Aviation carbon footprinting in Australia

Scott Stone
General Manager
Aviation Environment
Department of Infrastructure, Transport, Regional Development and Local Government
AUSTRALIA

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Evolution of carbon footprinting

- Community pressure for action
- Credibility of industry claims
- Lack of disaggregated data
- ICAO Carbon Calculator
- Sound basis for footprint regime
Australia’s TNIP Carbon Counter

- First step in footprinting regime
- Factual basis to manage carbon
- Built on ICAO Carbon Calculator
- Carbon footprints for networks
- Disaggregated footprint reports
Carbon Counter main interface
Computing carbon footprints

- Aircraft movement data sets
- Flight by flight CO$_2$ using Corinair
- Aggregation of single flight data
- Comprehensive filtering tools
- Graphic and numeric output
## Input data file extract

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Computing carbon footprints

- Aircraft movement data sets
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## Validation

<table>
<thead>
<tr>
<th>Month</th>
<th>Avtur (megalitres)</th>
<th>Cumulative monthly avtur totals (megalitres)</th>
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<td>Sales (less 8% military)</td>
<td>TNIP (computed)</td>
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<td>494.841</td>
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Reporting concepts

- **Trialing reporting formats**
- **Comprehensive & comprehensible**
- **Challenge given amount of data**
- **Needs of different audiences**
- **Layered approach required**
Overview of international operations footprint

- **NORTH EAST ASIA**
  - 2.14 Mt CO₂
  - 0.80 t CO₂ per passenger
  - 3.1 MWh per passenger

- **NORTH AMERICA**
  - 1.33 Mt CO₂
  - 1.37 t CO₂ per passenger
  - 5.2 MWh per passenger

- **SOUTH EAST ASIA**
  - 2.91 Mt CO₂
  - 0.63 t CO₂ per passenger
  - 2.4 MWh per passenger

- **MIDDLE EAST**
  - 0.62 Mt CO₂
  - 1.11 t CO₂ per passenger
  - 4.2 MWh per passenger

- **PACIFIC**
  - 0.18 Mt CO₂
  - 0.24 t CO₂ per passenger
  - 0.92 MWh per passenger

- **AFRICA**
  - 0.19 Mt CO₂
  - 1.04 t CO₂ per passenger
  - 3.9 MWh per passenger

- **NEW ZEALAND**
  - 0.69 Mt CO₂
  - 0.24 t CO₂ per passenger
  - 0.90 MWh per passenger

- **OTHER**
  - 0.075 Mt CO₂
  - 1.31 t CO₂ per passenger
  - 5.0 MWh per passenger
International footprint by origin city
Footprint by Australian States

- **Domestic – Intrastate**
- **Domestic – Interstate**
- **International**

### Distribution by State

- **NSW & ACT**: 5.73 Mt CO₂, 74.2% Domestic, 21.5% Interstate, 4.2% International
- **QLD**: 2.98 Mt CO₂, 45.0% Domestic, 21.4% Interstate, 33.6% International
- **VIC**: 2.81 Mt CO₂, 60.4% Domestic, 38.7% Interstate, 0.9% International
- **WA**: 1.79 Mt CO₂, 37.4% Domestic, 34.5% Interstate, 28.1% International
- **SA**: 0.50 Mt CO₂, 24.3% Domestic, 10.5% Interstate, 65.2% International
- **NT**: 0.35 Mt CO₂, 16.2% Domestic, 20.3% Interstate, 63.5% International
- **TAS**: 0.13 Mt CO₂, 0.2% Domestic, 4.1% Interstate, 95.7% International
- **AUSTRALIA**: 14.3 Mt CO₂, 57.0% Domestic, 10.8% Interstate, 32.3% International
Australian footprint by operation

Outer Circle: CO₂ emissions
Inner circle: Aircraft departures

- Domestic – Intrastate 34.6%
- Domestic – Interstate 57.0%
- International 10.8%
- 14.3 Mt CO₂
  1.062 million departures

Domestic – Intrastate
Domestic – Interstate
International
Footprint by distance

- **Total CO₂ = 5.40 Mt CO₂**
- **Total departures = 145,478**

- **77.0% Long haul (> 3000 km)**
- **21.4% Medium haul (500 - 3000 km)**
- **1.6% Short haul (< 500 km)**

- **16.0% Long haul (> 3000 km)**
- **55.1% Medium haul (500 - 3000 km)**
- **28.9% Short haul (< 500 km)**
Fuel efficiency - Sydney

The graph shows the fuel efficiency over the years from 1999 to 2009. The blue bars represent the total annual fuel consumed in Mt, while the red line indicates the fuel consumption per 100 RPK (Revenue Passenger Kilometer).

- The fuel consumption data is presented for each year, with a noticeable decrease in fuel consumption per 100 RPK over the years.
- The data indicates an improvement in fuel efficiency, suggesting advancements in aviation technology or operational procedures.
Conclusion

- **ICAO CC useful building block**
- **Great Circle methods robust**
- **Simple approach to footprinting**
  - readily available datasets
  - desktop computers and standard software
Thank you