Goals and Standards
The ICAO Perspective

Environment Section
Air Transport Bureau
International Civil Aviation Organization

2 October 2009
Agenda

ICAO Objective and Goals for Environment
• Quantification and Mitigation Challenges

Technology Standards and Goals

ICAO framework to address the environmental challenge
### ICAO

*(International Civil Aviation Organization)*

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<tr>
<th>Description</th>
<th>Details</th>
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<td>UN specialized agency</td>
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<td>Established by the “Chicago Convention” in 1944</td>
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<td>Forum for cooperation in all fields of civil aviation</td>
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<td>190 Contracting States and 86 international organizations</td>
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<td>Standards, policies &amp; guidance for environmental protection since 1960’s</td>
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<td>Focus on aircraft noise, local air quality and global climate</td>
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ICAO Strategic Objective for Environment

Minimize the adverse effect of global civil aviation on the environment
ICAO Environmental Goals

- Limit or reduce the impact of aviation GHG emissions on global climate
- Limit or reduce the number of people affected by significant aircraft noise
- Limit or reduce the impact of aviation emissions on local air quality

Quantify and Mitigate
Data Collection: Fuel consumption by State and air carrier
Forecasting: Air traffic and fleet
Modelling: AEDT/SAGE (US FAA), AEM (EUROCONTROL), AERO2K (EC), FAST (MMU)

GHG Emissions Example

ICAO Quantification Approach
Mitigation Challenge

- Manufacturers
- Technology
- Airside Operations
  - Navigation Providers
- Operators
- Market Based Measures
- Airports/Communities
- Landside Options
Establishing Technology Standards and Goals
Balance environmental benefit with technological feasibility, economic viability, and do not adversely impact other environmental factors

**Purpose**

Disable a backward slide on environmental improvement

**Principles**

Certification metric based on standard conditions and not correlated with single events

General correlation between certification metric and overall environment

Certification Standards based on already certified technology (TRL>8)

Technology availability across all manufacturers

Technology availability across all seat-classes
Technology Standards

Based on the trailing edge of technology

Looking Back

May apply to new design, new production or current operation
ICAO Technology Standards for NOx

Ref: Independent Experts NOx Review and the Establishment of Medium and Long Term Technology Goals for NOx (ICAO Doc 9887), 2006
Technology Goals

Balance environmental benefit with technological feasibility, economic viability, and do not adversely impact other environmental factors.

Purpose

Provide stretch targets for industry R&D to aim at in cooperation with States.

Principles

- Use the same metric as certification to enable direct comparison
- Technology Goals based on Current TRL < 8 technologies that will be TRL>8 at a given time
- Technology availability with at least one manufacturer
- Technology availability specific to the seat-class considered
Technology Goals

Based on the leading edge of technology

GOALS ≠ PROJECTIONS

Looking Forward
ICAO Technology Goals for NOx

Mid Term (2016)

- 45% below CAEP/6

Long Term (2026)

- 60% below CAEP/6

Ref: Independent Experts NOx Review and the Establishment of Medium and Long Term Technology Goals for NOx (ICAO Doc 9887), 2006
ICAO Environmental Policy Framework

Goals & Standards – Quantify & Mitigate

ICAO Global Goals (International Aviation)

State / Regional Goals (Domestic Aviation)

Global Projections

Technology and Operations Goals

State/Regional Projections

Measure & Model

Global Technology Standards
New Design Production Cut-offs Phase-outs

Market Based Measures

Airside Operations

Landside Options

Global Harmonization through Recommended Practices and Guidance