Environmental Policy of a Global Airline
AGENDA

- Introduction
- Aviation and Gaseous Emissions in Context
- Political background
- The Carbon Neutral Growth Concept
- The 4-Pillars Strategy: Carbon Reduction Potential
- Summary
Intro: Environmental Policy Focus

- **Gaseous Emissions**
  - CO2, => global aircraft
  - Contrails,… => global aircraft
  - NOx => global/local aircraft

- **Noise** => local aircraft

- **Waste** => local ground

- **Energy/Water consumption** => local ground

Major environmental impacts are aircraft related.
The major aircraft related environmental impacts on a global level are gaseous emissions.

=> **Focus of this presentation is aircraft related gaseous emission mitigation policy, especially CO2**
Intro: Aviation Industry Under Threat

- Despite a strong track record:
  - Best performance on fuel efficiency
  - Best performance on noise
  - Removal of Soot and Sulphur

- Perceptions of Aviation are:
  - Heavy polluter
  - Emissions growing fast
  - Only one energy source: kerosene
  - Industry has nowhere to go

- Intuitive Policy Response
  - Limit demand / growth
  - Apply taxation
  - Use revenues to fund emissions reductions in other sectors
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Aviation and Gaseous Emissions in Context (1)

- 80% of aviation’s GHG emissions are related to passenger flights exceeding 1,500 km/900 miles
  - ... for which there is no practical alternative.

- Aviation has >70% occupancy rates
  - ...more than double those of road and rail transportation.
“Being a small part of a serious problem, there is still a serious challenge to do even better.” (IATA)

Worldwide emitted greenhouse gases (CO₂-Aquivalents) according to different sectors (Kyoto-Gases)

- Waste 3,6%
- Agriculture 13,5%
- Changes in land use 18,2%
- Industrial processes 3,4%
- Fugitive emissions 3,9%
- Air transport 1,6%
- Other means of transportation 11,9%
- Electricity and heat generation 24,6%
- Other fuel combustion 9,0%
- Industry 10,4%

Source: World Resource Institute (WRI)
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Political background (1)

- The Kyoto-Protocol has excluded aviation and shipping because emissions can not be allocated to states.

- A larger number of states, which have a mature aviation market, have not signed the Kyoto-Protocol.

- ICAO has a task derived from Kyoto-Protocol to develop solutions for aviation but some ICAO-states that have not signed Kyoto do not feel bound to that task.

- ICAO has done its best and has defined mid term efficiency goals for aviation.
Political background (2)

- We find an increasing number of individual approaches and different instruments to deal with emissions mitigation.
- We see a spectrum from doing nothing up to various regional uncoordinated emission-trading systems, tax- and charging systems growing, resulting in “carbon and job leakage risks”.
- This is not an appropriate approach to deal with a global problem.
- This is not an appropriate approach for a global industry like aviation; individual and different system have impact on competition.
- The Copenhagen Conference in December 2009 is envisaged to be the key for the Post-Kyoto Process.

=> Aviation industry has developed the concept of Carbon Neutral Growth based on a Global Sectoral Approach for the sector and the 4-Pillars Strategy to contribute in mitigation of climate change
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The Concept of Carbon Neutral Growth from 2020

- It demonstrates aviation is seriously willing to act, it shows the sector has carefully analyzed the situation and has drawn conclusion.

- Goals: Carbon neutral growth in 2020 and 1.5% efficiency improvement up to 2020 is challenging but achievable (realistic).

- Longterm goal: 50% net carbon reduction
  - Only achievable if all stakeholders cooperate and contribute (airlines, manufacturers, airports, ANSPs).
  - Political support is prerequisite.

Adopted by IATA General Assembly 2009

Airlines are the first global industry to make such a commitment!!

http://www.iata.org/whatwedo/environment/
The Concept of **Carbon Neutral Growth** from 2020 and the Global Sectoral Approach

- Kyoto has shown that aviation emissions can not be treated by national states.

- Majority of aviation emissions occur in international airspace, which is not under control of national legislation.

- Aviation is „per definition“ international or global.

- Aviation is a highly competitive sector, any regional regulation has impact on competition risking carbon leakage and job leakage - see European Emission Trading System.

=> The most appropriate approach is **one** for the complete sector
The Concept of Carbon Neutral Growth - Key principles (1)

- **Global sectoral approach**: accounting for emissions at a global level, not by state.
- **Full integration in UNFCCC framework**, global access to carbon markets
- **Equal treatment vs. differentiated responsibilities**, open issue
- **ICAO leadership in the UNFCCC process**, ICAO is the appropriate United Nations body for making aviation-specific recommendations
The Concept of Carbon Neutral Growth - Key principles (2)

- **Cost-effective economic measures** like emissions trading, carbon funds, offsets etc. are accepted as long as they are implemented globally (basket of measures)
- **Revenues** to be clearly earmarked for environmental purposes and to be re-invested to directly improve the emissions profile of aviation,
- **Government action** prerequisite to modernize air traffic management, improve airport infrastructure and increase investment in low carbon sustainable alternative jet fuels,
- **Manufacturers action**, technology improvement, CO2-standards
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The 4-Pillars Strategy

The 4-Pillar Strategy describes the options and measures to reduce emissions. It is based on the following findings:

- The aviation system consists of many different stakeholders.
- Each of them can influence the efficiency of the system.
- Each of them then consequently has responsibility.
- Each of them is active in a dedicated part of the system.

=> To cover all options and to achieve a maximized output a coordinated approach is necessary – 4-Pillars Strategy is the result
The 4-Pillars Strategy:

Four pillars for climate protection

1. Technological progress
   - Innovations in aviation & engine technologies
   - Alternative fuels

2. Improved infrastructure
   - More efficient use of air space (SES)
   - Needs-adapted infrastructures
   - No subsidies for micro-airports

3. Operative measures
   - More efficiently sized aircraft
   - Optimized flight routes and speeds
   - Optimized processes on the ground

4. Economic instruments
   - Emissions trading system designed to complement the other pillars
   - Voluntary compensation

Manufactures, Fuel supplier
ANSP´s, Gov´s, Airports
Airlines, Airports, Ground Ops
Gov´s, Airlines, Customer
The 4-Pillars Strategy:
The 4-Pillars Strategy

Conclusions

- Aircraft- and engine-technology
- Operations
- Infrastructure improvements
  - prerequisite
  - not sufficient to achieve carbon neutral growth from 2020

- Biofuel
  - Very promising option to achieve carbon neutral growth long term

- CO2-Compensation / Carbon Offsetting
- Emissions trading
  - Can close a gap, but potentially risky:
    - compliance
    - costs not predictable
    - competitive distortion possible
The 4-Pillars Strategy

Three Key drivers for Carbon Neutral Growth
### Innovative Aircraft Technology – Examples

<table>
<thead>
<tr>
<th>Aero-Design</th>
<th>Weight</th>
<th>Compound Material</th>
<th>Optimized Energy Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharkskin</td>
<td>Adaptive Wing</td>
<td>Fuel savings: up to 3%</td>
<td>Fuel savings: up to 3%</td>
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<tr>
<td>Fuel savings: up to 3%</td>
<td>Fuel savings: 5 - 15%</td>
<td>Fuel savings: 15 - 20%</td>
<td>Fuel savings: up to 3%</td>
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<tr>
<td>High-Bypass-Engine</td>
<td>Intercooled Recuperated Aero-Engine (IRA)</td>
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<td>Fuel savings: about 8%</td>
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**Carbon Neutral Growth**
Fleet Modernization Programme at Lufthansa

10 Airbus A 330-300
In the Lufthansa fleet since 2004

24 Airbus A 340-600
In the Lufthansa fleet since October 2003

20 Boeing 747-800
In the Lufthansa fleet as of 2011

15 Airbus A 380-800
In the Lufthansa fleet as of 2010

170 aircrafts with list-order prize of 16 bn €
Alternative Fuels

- Kerosene is an excellent fuel, no alternative for the time being available
- Any alternative should be like kerosene (drop-in)
- Hydrogen is questionable (production, infrastructure)
- Bio-fuel specs in preparation
- Open questions to be answered: availability, price, certification, risk of partial crowding out of food production, environmental benefit
- Different Technology paths possible, FT-Process, HTV, Algae with different potential, Algae seem to have high productivity.

LH is active in promoting alternative fuels

Darrin Morgan, Boeing’s Director of Environmental Strategy (31.10.2008): “We are thinking that within three to five years we are going to see approval for commercial use of biofuels – and possibly sooner.”
Improvements in Operations

- Engine Water Wash (saves 80,000 l fuel/day)
- Winglets (save up to 5% fuel)
- Optimized watercapacity saves 5,000 l fuel a day
- Lighter seats save 13,000 l fuel a day
- Flightmanagementsystem „Lido OC“ saves up to 3.7% fuel a flight
- flexible flightspeed saves 89,000 l fuel/day
- Paperless Cockpit saves 4,000 l fuel/day
- A/C Cleaning saves up to 2% fuel
Summary

- The Aviation sector needs a global approach to solve a global problem for a global industry.
- The Aviation Sector Industry is willing to act, has committed to binding goals and has developed a strategy.
- There are various options available but compensation is necessary.
- The concept of Carbon Neutral Growth can only be successful if all other stakeholders contribute.
- We hope(expect) that concept of Carbon Neutral Growth with a global sectoral approach to be recognized in Copenhagen.
Thank you for your attention!

www.lufthansa.com/responsibility