Session Two –
Aviation Emissions Quantification and MRV
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“ICAO CAEP Modelling and Databases Task Force,
ICAO Goals Assessment Results”

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Introduction

- Results present the consensus view of MODTF, and are consistent across multiple models.
- Primary results based on ICAO FESG central forecast of aviation demand, with some comparisons with low-demand case.
- Supporting reports document goals assessment including modelled regional results and results for all models and various sensitivities.
Background

► ICAO CAEP WG3 provided input on future technology improvements and WG2 provided input on future operational improvements

► 2006 baseline and future 2016, 2026 and 2036
  - NOx above 3,000 ft
  - Full-flight fuel burn and CASFE

► Full flight fuel burn scenarios extrapolated to 2050
GHG: NOx Above 3,000 ft Results (1)

NOx Scenarios:

- Scenario 1 - CAEP 7 Baseline
- Scenario 2 - Moderate Aircraft Technology and Operational Improvement
- Scenario 3 - Advanced Aircraft Technology and Operational Improvement
GHG: NOx Above 3,000 ft Results (2)
GHG: NOx Above 3,000 ft Results (3)
GHG: Fuel Burn and CASFE Full-Flight Results

Fuel Burn and CASFE Scenarios:

• Scenario 1 - CAEP 7 Baseline
• Scenario 2 - Low Aircraft Technology and Moderate Operational Improvement
• Scenario 3 - Moderate Aircraft Technology and Operational Improvement
• Scenario 4 - Advanced Aircraft Technology and Operational Improvement
• Scenario 5 - Optimistic Aircraft Technology and Advanced Operational Improvement

Note: results were modelled for 2006, 2016, 2026, and 2036, then extrapolated to 2050
GHG: Fuel Burn Full-Flight Results (1)

Combined International and Domestic

Note: Results were modelled for 2000, 2010, 2020, and 2030, then extrapolated to 2050.
GHG: Fuel Burn Full-Flight Results (2)

Combined International and Domestic

Note: Results were modelled for 2006, 2016, 2026, and 2036, then extrapolated to 2050.
GHG: Fuel Burn Full-Flight Results (3)

Combined International and Domestic Great Circle Routing Depicted
GHG: Fuel Burn Full-Flight Results (4)

2006 International and Domestic Global Aircraft Fuel Burn

- International Traffic: 116 Mt* (62%)
- Domestic Traffic: 72 Mt* (38%)

Mt = millions of metric tonnes
Global Commercial Aircraft System Fuel Efficiency (CASFE)
Putting the Results in Context

2006 Transportation-related CO₂ Emissions Sources

*Percentages shown are based on the average of the 2006 IEA and UNFCCC data*
Summary

- A rich aviation noise, emissions and fuel burn database exists which can assist policy makers at the route, airport, regional, national and global levels.

- Aircraft technology and operational improvements can go a long way toward limiting the increase in aircraft-related GHG emissions.

- The lack of certainty regarding aviation growth is the most substantial variable in forecasting GHG emissions.

- Aircraft account for about 12 percent of the total of CO₂ transportation emissions.