



# Building a greener future

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Environment is at the top of aviation's agenda, alongside safety and security.

Environmental responsibility is a core promise we make to the 2.2 billion people who fly each year.

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# Foreword

Aviation is responsible for 2% of global CO<sub>2</sub> emissions and by 2050 will represent 3%. Aviation is a small part of a major problem – that of climate change. But our carbon footprint is growing and this is not acceptable. To be blunt, the issue of the environment will limit our future until we move our thinking from tactical to strategic.

The first step in developing a strategy is vision. At IATA's AGM in 2007, I challenged our industry to build our future on the vision of an industry that does not pollute – zero carbon emissions.

For some, this was a shock. But we have a great track record of turning dreams into reality. In 50 years, we moved from the Wright brothers' Flyer to the jet age.

Potential building blocks for a carbon-free future already exist. Fuel cell technology is here. A solar-powered aircraft is being built. And we can make fuel from biomass – algae – today.

The way forward is marked by four challenges.

In the short term, we must cut up to 18% of aviation fuel that is wasted as a result of inefficient infrastructure and operations. This represents more than 120 million tonnes of CO<sub>2</sub> per year. Implementing an effective Single European Sky alone would save 16 million tonnes annually.

In the longer term, technology must lead our efforts to build a zero carbon emission aircraft in the next 50 years. The world's leading aerospace nations must coordinate basic research, and then compete to apply it effectively. Governments and fuel suppliers must focus on alternative fuels. We aim to have 10% of airline fuel needs from alternative fuel sources by 2017.

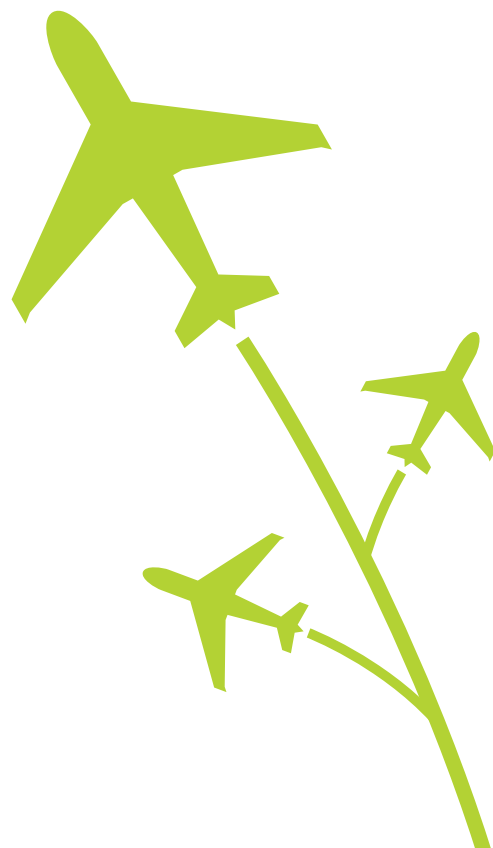
In the meantime, we need a global approach with a shared commitment by governments. IATA's message to governments is clear. Improve infrastructure, invest in technology and provide financial incentives to drive development. Only then should economic measures such as emissions trading be considered. For this, ICAO must deliver a global solution to aviation emissions that is fair, voluntary and effective. ICAO's relevance rests on its ability to deliver.

Finally, environmental responsibility must become a core promise—alongside safety and security—to the 2.2 billion passengers that fly every year.

Working together with a common vision and a clear strategy will deliver great results.



**Giovanni Bisignani**  
**Director General & CEO**



# Vision and Strategy

## Introduction

Aviation has an enviable environmental track record. While air travel is growing at a rate of 5% per year, its carbon footprint is growing at a much lower rate, some 3% per year. This is the direct result of significant and continuous investments in fleet modernisation, infrastructure improvements and operational advancements.

The UN Intergovernmental Panel on Climate Change (IPCC) estimates that aviation's share of global CO<sub>2</sub> emissions will grow from 2% today to 3% by 2050. In spite of its relatively modest share of carbon emissions, aviation – like all other industries – has a responsibility to ensure it's as environmentally efficient as possible.

## IATA's Vision

IATA considers climate change a serious issue and is determined to be part of the solution, with a clear vision.

An important milestone on the route towards a zero carbon future is to ensure that aviation CO<sub>2</sub> emissions stop growing. With traffic expected to grow 5% a year, this means we have to double current annual efficiency improvements to achieve carbon neutral growth. Further steps must see aviation progressively reduce its remaining carbon emissions before eventually becoming a totally carbon-free transport mode. With this vision, IATA is challenging the whole aviation sector to build and operate a commercial airliner that produces no net carbon emissions within 50 years from 2007.

Although complete solutions do not exist today, some of the building blocks – new materials and designs, alternative energy sources, advanced IT solutions – are already taking shape.

IATA is confident that with a commitment from all parties – and with ICAO leadership – this vision can be made a reality.



“ Being a small part of a serious problem, there is still a serious challenge to do even better. ”

# IATA's Four-Pillar Strategy

## 01 Technology

Technology is an important driver of progress. Accelerated development of cleaner, alternative fuels and more advanced technology for air traffic management and airframe and engine design is absolutely essential.

IATA, manufacturers and fuel suppliers are jointly working on an action plan focusing on short, medium and long term measures. In the short term, the potential exists to realise emissions reductions by identifying and applying product enhancements and modifications for the current fleet.

For the medium term, possibilities must be explored to accelerate fleet renewal and to introduce the latest technologies as early and as widely as possible.

Commercialisation of sustainable biofuels must also take priority. For the longer term, joint initiatives should be launched to identify and develop radically new technologies and aircraft designs.

### Action

↗ ICAO and industry should develop medium and long-term technology goals for engine fuel burn and CO<sub>2</sub> emissions, accompanied by appropriate fuel performance indicators and metrics.

↗ ICAO should develop global specifications for cleaner, alternative fuels. Research & development (R&D) investments in these fuels must be increased and coordinated.

↗ ICAO should promote a predictable investment horizon and a stable regulatory environment to foster R&D efforts.

↗ ICAO should support a technology roadmap with clear long-term goals to be jointly developed by manufacturers, suppliers, airlines and regulators worldwide.

## 02 Operations

More efficient aircraft operations can save fuel and CO<sub>2</sub> emissions by up to 6%, according to the IPCC in its 1999 special report on aviation. IATA is compiling industry best practices, publishing guidance material, conducting airline visits and establishing training programmes to improve existing fuel conservation measures.

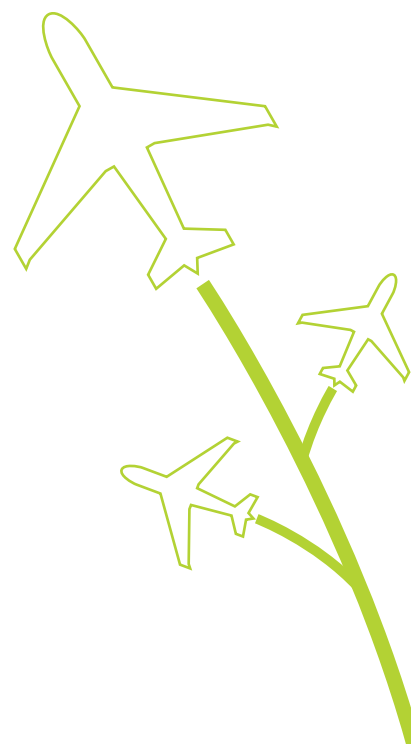
In 2007, IATA updated its fuel efficiency goal. It expects airlines to reduce their fuel consumption per revenue tonne kilometre (RTK) by at least 25% by 2020, compared to 2005 levels. This will save around 345 million tonnes of CO<sub>2</sub> emissions during that period.

Achievement of the IATA fuel efficiency goal will be predominantly driven by very significant investments in the continuous renewal of airline fleets. Increasing load factors also play an important part. The IATA goal does not, however, take account of additional operational and infrastructure improvements, which, if pushed beyond historical trends, could yield significant extra benefits.

### Action

↗ IATA aims to raise environmental standards by extending existing fuel conservation programmes and promoting environmental management systems across all airlines.

↗ ICAO should update international fuel management regulations (including ICAO Annex 6), for further fuel efficiency gains.



## 03 Infrastructure

Infrastructure improvements present a major opportunity for fuel and CO<sub>2</sub> reductions in the near term. By addressing airspace and airport inefficiencies, governments and infrastructure providers could eliminate up to 12% of CO<sub>2</sub> emissions from aviation, according to the IPCC.

Implementation of the Single European Sky and the US NextGen Air Transport System is a top priority for the progressive harmonisation of global airspace management. Flexible airspace access must also become a reality, especially in Asia where traffic growth is particularly strong.

### Action

➤ **Governments must adopt policies and remove obstacles to allow airspace and airport inefficiencies to be cut in half over the next five years, thereby saving 40 million tonnes of CO<sub>2</sub> emissions per year.**

➤ **States and ICAO should implement ICAO's Global Air Navigation Plan at the regional level and prioritise the development of regional action plans to eliminate inefficiencies and harmonise global airspace management.**



## 04 Economic Measures

Economic measures should be used to boost the research, development and deployment of new technologies rather than as a tool to suppress demand. The use of tax credits and direct funding must be explored as incentives to drive new technology programmes.

Punitive taxes do not improve environmental performance. Emissions trading could be a more cost-effective solution as part of a global package of measures including technology, operations and infrastructure improvements.

But the trading system must be properly designed and implemented on a global and voluntary basis. It must also be an open trading system, allowing permit trading with other industries.

Economic measures can further be used to engage airline customers in climate change initiatives. IATA is developing an industry carbon offset programme to promote the use of credible, sustainable offset mechanisms for aviation.

### Action

➤ **ICAO and IATA should work with international financial institutions to explore new funding mechanisms to provide clean technologies to the developing world.**

➤ **IATA supports the development of minimum standards to calculate flight emissions to ensure the transparency and credibility of carbon-offset facilities offered to the travelling public.**

➤ **ICAO is urged to adopt a realistic yet ambitious action plan for aviation and climate change, recognising the need for a comprehensive package of measures that includes technology, operations and infrastructure improvements, while also considering the potential for a global framework to manage aviation's emissions.**

# Fast Facts

## Aviation's contribution to climate change

Aviation accounts for 2% of total man-made CO<sub>2</sub> emissions. This could reach 3% by 2050<sup>1</sup>.

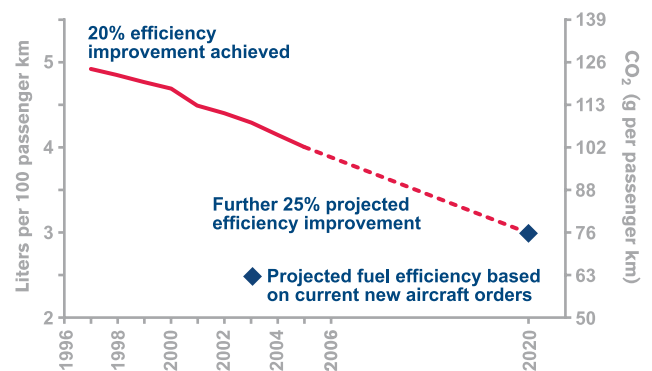
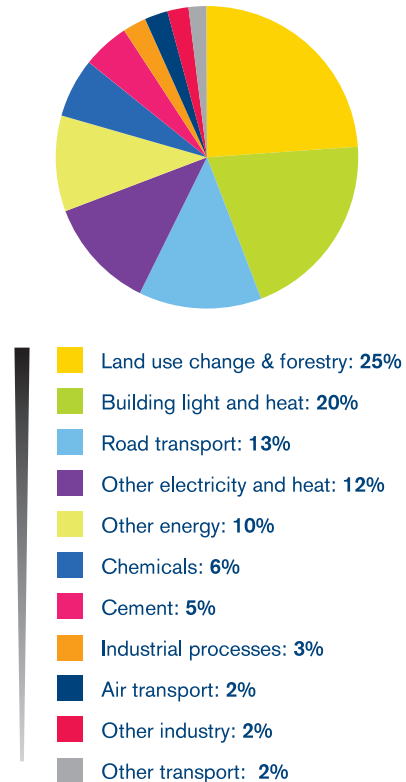
- Between 2000-2004, aviation's CO<sub>2</sub> emissions rose 4.5%, from 675 to 705 million tonnes<sup>2</sup>. During the same period, total worldwide CO<sub>2</sub> emissions increased 13%.
- Considering CO<sub>2</sub> and other greenhouse gases, aviation accounts for 3% of the total man-made contribution to climate change<sup>3</sup>. This could reach 5% by 2050<sup>4</sup>.
- Up to 18% of fuel is wasted through infrastructure and operational inefficiencies<sup>5</sup>. This represents around 120 million tonnes of CO<sub>2</sub> per year.
- IATA actions to improve operations and infrastructure saved 25 million tonnes of CO<sub>2</sub> in 2006 and 2007 alone. This includes the optimisation of more than 700 air routes worldwide<sup>6</sup>.

## Driving fuel use down

Airlines have improved their fuel efficiency and CO<sub>2</sub> emissions 20% over the past 10 years. They are determined to be at least a further 25% better by 2020, compared with 2005, mainly through huge investments in fleet renewal<sup>7</sup>.

- Today's aircraft fly 3 times further on the same amount of fuel than 40 years ago, equal to a 75% fuel efficiency gain per passenger/km.
- The newest aircraft (A380/B787) use less than 3 litres of fuel per 100 passenger/km. This compares favourably with small family cars, but at 6 times the speed.
- By 2020, new technologies are expected to be at least 50% more fuel-efficient than today. Noise at source is expected to be cut by a further 50% and NO<sub>x</sub> emissions, which mainly affect local air quality, reduced by 80%.

Global CO<sub>2</sub> emissions



Source: IATA WATS 2007

<sup>1</sup> IPCC Special Report on Aviation and the Global Atmosphere (1999) and IPCC Fourth Assessment Report (2007). Note that this includes emissions from general and military aviation, which together represent around 0.1%.

<sup>2</sup> IEA (2006). Includes commercial, military and general aviation.

<sup>3</sup> IPCC Fourth Assessment Report (2007)

<sup>4</sup> and <sup>5</sup> IPCC Special Report on Aviation and the Global Atmosphere (1999)

<sup>6</sup> IATA Safety, Operations & Infrastructure Division (2007)

<sup>7</sup> IATA (2007)

## Aviation – a catalyst of economic and social progress

Aviation stimulates the economy, trade and tourism, generates business opportunities and enhances quality of life in both developed and developing regions.

- Aviation transports 2.2 billion passengers annually and 35% of interregional exported goods (by value). 40% of international tourists travel by air<sup>8</sup>.
- Aviation generates 32 million jobs worldwide and contributes nearly 8% (or US\$ 3,557 billion) to world gross domestic product<sup>9</sup>.
- Aviation largely covers its infrastructure costs, paying US\$42 billion per year in user charges. Unlike road and rail, it is often a net contributor to national treasuries through taxation.
- Aviation is the most efficient way of travelling.
  - It can use the optimum distance between two points and minimises land use.
  - Its occupancy rates exceed 75%, compared to 40-50% for trains and 30% for cars.
  - 80% of aviation emissions are from passenger flights exceeding 1,500 km or 900 miles, for which there is no practical alternative<sup>10</sup>.

## Aviation - employment and GDP<sup>11</sup>

	World	Africa	Asia/Pacific	Europe	Latin/ Caribbean	Middle East	North America
<b>Jobs (in millions)</b>							
Direct/indirect/induced	14.7	0.4	3.2	4.2	0.7	0.5	5.7
Catalytic	17.1	2.9	7.3	3.4	2.0	0.7	0.9
<b>Total</b>	<b>31.9</b>	<b>3.3</b>	<b>10.5</b>	<b>7.6</b>	<b>2.7</b>	<b>1.1</b>	<b>6.6</b>
<b>GDP (in billions US\$)</b>							
Direct/indirect/induced	1093.0	9.2	154.1	331.3	22.2	17.6	558.6
Catalytic	2463.7	57.8	653.2	895.4	135.1	54.9	667.3
(of which tourism)	387.6	18.8	70.7	194.6	23.0	10.8	69.8
<b>Total</b>	<b>3556.7</b>	<b>67.1</b>	<b>807.4</b>	<b>1226.6</b>	<b>157.3</b>	<b>72.5</b>	<b>1225.9</b>

<sup>8</sup> ATAG, The Economic & Social Benefits of Air Transport (2005) and IATA (2008)

<sup>9</sup> Oxford Economics updated data for ATAG (2007)

<sup>10</sup> AERO modelling system, Pulles J.W. et al. (2004)

<sup>11</sup> Oxford Economics updated data for ATAG (2007)



## Get the facts about aviation and the environment

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