

Aviation & Emissions

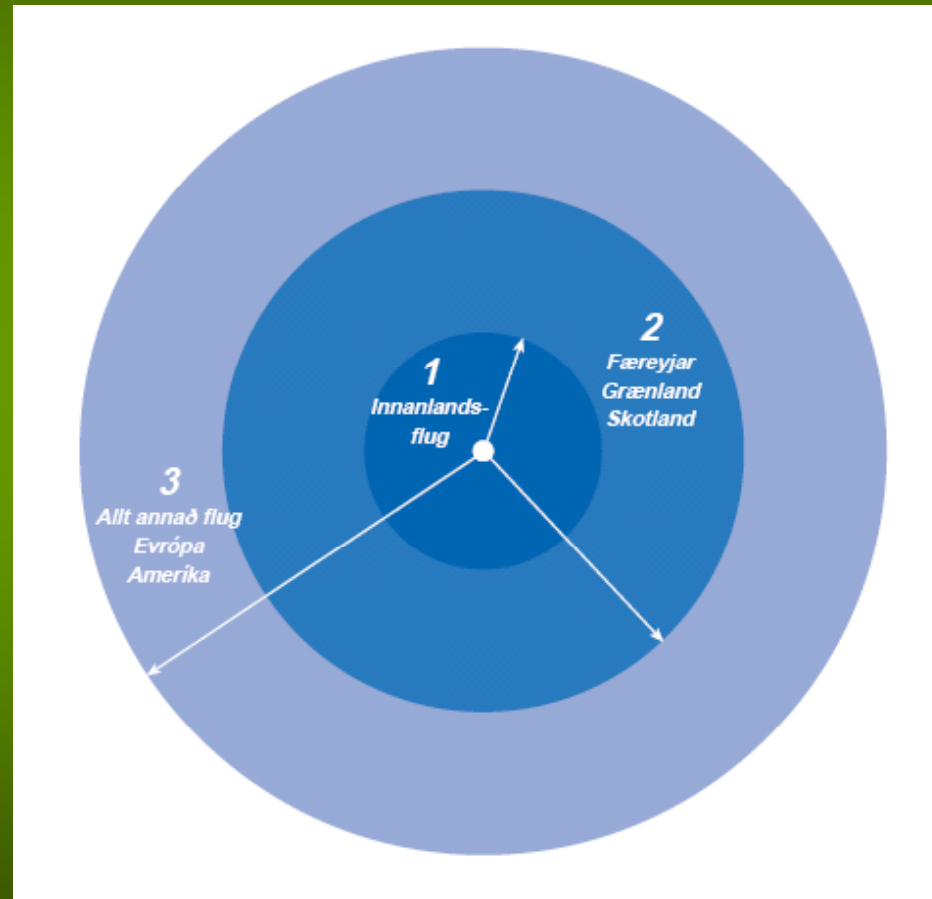
- problems and possibilities?

Sveinn V. Ólafsson
Aerospace Engineer
Icelandic Civil Aviation Administration



Icelandic air travel

Three distances to cover



Quick trip alone

Reykjavík – Akureyri - Reykjavík

Flying

- Fokker F50
- 920 kg JET-A1
- 40 persons

→ 73 kg CO₂ /person

Driving

🕒 **SUV/Jeep**
165 kg CO₂

🕒 **Compact**
100 kg CO₂

Iceland – Copenhagen - Iceland

Flying

- From Reykjavík
- Boeing 757-200
-
- 175 kg CO₂/person
+ freight

We are sailing

- ⌚ From Seyðisfjörðu
- ⌚ M/f Norröna
- ⌚
- ⌚ 388 kg CO₂/person
+ freight

Emissions - Background

⊕ Aircraft produce around 3% of CO₂ emissions within EU.

⊕ NO_x is also produced

⊕ Water vapor

⊕ Due to rapid growth aviation emission would account for 5% by 2050.



Aviation Fuel Burn - Facts

- ✿ Fuel burn/emissions from aircraft has been reduced 70% since 1970 (pkm).
- ✿ Total aviation emissions within EU increased 87% between 1990 og 2005.
- ✿ It is estimated that technological progress will result in up to 50% less CO₂ per pkm in 2020 (aircraft design, materials, engines, air navigation,....)
- ✿ Airlines within IATA improved their fuel efficiency 3.4% in 2004 (pkm).

How much fuel do aircraft use?

- In 1995 Lufthansa Group used 5,1 liters/100 pkm.
- The fuel consumption had dropped down to 4,4 liters/100 pkm in 2005.


♠ CO₂ proportional to fuel burn.


🕒 Toyota Prius uses 4,3 liters/100 km

🕒 Toyota Landcruiser 10 -15 l/100 km



Growth vs. fuel used

 The growth of world aviation is forecasted to be 4,7% (Boeing).

 50% reduction in emissions would compensate for 5% growth until 2020 (zero increase in Carbon).

The EU-ETS Road Ahead

- ⌚ Allowances in ETS (discrete and immediate)
- ⌚ Growth in aviation (continuous)
- ⌚ Fuel efficiency of aircraft (leaps or steps)



Three factors with inherently different timescales to mix and play with for the airline and travel industry.....!*?&

How much Allowances will be allowed?

Icelandic aviation



- Icelandic aviation has been growing 7,5% per year.
- Would result in 30% net increase in carbon by 2020 (tech improvements accounted for).
- Iceland is an ISLAND and TOTALLY dependent on aviation in its development and sustained growth.

Ways to decreased fuel burn?

- ✎ New aircraft are more efficient
Boeing 787 Dreamliner is 20% more efficient =25% growth
- ✎ Better performance and planning, route network, frequency, load factors,
- ✎ Buy new equipment such as winglets, engines etc. if available for old aircraft
- ✎ Air navigation can improve fuel efficiency by up to 12% in Europe.
- ✎ R&D should provide better more efficient tecknology
- ✎ New enery sources such as biofuels,.....?

Conclusions



- ♠ Iceland being an ISLAND is totally dependent on air travel if to be developed.
- ♠ Air travel will grow faster than technology. No reduction of emissions in short term.
- ♠ Will EU cap the ETS allowances – critical
- ♠ Fuel prices, fuel prices, ↑