ACT GLOBAL

ICAO: UNITING AVIATION ON CLIMATE CHANGE

ICAO Colloquium on Aviation and Climate Change

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

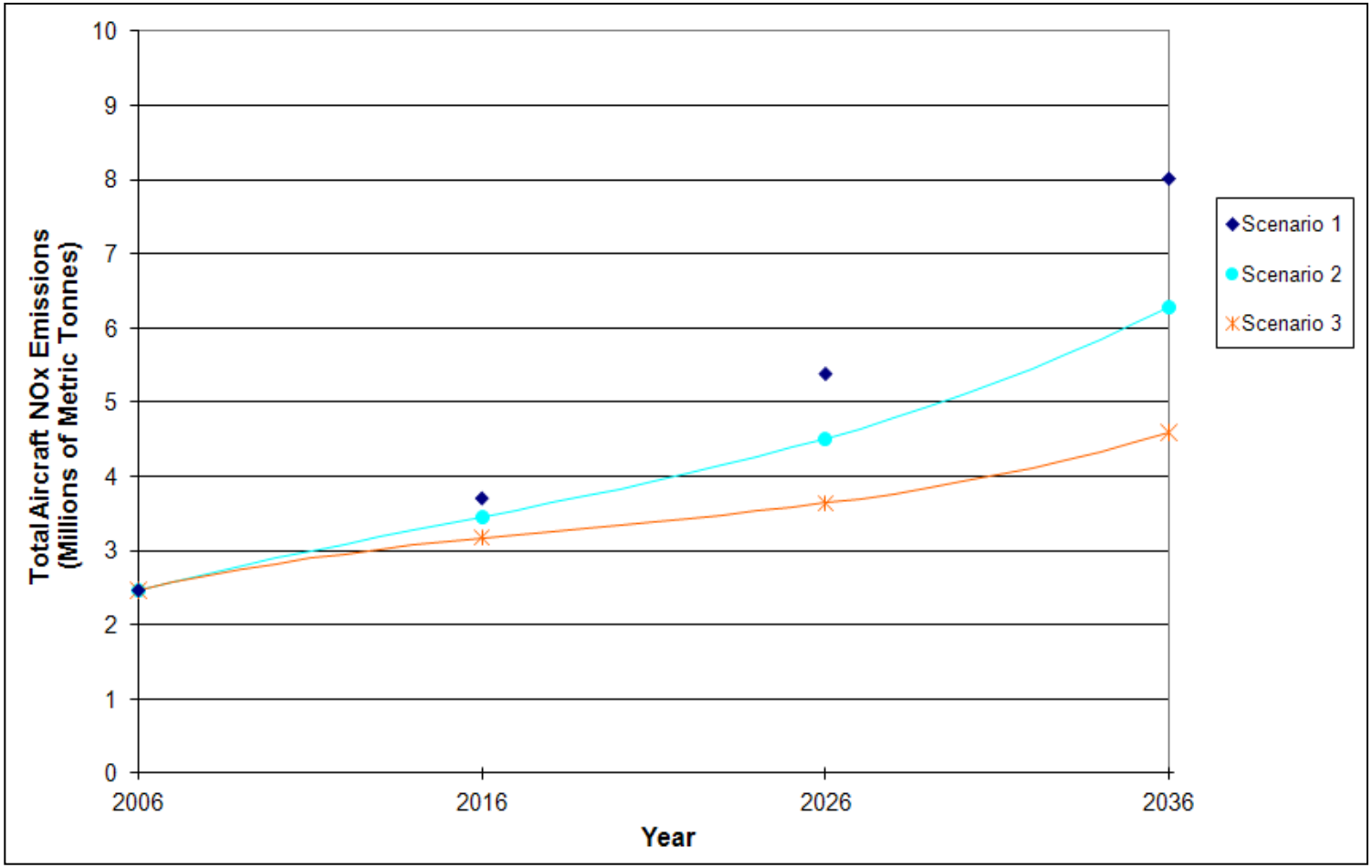
- ICAO CAEP WG3 provided input on future technology improvements and WG2 provided input on future operational improvements
- 2006 baseline and future 2016, 2026 and 2036
  - NOx above 3,000 ft
  - Full-flight fuel burn and CASFE
- Full flight fuel burn scenarios extrapolated to 2050

GHG: NOx Above 3,000 ft Results (1)

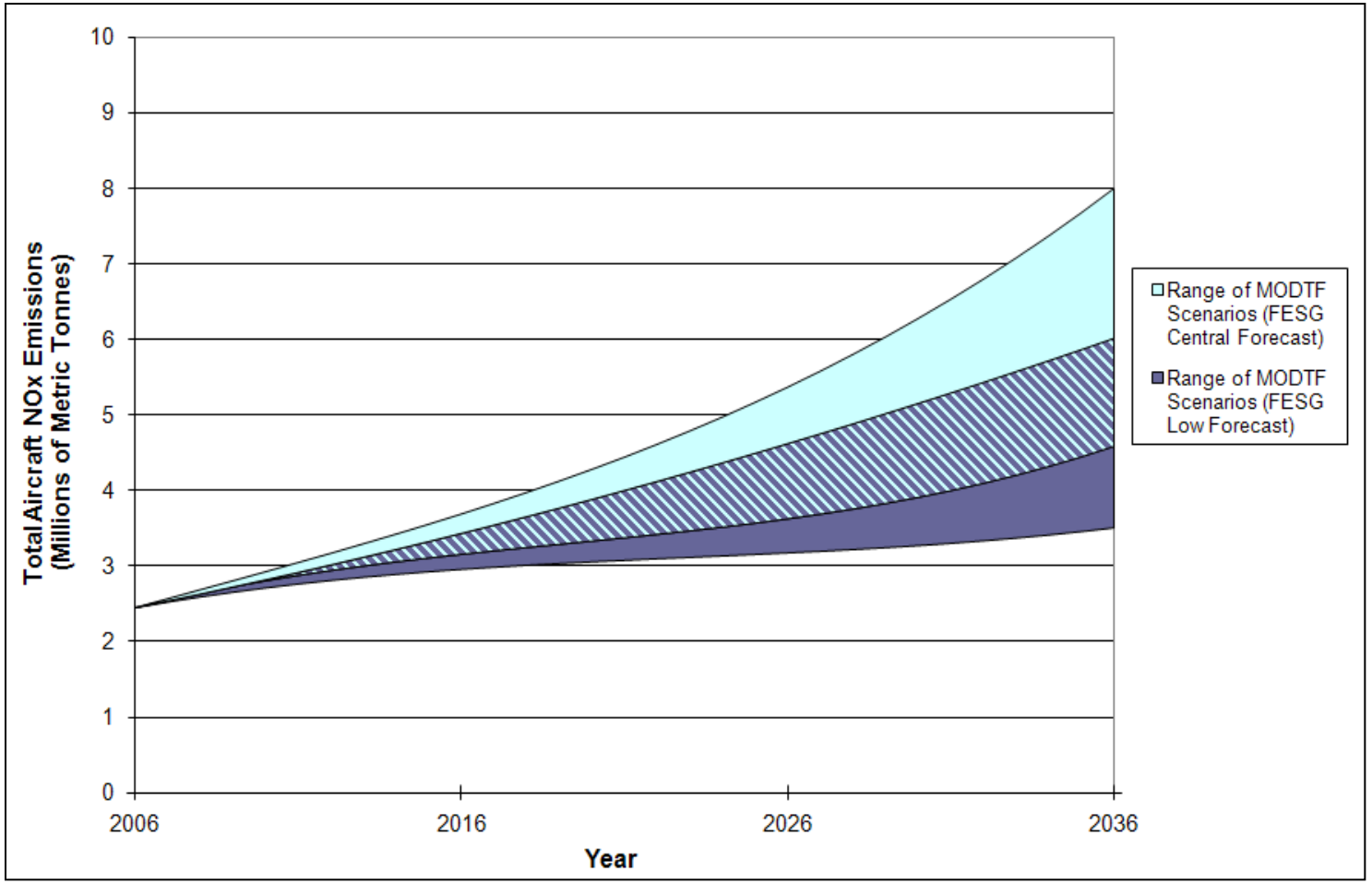
NOx Scenarios:

- 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)



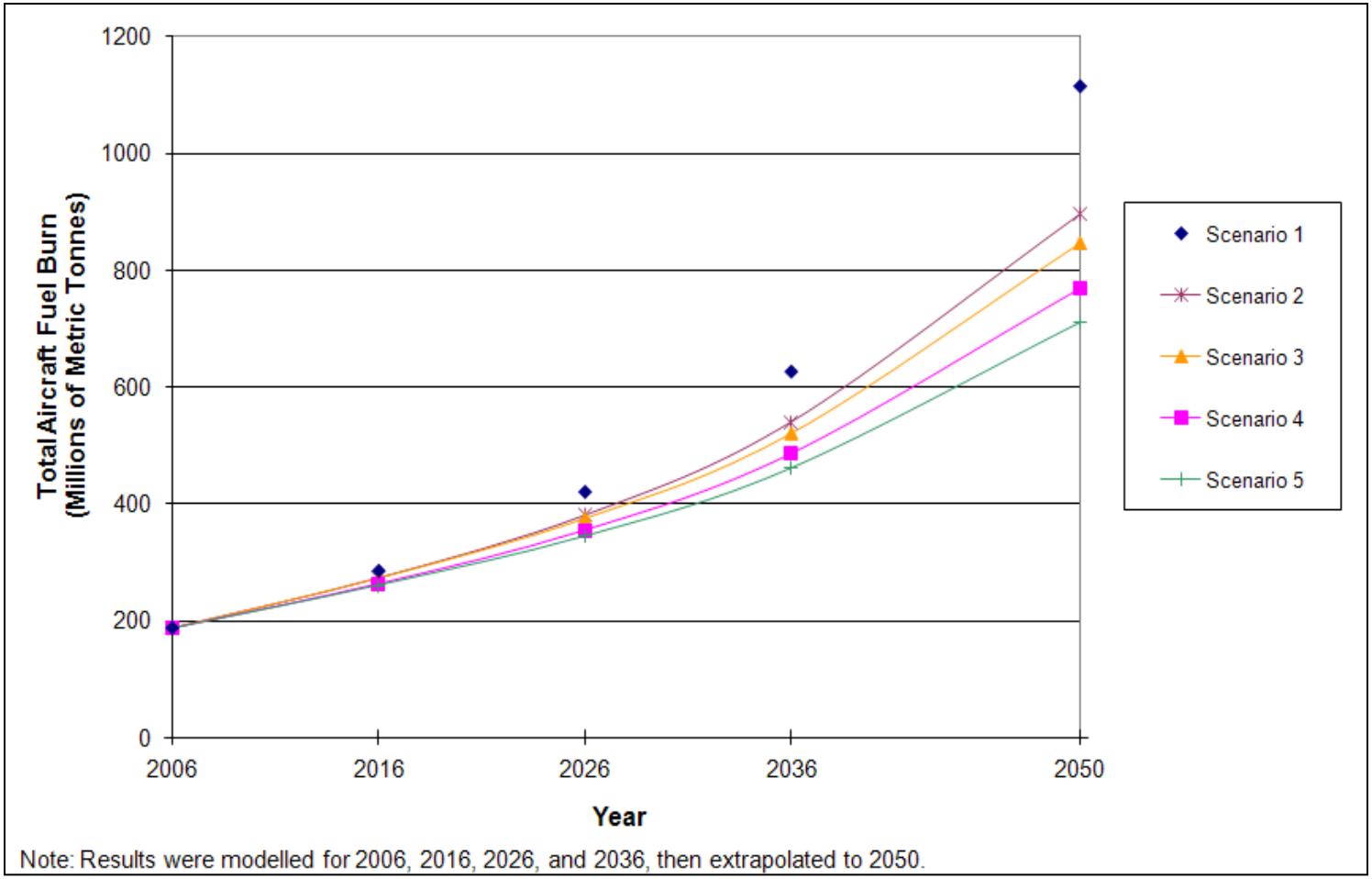
GHG: Fuel Burn and CASFE Full-Flight Results

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**

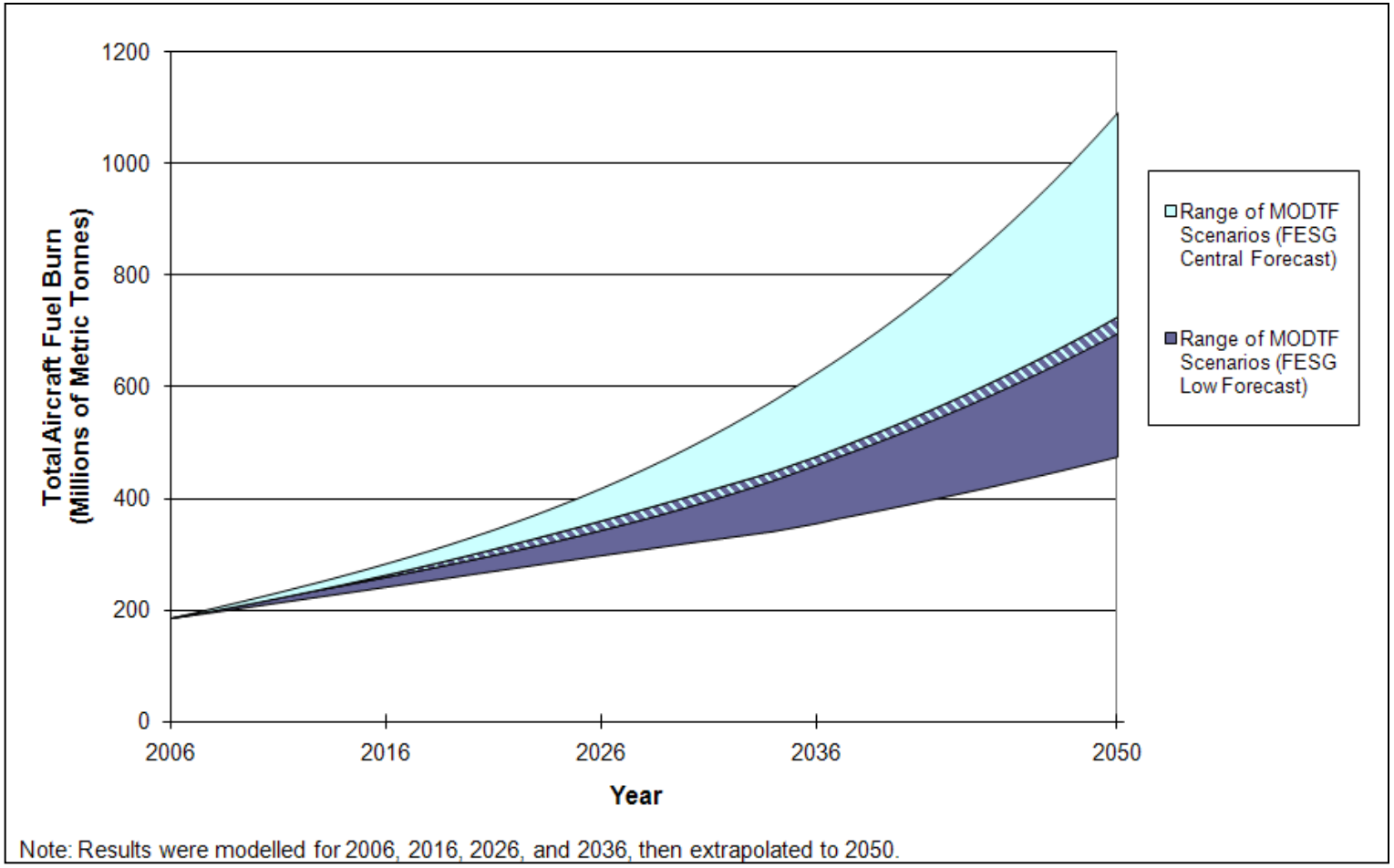
Note: results were modelled for 2006, 2016, 2026, and 2036, then extrapolated to 2050

GHG: Fuel Burn Full-Flight Results (1)



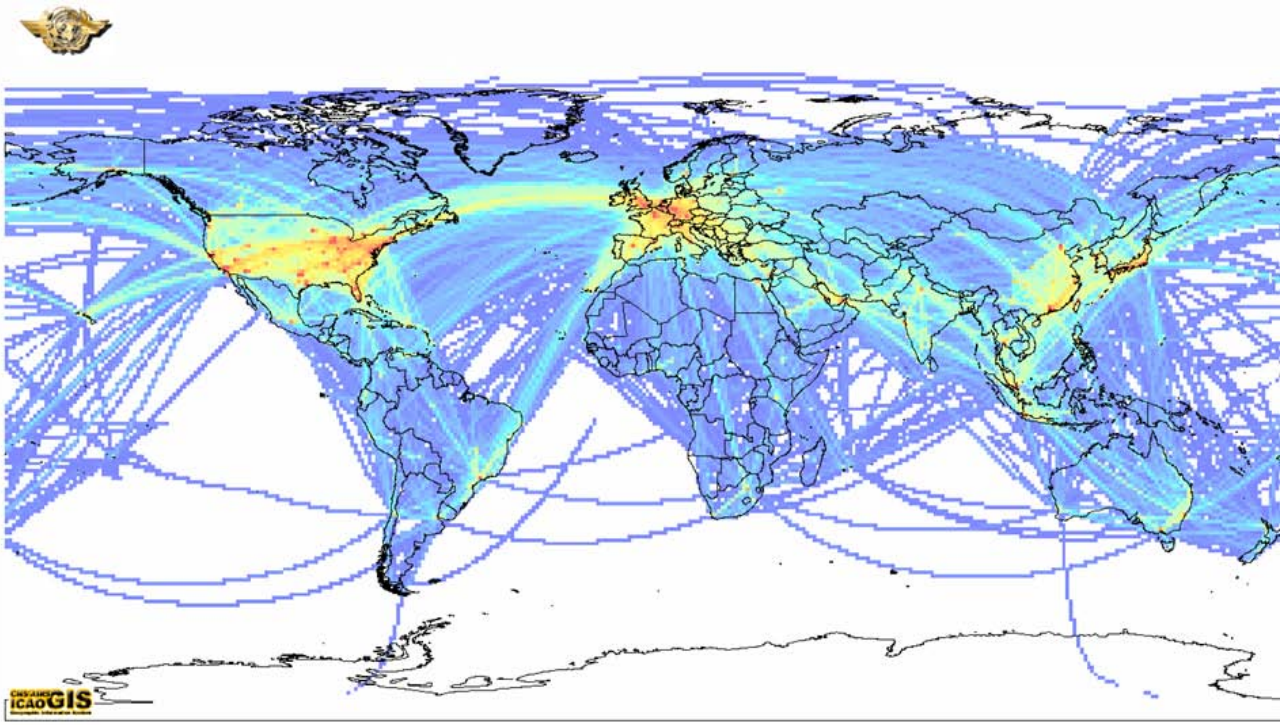
Combined International and Domestic

GHG: Fuel Burn Full-Flight Results (2)

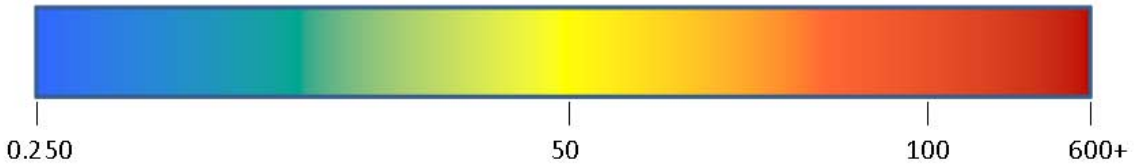


Combined International and Domestic

GHG: Fuel Burn Full-Flight Results (3)

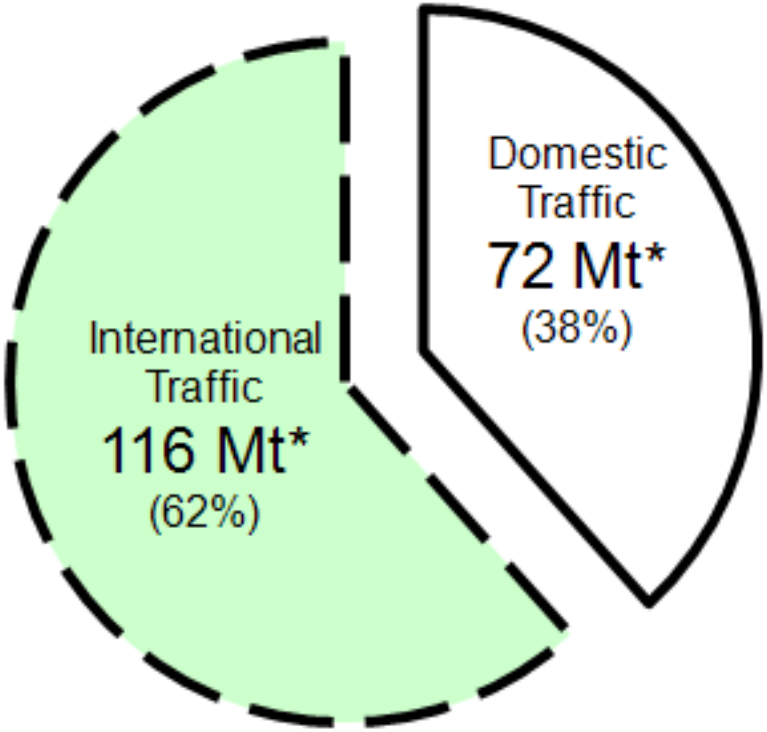


Fuel burn (thousands of metric tonnes per 1° by 1° grid cell)



Combined International and Domestic Great Circle Routing Depicted

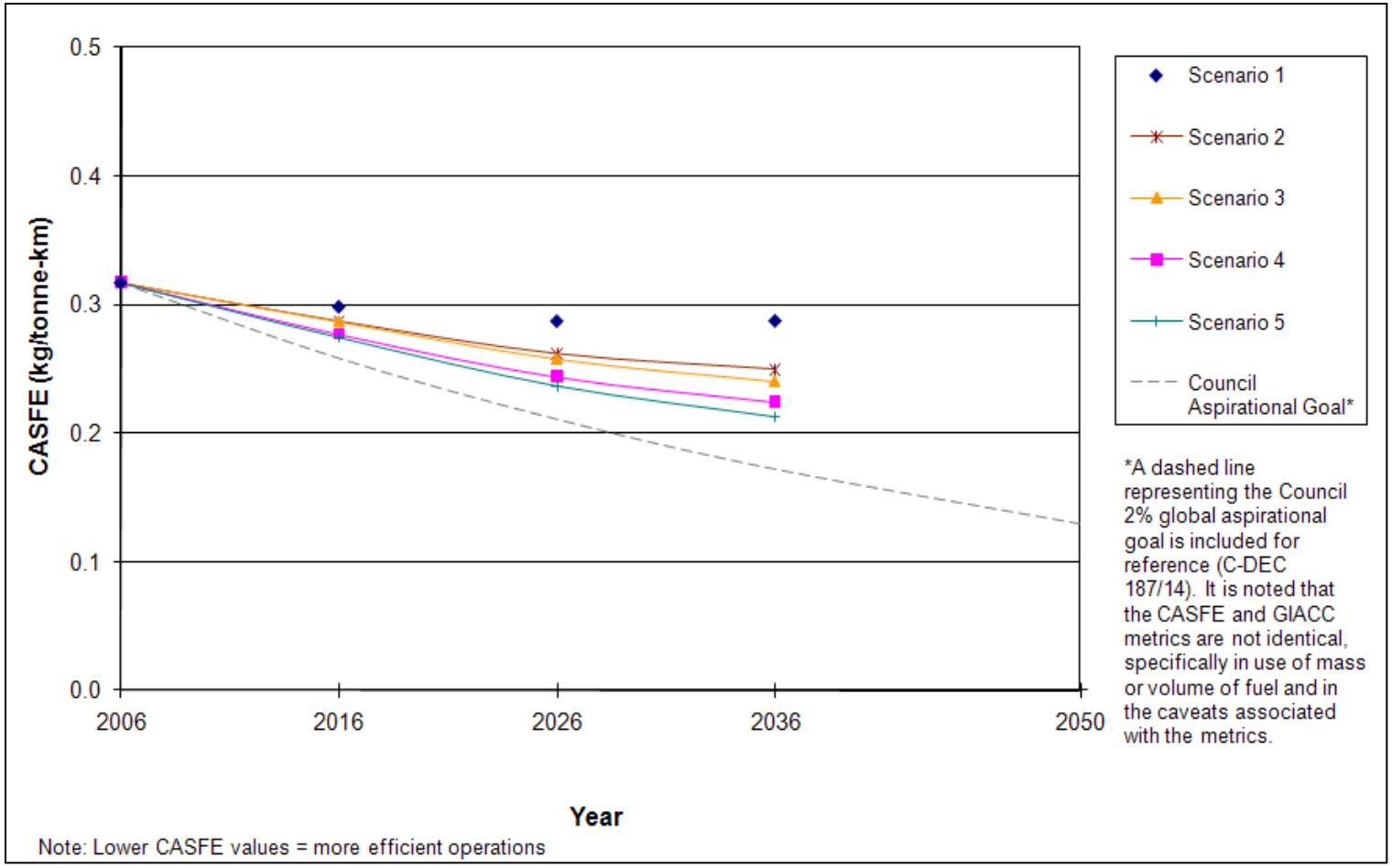
GHG: Fuel Burn Full-Flight Results (4)



Mt = millions of metric tonnes

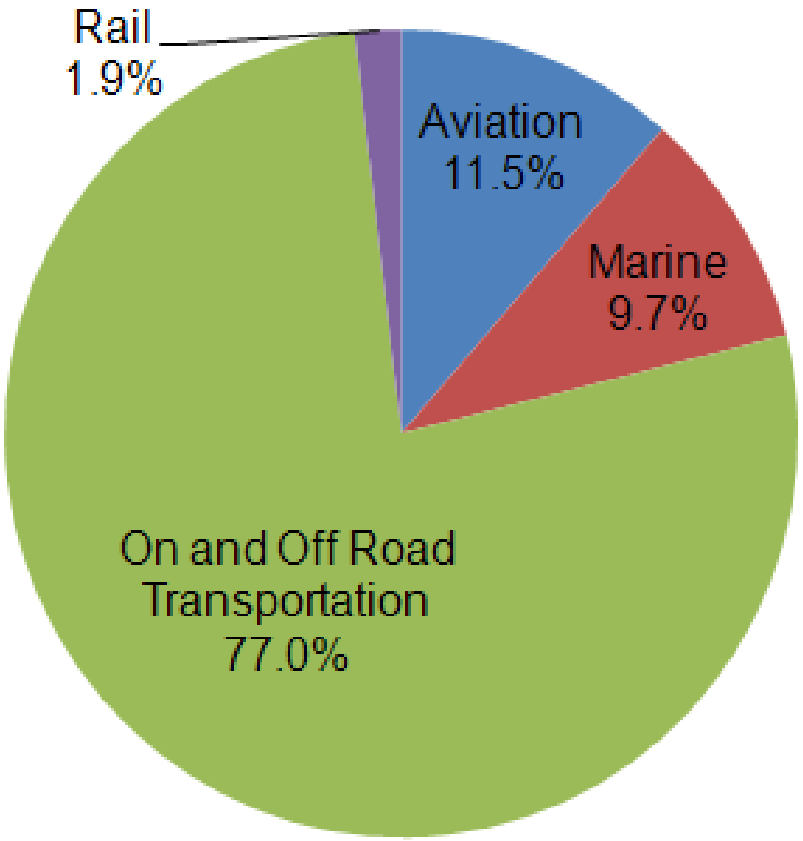
2006 International and Domestic Global Aircraft Fuel Burn

GHG: CASFE Full-Flight Results



Global Commercial Aircraft System Fuel Efficiency (CASFE)

Putting the Results in Context



2006 Transportation-related CO_2 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 CO_2 transportation emissions