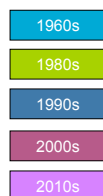# Airport Environmental Management and Sustainable Development – what is it? Managing the environmental impact of airports

sharon.mahony@eurocontrol.int
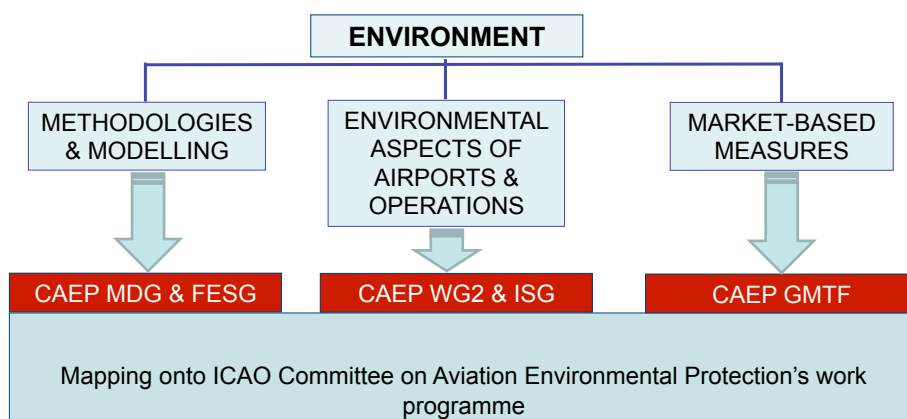
Supporting European Aviation

EUROCONTROL – History

1960s
1980s
1990s
2000s
2010s

41 member states & the European Community

2 'Comprehensive Agreement' states – Morocco & Israel

EUROCONTROL Environment Activities
3 Main Areas of Expertise

ENVIRONMENT

METHODOLOGIES & MODELLING	ENVIRONMENTAL ASPECTS OF AIRPORTS & OPERATIONS	MARKET-BASED MEASURES
CAEP MDG & FESG	CAEP WG2 & ISG	CAEP GMTF

Mapping onto ICAO Committee on Aviation Environmental Protection's work programme

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Objective

To demonstrate that the effective management of key aviation environmental impacts at an airport requires the engagement and collaboration of _**ALL**_ core operational stakeholders
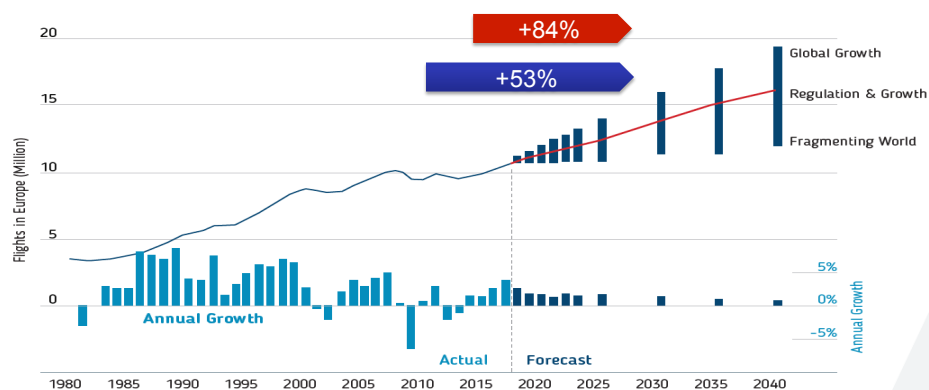
CONTEXT

- Flight & Passengers to double out to 2030* (global)

- Opportunities for aviation to increase socio-economic benefits for society globally

* www.eurocontrol.int/articles/challenges-growth

Flight forecast for Europe to 2040

www.eurocontrol.int/articles/challenges-growth

Challenges of Growth 2018

Available at:
www.eurocontrol.int/articles/challenges-growth
For more info, contact: statfor.info@eurocontrol.int (forecast)
rachel.burbidge@eurocontrol.int (adaptation)

Taking Action: Risks and Risk Assessment

AIRPORT OPERATORS

Precipitation change
- Disruptions to operations (e.g. airfield flooding, ground subsidence)
- Reduction in airport throughput
- Inundation of transport access (passengers and staff)
- Loss of local utilities provision (e.g. power)
- Inadequate drainage system capacity
- Inundation of underground infrastructure (e.g. electrical)

Sea-level rise
- Loss of airport capacity
- Loss of airport infrastructure

Temperature change
- Changes in noise impact due to changes in aircraft performance
- Heat damage to airport surface (e.g. runway, taxiway)
- Increased heating and cooling requirements

Wind changes
- Convective weather: disruption to operations
- Local wind patterns: potential disruption to operations and changes to distribution of noise impact
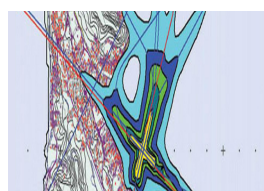- Crosswinds: reduction in capacity

Extreme events
- Disruptions to operations
- Disruption to ground transport access
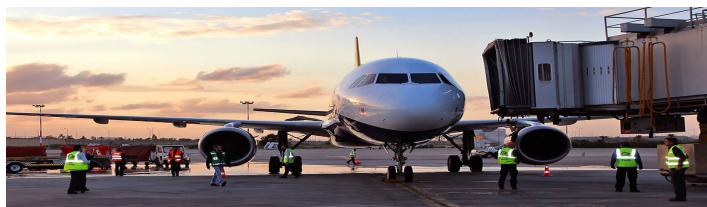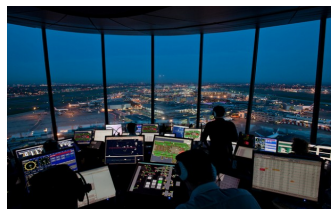- Disruption to supply of utilities
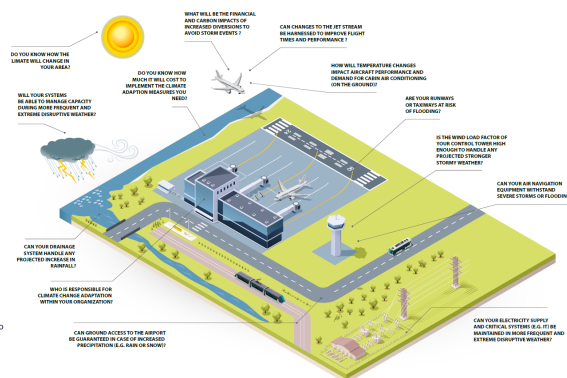
Impacts of Climate Change on Aviation

Major Environmental Aspects of Aviation

Role of different stakeholders = different environmental impacts

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Different Stakeholders Have Different Impacts

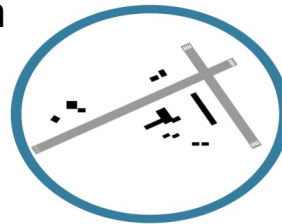|	Airport	Airline	ANSP	Ground Handling	Retail and Catering	Engineer & Maintain	Ground Transport Providers
CO_2	X	X	X	X	X	X	X
Noise	X	X	X	X			
Air quality	X	X	X	X	X	X	X
Utilities	X	X	X	X	X	X	X
Wastes	X	X	X	X	X	X	X
Ecology	X						X

What is the problem ?

- Environmental impacts can
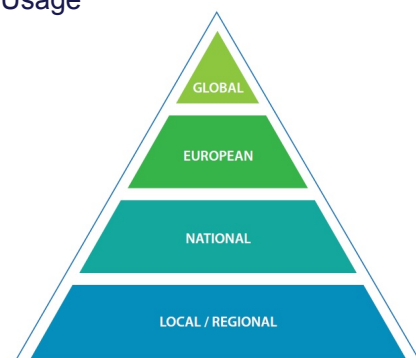
  - Constrain Operational Capacity

    - Constrain potential for the sustainable growth of airport

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In addition to legislation …

Regulatory limits on noise & emissions

Land Planning Usage

GLOBAL

EUROPEAN

NATIONAL

LOCAL / REGIONAL

Opposition by local communities

Supported by social medi

Why people are complaining

More people affected by aircraft noise

	Indicator	Units	2017	% change since 2014	% change since 2005
Traffic	Passenger kilometres flown by commercial flights[1]	billion	1,643	+20%	+60%
	Number of city pairs served most weeks by scheduled flights[1]		8,603	+11%	+43%
Noise	Number of people inside L_{den} 55 dB noise contours[2]	million	2.58	+14%	+12%
	Average noise energy per flight[3]	10^9 Joules	1.24	-1%	-14%
Emissions	Full-flight CO_2 emissions[1]	million tonnes	163	+10%	+16%
	Full-flight 'net' CO_2 emissions with ETS reductions[1]	million tonnes	136	+3%	n/a[4]
	Full-flight NO_x emissions[1]	thousand tonnes	839	+12%	+25%
	Average fuel consumption of commercial flights[1]	litres fuel per 100 passenger kilometres	3.4	-8%	-24%

(1) All departures from EU28+EFTA   (2) 47 major European airports
(3) All departures and arrivals in EU28+EFTA   (4) ETS not applicable to aviation in 2005

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Principles of Sustainable Development

Environmental — *e.g., environmental impacts - climate change*

Economic — *e.g., economic efficiency - growth*

Social — *e.g., social equity - income & jobs*

'Sustainable Development'

Institutional — *e.g., government policy - political legitimacy*

Principles of Sustainable Development
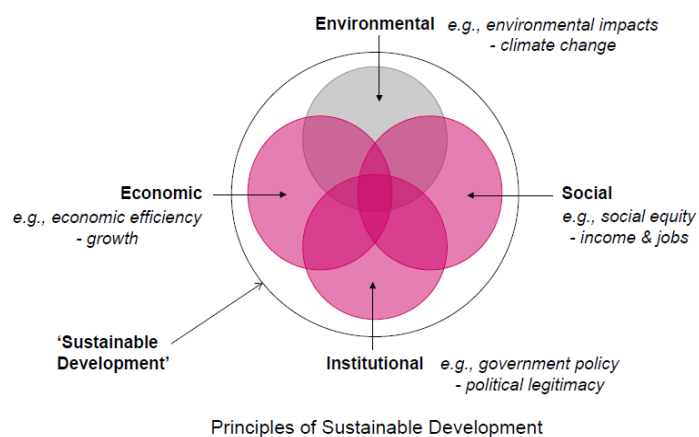
Important to integrate environmental & sustainability goals into…

- Decision making process

- Daily operations of airports

social impact   environmental impact   economic impact

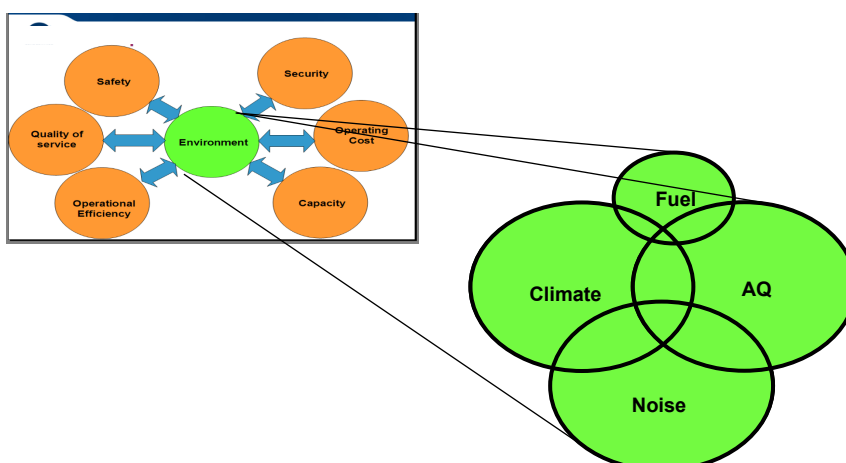# Sustainable Mobility

❑ Improve environmental impact of existing services.
- Infrastructure
- Technology
- Operations
- Business models

❑ Reduce the need for transportation.
- - Information and communication technologies
- - City / regional planning

❑ Deliver services in new ways.
- Air- high speed rail intermodal transfer (to reduce CO_2)

Interdependencies

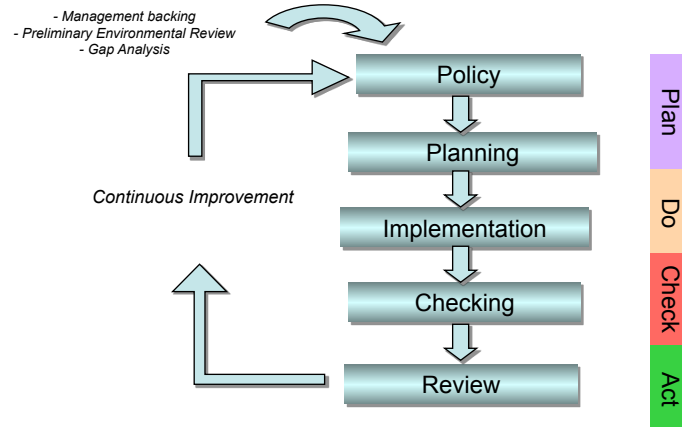## Managing Aviation Environmental Impacts involves:

- Assessment of the nature and magnitude of impacts.
- The introduction of a management system.
- The engagement of all stakeholders into an integrated approach through:
    - Stakeholder engagement and consultation.
    - Collaborative decision making.
    - Collaborative Environmental Management.
- Periodic review of the effectiveness of the approach.
- The implementation of corrective action..

Definition

"Part of an organisation's management system used to develop and implement its environmental policy and manage its environmental aspects"

International Organization for Standardization (ISO) definition (2004):

EMS Framework – The Deming Cycle

EUROCONTROL

- Management backing
- Preliminary Environmental Review
- Gap Analysis

Continuous Improvement

Policy → Planning → Implementation → Checking → Review

| Plan | Do | Check | Act |

Why Use an EMS?

EUROCONTROL

Drivers →

- ❑ Financial and business risks
- ❑ Reputation and stakeholder requirements
- ❑ Regulatory compliance
- ❑ Release constraints to growth

Why Use an EMS?

Benefits →

- Reduced costs through targeted initiatives
- Improved environment & business KPIs.
- Reduced risks of non-compliance
- Partnership building with key stakeholders
- Avoid or mitigate environmental constraints
- Optimise capacity within env. constraints
- Support permission to grow
- Involve and engage your workforce
- Reduce ATM's adverse affects on people
- Lower insurance costs

EMS Leading to Operational Response/Actions

Key Outcomes →

- Environment embedded in business activities
- Awareness raising:
    - Environment as well as safety & capacity
- Ensures proactive action
    - Changes in technology, science & human response
    - Changes in regulation e.g. PM2.5

ISO14001

- ISO 14001 is the international standard that specifies requirements for an effective environmental management system (EMS). It provides a framework that an organization can follow, rather than establishing environmental performance requirements.



2015 Revisions to ISO14001

- Must consider context of the organisation and needs and expectations of interested parties. This includes impact of a changing climate on the organisation.

- Greater emphasis on leadership.

- Must identify risk and opportunities alongside environmental aspects e.g. risk analysis.

- When planning the EMS, must consider a life cycle perspective although full LCA not required.

- Stronger focus on determining the root cause of non-conformances and reviewing the outcome(s) of corrective actions.

EMS in Aviation

- Individual ANSPs and Airports have EMS
- But Aviation has a key issue: Shared impacts between industry partners
  - Is it effective to work alone?
  - How can joint objectives, initiatives and targets be established?
- Need to Collaborate
  - Collaborative Decision Making (tactical collaboration)
  - Collaborative Environmental Management CEM (strategic approach)

EMS Flexibility

Integrated?

Light?

EMS

Certified?

ISO or EMAS?
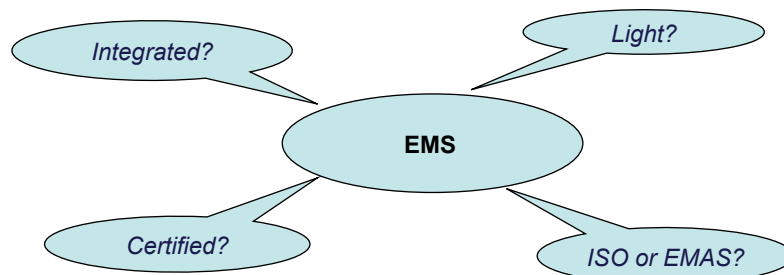
The Challenge for Airports

- Invest to release environmental capacity limits
    - Airports now understand the BUSNESS THREAT.

Evolution of Average Price of Air Travel

- BUT Low cost airline models that drive growth
    - Require new sources of income (car parking, airport retail) that can conflict with environmental objectives.
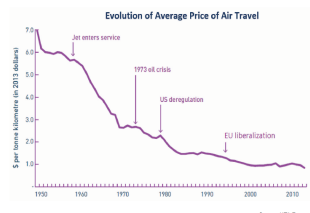
Customer expectation / demand is driving demand for low cost, retail and car parking.

Perhaps business models are the new sustainability challenge.

The Challenge for Airlines

- Airlines understand sustainability, recognise business risk and need to move towards more sustainable products.

- But the cost is significant and the public demand more services at lower cost .

- So can industry drive the consumer or must they wait for consumer demand for fear of losing market share?

- Perhaps sustainability requires different pricing (is low cost sustainable).

The Challenge for ANSPs

- Help maximise the role that air transport can play in supporting social and economic development by:

- Helping to reduce the environmental impacts of aviation whilst….
    - Maximising capacity and operational flexibility.
    - Facilitating long term growth.
    - Maintaining or improving safety.
    - Cutting operating costs within the system.

Potential Responses

- Airline operating procedures

- Selection of appropriate runway for stand allocation

- Minimising taxi time and distance, but also fuel burn

- Reduction of ground holding through effective management of stands

- Airport CDM – CDO/CCO - PBN

CAEP Airports & Operations Products

- MORE TO COME…..
- Environmental Community Engagement for PBN
- Climate Adaptation Synthesis
- Aircraft End-of-Life and Recycling
- ASBU Block 0/1 Fuel & Benefits Analysis
- Global Horizontal Flight Efficiency Analysis

35

Conclusions

- ❑ Environment is now a core business issue
- ❑ Needs to be addressed in a systematic manner and quantified
- ❑ For Aviation there are multiple stakeholders to manage and no single manager
- ❑ Engagement and Collaboration with stakeholders is key
- ❑ A process is needed to engage and manage input/ outputs of individual EMS

Recommendations

- Managing and coordinating different EMSs needs a process framework

- Implement a process that is collaborative and allows collective understanding of interdependencies

- This process could be a collaborative working arrangement such as CEM

- Needs to be transparent and seen to be effective