SUSTAINABLE AVIATION

# *Sustainable Aviation Progress Report 2006*

# Contents



**Image acknowledgments**

Front cover images - © BAA plc

# Foreword

When we launched *Sustainable Aviation* in June 2005 we emphasised that it was a long term strategy designed to ensure that the UK aviation industry met its environmental responsibilities over the years ahead. We said at the time that some of the eight Goals and 34 Commitments would take many years to realise but we promised to report on a regular basis and we are proud to present this, our first progress report, after just 18 months. We are particularly pleased that, as the report highlights, many of the *Sustainable Aviation* signatories have risen to the challenges that are embodied by our Goals and Commitments and have started to make progress towards achieving them.

As the main purpose of this report is to describe progress we focus on the key issues of Climate Change, Local Environmental Impacts and our own Governance and Communications. We include a number of Indicators that have been developed so far and also outline the activity we are planning during the next two years.

The full list of our Goals and Commitments is shown in Appendix I. Appendix II lists Recommendations to government, contained in our Strategy, and we look forward to these issues being addressed in the government's forthcoming progress report on the Air Transport White Paper (ATWP).

This report is supplemented by further information on the *Sustainable Aviation* website which reports against each Commitment and on the wide range of activities undertaken by signatory organisations.

We have developed a governance structure to manage this long-term activity and will continue to fine-tune our structure to ensure the right resources are being applied.

This strong foundation will be important as we move closer to addressing the challenges ahead. The attention on aviation's environmental performance is likely to continue and increase and the industry will need to respond, demonstrating commitment, action and performance improvements. *Sustainable Aviation* will be a critical part of that response, providing a forum for collaboration and shared delivery that involves airlines, airports, manufacturers and air navigation service providers.

The recent Stern Review on the economics of climate change[1] has reinforced the need to address global warming and its report emphasised the need for effective measures and international collaboration, as well as pointing out that effective early action need not jeopardise economic growth.

Since our launch five new organisations have become signatories of *Sustainable Aviation*, ensuring that we now speak for over 90 per cent of UK airlines, airports and air navigation service providers, as well as all major UK aerospace manufacturers. We will continue to promote the principles of our strategy both within the UK and internationally.

**Sustainable Aviation Council**
**December 2006**

[1] The economics of climate change. Stern, N, 2006. HM Treasury, UK

# Executive Summary

The UK aviation industry recognises its environmental, social and economic responsibilities and is committed to building a sustainable future. The publication of *Sustainable Aviation*, in June 2005, established UK airlines, airports, aerospace manufacturers and the main air navigation services provider as world leaders in addressing the challenges presented by the global growth in demand for air transport.

*Sustainable Aviation* is the first joint strategy of its kind, bringing together the different parts of the aviation industry to make a series of shared Commitments. This progress report sets out the actions we have taken since publication and it is the first of the regular biennial reports that we will produce.

The Strategy sets out a series of Goals and specific Commitments for the long-term sustainable development of the aviation industry. These include climate change, local air quality, and economic and social issues.

Since publication, we have made important progress in each of the key areas above. We have established a governance structure, consisting of a Sustainable Aviation Council and a Working Group, to monitor and direct the implementation of the Strategy. The issues of climate change and local environmental impacts were further identified as priority areas.

## ACTION ON CLIMATE CHANGE

The recent Stern report has highlighted the overwhelming scientific evidence for the risks associated with climate change and the need for an urgent global response. Aviation currently represents a relatively small percentage of global greenhouse gas emissions and this would rise by 2050 under a business-as-usual scenario[2]. The UK and the European Union are planning to cut greenhouse gas emissions substantially by 2050. Significant reductions in overall global emissions would lead to an increase in aviation's percentage contribution to climate change. The UK air transport industry is committed to playing its part in limiting greenhouse gas concentrations in the atmosphere.

The Stern report identified Emissions Trading Schemes (ETS) as an effective mechanism for achieving sustained reductions in global carbon dioxide ($CO_2$) emissions, across countries and industries. A cap and trade system provides the means to limit emissions at an agreed level in the most technically and economically viable way.

A European ETS is an important step towards a broader international agreement to address aviation emissions and significant progress has been made towards this objective. Active support has been given to the UK and EU policy objective to include aviation in the EU ETS and we welcome the imminent announcement of draft legislation to this effect. We look forward to providing further assistance in developing a pragmatic and deliverable policy approach in Europe.

UK air transport industry is committed to playing its part in limiting greenhouse gas concentrations in the atmosphere

Understanding the non-$CO_2$ atmospheric impacts of aviation will be vital in addressing the overall contribution of aviation to climate change. We have consistently supported prioritisation of research in this area and strengthening of links between industry and the research community. We therefore welcome a major new government funded initiative – Opportunities for Meeting the Environmental Growth of Aviation (OMEGA) – to develop a broadly based knowledge transfer network for further research into atmospheric science, technology and economics. We will play a key role in this project.

Technology will play a leading role in reducing the environmental impact of air transport. The Advisory Council for Aeronautics Research in Europe (ACARE) has set improvement targets for fuel burn, noise, and nitrogen oxides (NOx) of 50, 50 and 80 per cent respectively for new aircraft in 2020 compared with their equivalents in 2000. We are on track to meet these objectives. In addition, alternatives to aviation kerosene, such as biofuels, continue to be assessed.

In the UK, more than £130 million has been committed to major research and technology validation programmes in the past 12 months. The main focus for these programmes is more environmentally-friendly engines, more efficient wing, fuel and landing systems, and increased understanding of aerodynamics and advanced materials and structures. This work is being jointly funded by industry, government, regional development agencies and devolved administrations as part of the National Aerospace Technology Strategy. These projects signal the scale of the long-term investment required, from all stakeholders, to deliver the step-change in performance required by the *Sustainable Aviation* targets.

In addition to these longer-term measures we are also working to minimise our current contribution to climate change. For example, in 2005 British Airways became the first scheduled airline to offer carbon offsetting to customers and the industry is currently working to introduce and promote carbon offsetting as an immediate step, pending introduction of emissions trading.

## LOCAL ENVIRONMENTAL IMPACTS

Noise remains a major concern for people living adjacent to airports and under flight-paths. Sector-wide communication and understanding of sustainability issues is one of the key strengths of *Sustainable Aviation* and a dedicated Noise Abatement group has been established which brings together airports, airlines and NATS to identify and move forward noise abatement efforts around airports including ground noise. Work is underway through the group to develop a best practice guide for environmentally optimal departure procedures.

Airports have reviewed their noise mitigation schemes as part of the masterplan process and NATS has also launched a Continuous Descent Approach (CDA) outreach programme to publicise and inform airports and airlines about the benefits of this operating technique.

ACARE has also established a target of a 50 per cent reduction in noise and, as part of their contribution, the UK aerospace manufacturers have invested heavily, to drive progress towards meeting this target by 2020, through innovative design and manufacturing technology programmes.

Further progress has been made in identifying best practice concerning responsible environmental behaviour

The industry is delivering on its commitment to play a full part in the improvement of air quality at sensitive airport locations. A *Sustainable Aviation* Indicator reports concentrations of nitrogen dioxide ($NO_2$) at airports[3]. BAA and British Airways provided technical support to the government-led Project for the Sustainable Development of Heathrow (PSDH) which seeks to quantify the effect of the airport on the wider air quality of the area.

Progress towards the ACARE target of an 80 per cent reduction in NOx emissions has continued. For example the Rolls-Royce Trent 900 demonstrates a 20 per cent reduction in NOx emissions over its predecessor the Trent 895 during the period 1998-2006. It is envisaged that the new Trent 1000 engine, due to enter into service in 2008, will offer a further 10 per cent reduction in NOx over the Trent 900.

Further progress has been made in identifying and disseminating best practice concerning responsible environmental behaviour. In November 2006 the Airport Operators Association (AOA) published an updated and expanded Environmental Guidance Manual for airports. It is expected that airports and their stakeholders will consult the manual for the latest information and techniques for monitoring and reducing the environmental footprint of airports. Further work has also been undertaken by SBAC in encouraging the use of ISO 14001 standards by aerospace supply chain manufacturers.

[2] Stern reports that aviation $CO_2$ emissions currently account for less than two per cent of global greenhouse gas emissions and suggests this would rise to less than three per cent by 2050 under business as usual predictions

[3] See www.sustainableaviation.co.uk

## ECONOMIC AND SOCIAL BENEFITS

The UK aviation industry operates within a challenging global market place, and continues to play a vital role in the UK economy. In 2006, in partnership with government, we commissioned a major study to quantify the contribution of the UK air transport sector to the national economy. It reported that the industry makes an £11.4 billion value-added contribution to the UK economy, supporting more than 700,000 direct and indirect jobs[4].

In addition, aerospace manufacturing is a UK success story and provides high value and highly skilled employment, remaining second only to the USA in world rankings. The SBAC UK Aerospace Industry Survey (2006) shows that 2005 was a highly successful year for the sector with civil aerospace revenue standing at £10.5 billion, a rise of over 18 per cent on the previous year. Aerospace manufacturing directly employs 124,237, an increase of nearly 10,000 from 2004. In 2005, self-financed research and development in aerospace was worth £0.89 billion, 76 per cent of which was for the civil sector.

Aviation services support international trade and are an important factor in determining investment by new and existing businesses. They also contribute to social inclusion, cultural exchange and international communication. The growth in traffic at regional airports has also been an important factor in generating local economic growth and greater competitiveness.

## LOOKING FORWARD

In addition to making progress on the Commitments contained in the Strategy, we will further develop the areas of governance, stakeholder engagement and wider communication.

The past 12 months represent important progress towards the long-term sustainable development of the UK's aviation industry. There is more that needs to be done if the Goals are to be achieved, but we remain committed to delivering the Strategy. The work undertaken in the first year since the launch of *Sustainable Aviation* shows that our combined efforts are already having an impact and will continue to do so as the Goals and Commitments are strengthened and delivered in the years to come.



[4] *The Economic Contribution of the Aviation Industry in the UK*, Oxford Economic Forecasting, October 2006



# 1

# *Sustainable Aviation* – progress on key issues

This report provides a summary of progress in key areas from a diverse range of sustainability initiatives undertaken by the aviation industry. A number of *Sustainable Aviation* (SA) signatories produce more detailed environmental and social reports. Links to the websites of SA signatory companies are provided at www.sustainableaviation.co.uk.

*Sustainable Aviation* sets out eight key Goals and 34 specific Commitments for the long-term sustainable development of the aviation industry. The Goals of the Strategy are as follows:

- Full industry commitment to sustainable development and a broader understanding of the role of aviation in a sustainable society
- Aviation incorporated into a global policy framework that achieves stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous man-made interference with the climate system
- Limit and, where possible, reduce the number of people affected by aircraft noise in the UK
- Industry playing its full part in improving air quality and meeting air quality regulatory requirements at sensitive airport locations
- Industry playing its full part in the development of an integrated transport system
- Continue to manage and limit the industry's overall environmental footprint
- A competitive and commercially viable aviation industry making a positive contribution to the UK economy
- An industry with constructive relationships with employees, local communities, customers and industry partners, meeting society's air transport needs.

## PRIORITY AREAS

The *Sustainable Aviation* Goals and Commitments cover a wide number of sustainability issues. For the first year, we identified three priority areas judged as either time-critical or of high relative importance.

The priority areas identified were:

1: Climate Change

2: Local Environmental Impacts

3: Governance and Communications

## LIST OF SIGNATORIES

**Airlines:**
bmi
British Air Transport Association
British Airways
easyJet
First Choice Airways
flybe
Monarch
Thomas Cook
Thomsonfly
Virgin Atlantic

**Air Navigation Service Provider:**
NATS

**Airports:**
Airport Operators Association
BAA (Aberdeen, Edinburgh, Gatwick, Glasgow, Heathrow, Stansted, Southampton)
Belfast City
Birmingham International
Bristol International
Glasgow Prestwick International
Leeds Bradford
London City
Manchester Airports Group (Bournemouth, Humberside, Manchester, NEMA)
Newcastle International
Peel Airports (Durham Tees Valley, Liverpool John Lennon, Robin Hood Doncaster Sheffield, Sheffield City)
TBI Group (Belfast International, Cardiff International, London Luton)

**Manufacturers:**
Airbus UK Ltd
BAE Systems plc
Bombardier Aerospace, Belfast
Cobham plc
Defence Aviation Repair Agency (DARA)
Doncasters Ltd
Farnborough Aerospace Consortium
Goodrich Engine Control Systems
GKN plc
Marshall of Cambridge Aerospace
Meggitt plc
Messier-Dowty Ltd
QinetiQ
Rolls-Royce plc
SBAC
Smiths Group plc
West of England Aerospace Forum





# 1.1 CLIMATE CHANGE

**SUSTAINABLE AVIATION GOAL:**

Aviation incorporated into a global policy framework that achieves stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous man-made interference with the climate system

The Stern report for the UK Government has highlighted the overwhelming scientific evidence for the risks associated with climate change and the need for an urgent global response. The Intergovernmental Panel on Climate Change (IPCC) has reported that the global emissions of $CO_2$ by aircraft accounted for around two per cent of all man-made $CO_2$ emissions in 1992. This figure could rise to three per cent by 2050, according to the IPCC mid-range emissions scenario. Stern reports that aviation $CO_2$ emissions currently account for less than two per cent of global greenhouse gas emissions and suggests this would rise to less than three per cent by 2050 under business as usual predictions. The UK Government is planning to cut greenhouse gas emissions substantially by 2050 and if overall global emissions are sharply reduced, then aviation's percentage contribution to climate change is likely to be higher. The UK aviation industry is committed to playing its part in limiting greenhouse gas concentrations in the atmosphere.

## KEY INITIATIVES

### Emissions trading

- Significant step towards managing aviation emissions: European Commission & Council back inclusion of aviation in emissions trading
- Industry actively working to develop and promote carbon offsetting as an immediate step pending introduction of emissions trading – British Airways and Monarch launch carbon offset schemes
- Major industry survey shows public backing for emissions trading

### Improving understanding of climate change

- Industry paper on non-$CO_2$ effects
- Monitoring and supporting the science of climate change

### Technological improvements

- Good progress towards ACARE fuel efficiency targets
- Continued research on alternative fuels
- Support for 'Single European Sky' research to improve efficiency of air traffic management

### Airline emissions and fuel efficiency data

- UK airlines have developed and agreed a common methodology for the reporting of aircraft emissions and fuel efficiency

### Airport energy use

- Airports secure funding for Airport Carbon Management Group to drive forward emissions reductions

## Emissions trading

The Stern report identified Emissions Trading Schemes (ETS) as effective mechanisms for achieving sustained reductions in global $CO_2$ emissions, across countries and industries. The inclusion of aviation in the EU ETS is an important step towards a broader international agreement to address aviation emissions and significant progress has been made towards this objective.

Active support has been given to the UK and EU policy objective to develop emissions trading for aviation and we welcome the imminent announcement of draft legislation to this effect. We look forward to providing further assistance in developing a pragmatic and deliverable policy approach in Europe (see *Significant Progress on Emissions Trading*).

### SIGNIFICANT PROGRESS ON EMISSIONS TRADING

Active support has been given to the UK and EU policy objective to develop emissions trading for aviation. Over the last year significant progress has been made towards this. A key contribution has been the effort put into securing common industry positions on aviation and emissions trading. European-wide policy agreements have given the clear signal that the aviation industry is committed to addressing its climate change impacts and engaging with policy makers to develop an appropriate design for emissions trading.

In September 2005, the European Commission announced that aviation should, in principle, be included in the EU Emissions Trading Scheme (ETS). The Commission set up a Working Group with representatives from the aviation industry and EU states which met several times during the winter of 2005/6 to discuss the detailed design options.

British Airways, easyJet and Rolls-Royce all made presentations to the Working Group, addressing the issues of airline emissions reporting, methods for distribution of emissions allowances and developments in engine technology. The Commission expects to publish its recommendations before the end of 2006. We look forward to providing further assistance in developing a pragmatic and deliverable approach to including aviation in European emissions trading.

At the international level, *Sustainable Aviation* signatories have made a significant contribution to the International Civil Aviation Organisation (ICAO) Emissions Trading Task Force that is developing guidance for the application of emissions trading internationally. We will continue to work at an international level towards a global solution to air transport emissions.

### AIRLINE IMPLEMENTS VOLUNTARY CARBON OFFSETS

*Sustainable Aviation* signatories made a commitment to "inform passenger understanding of the climate impacts of air travel, including evaluating carbon offset initiatives as a practical short-term measure".

The UK Government supports the use of voluntary offset schemes to raise awareness of climate change and, in 2005, made a commitment to offset emissions from government air travel. In September 2005, British Airways became the first scheduled airline to offer a voluntary offset scheme to its customers. The scheme's primary aim is to raise passenger understanding of the climate impacts of air travel, and is not claimed to be a substitute for international policy action.

Passengers are able to offset the $CO_2$ emissions created during their flights by making a voluntary contribution to an organisation that invests in projects that avoid, reduce or absorb $CO_2$ emissions through renewable energy, energy efficiency and forest restoration.

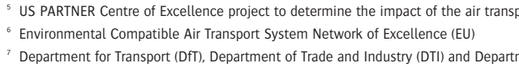
Customers can offset their emissions via the booking confirmation form or at www.ba.com/offsetyouremissions. They are directed to an online calculator, which estimates the $CO_2$ emissions for their journey and allows them to make their contribution for those emissions. For example, the contribution on return flights from London Heathrow to Johannesburg is £15.37.

After initial steps to gain experience of offsetting, this scheme will be strengthened to incorporate stakeholder feedback.

> Active support has been given to the UK and EU policy objective to develop emissions trading for aviation

There has been growing interest in the use of carbon offsetting as an immediate step to address and raise awareness of climate change, pending introduction of emissions trading. For example, in September 2005 British Airways became the first scheduled airline to offer carbon offsetting to customers (see *Airline Implements Voluntary Carbon Offsets*). The industry is developing further measures to extend the use of offsets. We anticipate that government will consult on this area shortly.

The British Air Transport Association (BATA) commissioned a YouGov survey into public attitudes towards air travel and its environmental impacts, which revealed that 56 per cent of people are concerned about the environmental impacts of air travel, but that only a minority (13 per cent) have changed their travel habits as a result of environmental concerns. When asked who, if anyone, should be responsible for the environmental cost, the majority (82 per cent) expect air travellers to pay and by far the most popular option selected (48 per cent) was through airlines being part of an international scheme which controls overall emissions (see *Sustainable Aviation* website for details).



### SIGNIFICANT CHALLENGES, RADICAL SOLUTIONS: OPPORTUNITIES FOR MEETING THE ENVIRONMENTAL GROWTH OF AVIATION (OMEGA)

The newly-established, two-year, OMEGA project aims to deliver high-impact, multi-disciplinary research in science, technology and economics through facilitating knowledge exchange between academia, industry and policy makers to assist in the development of future strategies for a sustainable UK aviation industry. The research projects will cover air quality, noise and climate change (science workstream); airframe, propulsion and air traffic management (technology workstream); and business models, national/international policy and demand (economics workstream). Sustainability of the existing partnership is envisaged well beyond the life of the project, in particular, the development of links with organisations such as PARTNER[5] and ECATS[6]. Government departments[7], and a host of leading international universities including Oxford, Cambridge, Cranfield, Manchester Metropolitan, Massachusetts Institute of Technology (MIT) and Penn State will work in conjunction with *Sustainable Aviation* signatories including BAA, British Airways, Airbus, Rolls- Royce, SBAC, AOA and NATS. Although formally commencing in January 2007, OMEGA has already established a strong partnership link between international institutions and we will be providing updates on the project's work in future progress reports.

## Improving understanding of climate change

The non-$CO_2$ atmospheric impacts of aviation may be important in addressing climate change. NOx emissions at cruising altitudes play a role in both ozone creation and methane destruction, which have warming and cooling effects respectively. Aircraft can also generate condensation trails (contrails) and aviation induced cirrus clouds. Ozone creation, contrails and cirrus clouds have a local effect, whilst methane and $CO_2$ are well-mixed gases with a global effect. These emissions also have different residence times.

A better understanding of the atmospheric science will enable the most appropriate measures to be implemented. However, scientific uncertainty is not a reason for inaction and we must continue to seek the most appropriate ways to address all of these impacts.

We support initiatives to understand and address aircraft non-$CO_2$ effects through atmospheric research, technology improvements and investigation of other appropriate mechanisms.

We are maintaining close links with the OMEGA project, a major new government funded initiative to develop a broadly based network for further scientific research into aviation and the environment (see *Significant Challenges, Radical Solutions*).

## Technological improvements

Technology will play a leading role in reducing the environmental impact of air transport. ACARE has set improvement targets for fuel burn, noise, and NOx of 50, 50 and 80 per cent respectively for new aircraft in 2020 compared with their equivalents in 2000. We are on track to meeting these objectives; for example the 8 per cent fuel efficiency gain between the Rolls-Royce Trent 895 engine and its successor the Trent 900 over the period 1998-2006. In addition, alternatives to aviation kerosene, such as biofuels, continue to be assessed (see *Alternative Fuels*).

[5] US PARTNER Centre of Excellence project to determine the impact of the air transport industry on the environment
[6] Environmental Compatible Air Transport System Network of Excellence (EU)
[7] Department for Transport (DfT), Department of Trade and Industry (DTI) and Department for Environment Food and Rural Affairs (DEFRA)

The ACARE targets are an important part of the SA strategy and SBAC has been working closely with industry peers in order to define a robust mechanism for reporting progress against these targets (see *Meeting the Technology Challenge: Towards the ACARE Targets*).

Improvements in Air Traffic Management (ATM) have the potential to increase efficiency and significantly reduce emissions. There is a range of work being undertaken in this area at a European level, including Single European Sky ATM Research programme (SESAR). Signatory companies have contributed to this process, and are committed to continuing to promote more efficient air traffic management procedures in Europe and worldwide.

## ALTERNATIVE FUELS

The potential of alternatives to kerosene as aviation fuel has received considerable attention during the past year. In 2005, an international roundtable was held in this area to exchange information and explore potential options alongside the Aviation and Environment Summit in Geneva.

The in-house fuel technology team of Rolls-Royce has examined the potential for renewable sources for aviation, in partnership with academia. A Fluids and Fuel Centre of Excellence has been established at Sheffield University, funded by Rolls-Royce and the company is supporting a DTI funded programme on bio-fuels. Airframe manufacturers including Airbus have commenced a long-term investigation into the uses of fuel cells powered by hydrogen and kerosene as an alternative to an emergency ram air turbine. At an international level, IATA is also engaged in work on alternative aviation fuels.

Despite such progress, a great deal of further work still needs to be done to assess the overall viability and applicability of alternative fuels to aviation in the long term. Work aimed at allowing the use of pure synthetic fuel is also underway. Such innovation will not be delivered overnight, although there are undoubtedly significant opportunities for improving technological performance in this area. Active monitoring of the potential of alternative fuels will continue and developments will be reported in future SA progress reports.

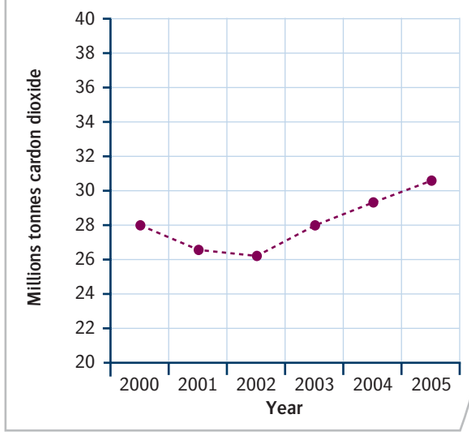
Notwithstanding the above developments, kerosene is a safe, high energy density fuel and is likely to remain the fuel of choice for the foreseeable future.

### Airline emissions and fuel efficiency data

UK airlines have developed and agreed a common methodology for the reporting of aircraft emissions and fuel efficiency (see *fuel efficiency and $CO_2$ emissions Indicators*). This development enables presentation of the key aviation climate change Indicators for the first time to passengers and other stakeholders.

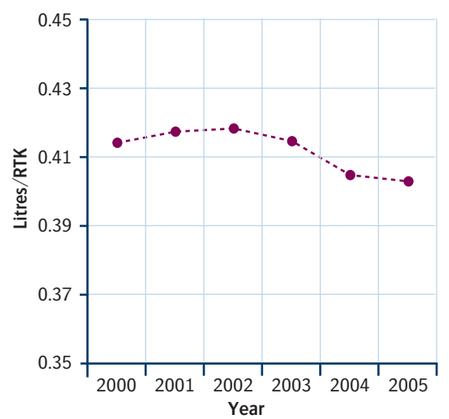
INDICATOR: Aggregate airline carbon dioxide emissions[8]

**Emissions**




INDICATOR: Aggregated airline fuel efficiency in Litres per Revenue Tonne-Kilometre[8]

**Fuel Efficiency**

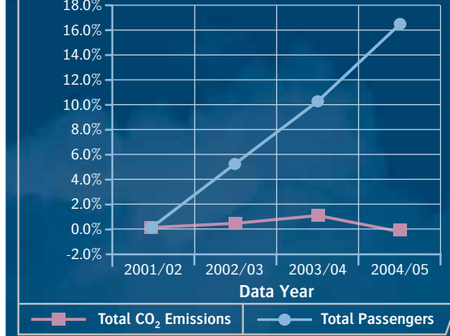



## AIRPORT CARBON MANAGEMENT GROUP

The Airport Carbon Management Group (ACMG) was established six years ago as a group of airports looking to reduce their carbon emissions, principally through reductions in energy use. The group, which represents around 95 per cent of passenger traffic at UK airports, carries out an annual performance benchmarking exercise, and meets to exchange best practice and discuss carbon reduction projects.

Benchmarking work has demonstrated that there is a link between passenger numbers and carbon emissions, and the ACMG has worked hard to contain the expected rise in energy use over the last five years. The group's activities have been successful – the graph below shows that $CO_2$ emissions resulting from energy use by member airports actually fell slightly (by 0.2 per cent) whereas passenger numbers over the same period rose by 16 per cent.

**Airport Carbon Management Group – Total $CO_2$ Trend 2001-2005**




In 2006 the AOA successfully bid for a £20,000 grant from the Carbon Trust Networks Programme to expand the scope and membership of the ACMG and achieve carbon reductions through three specific services:

- A dedicated extranet to allow more information to be displayed, and greater and more flexible access for current and prospective ACMG members. See www.acmg.org.uk
- A greater range of materials available for members to assist them in spreading best practice in carbon reduction
- A number of workshops to bring together current and prospective ACMG members, to inspire and plan future carbon reduction goals and techniques

Total carbon savings from this project are estimated at around 13,000 tonnes of $CO_2$ per year – equivalent to around two per cent of airport carbon emissions. It is hoped that the enhanced capabilities of the ACMG will enable it to deliver even greater reductions in the years ahead.

The growth in emissions in the second half of the period reflects a modest growth in the UK airlines' fleet size and also mirrors a general recovery in demand following a number of external events which disrupted the industry during the period from 2000 to 2003. This recovery has allowed many airlines to accelerate the process of fleet replacement. The five-year change represents a little less than two per cent per annum growth in emissions and about 0.5 per cent per annum improvement in fuel efficiency.

Developments in technology mean that the new aircraft types now being designed and delivered will provide a significant improvement in fuel and emissions efficiency. As an example, the UK regional airline flybe is the worldwide launch customer for the Embraer 195 and has ordered 14 of the aircraft with the first delivered in September 2006. These aircraft will use considerably less fuel than the ones they replace as well as reducing noise levels by 35 per cent. This order complements an order of Bombardier Aerospace Q400 turbo-prop aircraft which deliver comparable improvements in efficiency.

Since June 2005 other UK airlines have ordered new-technology replacement aircraft such as the Airbus A380 and Boeing 787. Each will deliver major emissions efficiency gains and lower noise levels compared with the aircraft they replace.

### Airport energy use

The AOA obtained a grant from the Carbon Trust Networks Fund to extend the range and effectiveness of the Airport Carbon Management Group (see *Airport Carbon Management Group*). Other signatory companies have continued to look at ways to reduce the ground-based carbon footprint of the aviation industry.

[8] SA Signatory airlines

# Meeting the Technology Challenge: Towards the ACARE Targets

The industry is working towards the 2020 targets set by the Advisory Council for Aerospace Research in Europe (ACARE) to reduce fuel consumption and $CO_2$ emissions by 50 per cent, to reduce NOx emissions by 80 per cent and reduce perceived external noise by 50 per cent. The ACARE targets represent a doubling of the historical rate of improvement. In this reporting period, SA signatories have made important progress in their efforts to meet these targets, highlighted below.

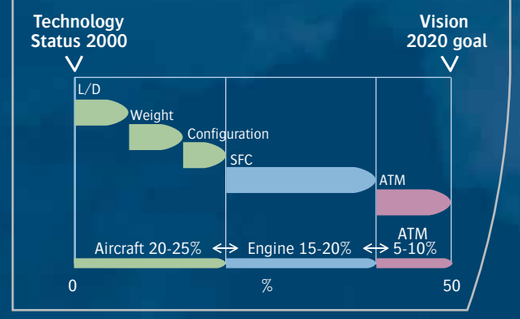
## RESEARCH CO-ORDINATION

Delivery against the ACARE targets will require a series of step changes in the sector's capability to design, manufacture and operate aircraft. One of our commitments links required improvements in fuel efficiency needed to reduce $CO_2$ emissions, and reductions in NOx emissions. The industry has broken down the 50 per cent $CO_2$ reduction target (on a passenger per kilometre basis) into the core aspects of aircraft and engine design and operations (including Air Traffic Management, ATM). Reduced fuel burn will also reduce NOx production at high altitude as well as $CO_2$, as long as advances in combustion are also progressed.

Whilst complementing involvement in European "Framework" research programmes, the UK National Aerospace Technology Strategy forms the principal mechanism by which research activity on this theme is being co-ordinated, specifically:

- Integrated Wing Technology Validation Programme
- Environmentally Friendly Engine Technology Validation Programme
- Advanced Materials & Structures and Aerodynamics Aerospace Innovation Networks.

**Contribution towards ACARE fuel consumption target**




More than £130 million has been committed to major research and technology validation programmes in the past 12 months. The main focus for these programmes is more environmentally friendly engines, more efficient wing, fuel and landing systems, as well as increased understanding of aerodynamics and advanced materials and structures. This work is being jointly funded by industry, government, regional development agencies and devolved administrations as part of the government-endorsed National Aerospace Technology Strategy. These projects signal the scale of the long-term investment required, from all stakeholders, to deliver the step change in performance required by the *Sustainable Aviation* targets.

The proposed £1.1 billion, 7 year EU Joint Technology Initiative "Clean Sky" will also deliver technology to enable achievement of the ACARE goal of 50 per cent fuel reduction by 2020 on a per passenger per kilometre basis.





The major European aerospace manufacturers have recently reached agreement to develop this initiative with the support of the EU Research Commissioner. In addition, an aerospace innovation network in environmentally friendly technology will be established in 2007.

## IMPLEMENTATION MECHANISMS

### Integrated Wing Advanced Technology Validation Programme

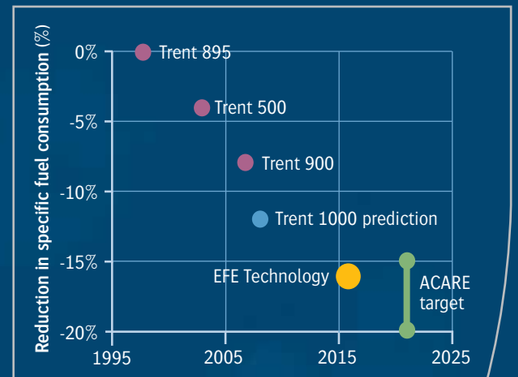
This critical project, now underway at a cost of £35 million and involving 17 partners, will address development and validation of technologies associated with wing and major system (landing gear and fuel) design, manufacture and integration. The project will provide the means to assess their performance as an integrated system, rather than as separate topics as happens today. Aircraft drag, and hence fuel burn and emissions, is affected by weight as much as by advanced aerodynamics and advances in both areas are critical components in the programme. Furthermore, new systems require new manufacturing and installation processes and only by bringing the relevant disciplines together in a programme of this nature will major steps forward in performance of the whole system be achieved. The tools generated will assess the potential of individual technologies with regard to environmental performance, indicating where investment can give the greatest benefit. Project partners will work closely with the OMEGA project on this aspect.

Phase 2 of the project, due to start in 2008, will select the most promising advanced integrated wing configuration and validate the potential of proposed technologies against the ACARE targets. The project will form the backbone of integration and validation for ongoing UK wing technology development and national involvement in EU funded activities.

### Environmentally Friendly Engine (EFE) Technology Validation Programme

Rolls-Royces' recent engine developments have already demonstrated excellent progress towards achieving the ACARE emission goals. To progress this further, a new research and technology programme (EFE) has been launched. At a cost of £95 million over five years, this programme aims to validate the technology including a 60 per cent reduction in NOx emissions in future aircraft engines. The programme will examine a range of issues, including novel high temperature materials, high efficiency turbine components, low emissions combustion (NOx, particulates, etc.), innovation in manufacturing, engine controls, actuation and nacelle aerodynamics. A significant part of the programme will focus on the application of these technologies to specific components that then need to be integrated into a gas turbine engine.

INDICATOR: Progress towards ACARE fuel efficiency target for new aircraft relative to 2000




NB: The specific fuel consumption is, the fuel burned per unit of thrust. The ACARE target for engine performance is 15-20%.

### Aerospace Innovation Networks

The industry is establishing two Aerospace Innovation Networks, focusing on advanced materials and structures and aerodynamics respectively. The Advanced Materials and Structures Aerospace Innovation Network is examining the contribution of lightweight and high performance materials to improvements in aircraft design and manufacturing. The Aerodynamics Aerospace Innovation Network is currently developing research aligned to future airframe and power-plant performance targets. Together, these innovation networks are contributing both to the industry's desire to achieve the ACARE requirements in particular and the wider need to ensure the future sustainability of the industry.

## 1.2 LOCAL ENVIRONMENTAL IMPACTS

**SUSTAINABLE AVIATION GOALS:**

Limit and, where possible, reduce the number of people affected by aircraft noise in the UK

Industry playing its full part in improving air quality and meeting air quality regulatory requirements at sensitive airport locations

Industry playing its full part in the development of an integrated transport system

Continue to manage and limit the industry's overall environmental footprint

Although political debate in the UK over the last year has focused on aviation's contribution to climate change, the industry continues to have significant impacts at a local level, which can be major concerns for people living near airports. These include noise, air quality and congestion in particular.

The industry needs to address these and other local impacts if it is to retain its 'licence to operate', and it remains committed to do so. To address these impacts, we have collaborated on a number of joint projects since the launch of the SA strategy.

### KEY SUSTAINABLE AVIATION INITIATIVES

#### Noise

- Addressing noise at source – continued progress towards ACARE targets
- Operational procedures to address noise
  - Launch of the Sustainable Aviation Noise Abatement Task Group
  - Roll-out of an outreach programme on Continuous Descent Approach
- Night flights – new regime at designated London airports
- Mitigation – continued implementation of property-related mitigation initiatives at airports
- Community engagement – tailoring communication to noise affected communities

#### Air quality

- Technological improvements – continued progress towards ACARE targets
- Industry technical contribution to the air quality research programme as part of the Project for the Sustainable Development of Heathrow (PSDH), to improve the assessment of aircraft and airport

#### Surface access

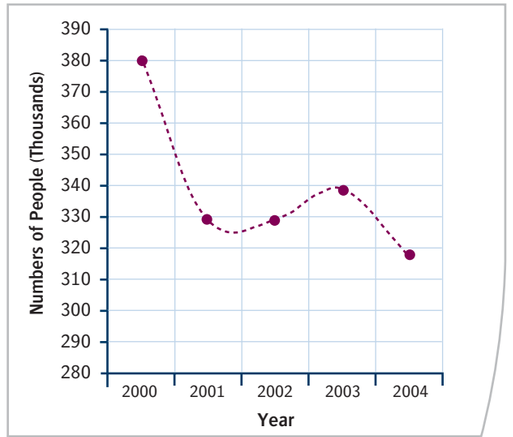
- The inaugural Surface Access Forum held by government and airport operators to promote public transport

#### Environmental management

- Major update of the Airport Environmental Guidance Manual to share best practice between airports
- Aerospace manufacturers seek to extend environmental management systems

## NOISE

INDICATOR: The number of people living within the 57dB(A) 16 hour Leq contour at individual airports




57dB(A) Leq noise contour around Heathrow, Gatwick, Stansted, Manchester, Birmingham and Luton airports. Source, DEFRA.

There have been substantial reductions in the noise generated by new aircraft and in the overall noise emissions at many airports. However, at most airports, the frequency and total number of movements is expected to increase in the future. For some people near airports or under flight-paths, aircraft noise is a significant issue affecting their quality of life.

Internationally, a 'Balanced Approach' to addressing noise impacts has been agreed. This involves the use of a cost effective balance of four key elements: reduction at source; operational improvements; land use planning; and operational restrictions. This is embedded in European legislative requirements and is now central to strategy for addressing noise issues.

The Commitments in the SA Strategy were structured around this approach and we have used this to guide initiatives undertaken over the last year.

#### Noise at source

In relation to noise at source, the ACARE goals for long-term technological progress remain central to *Sustainable Aviation*. For noise, the goal is a 50 per cent reduction in perceived external noise by 2020, for new aircraft in 2020 compared to equivalent new aircraft in 2000. The SBAC and signatory manufacturers have continued to make progress towards that Goal (see *Meeting the Technology Challenges of Sustainable Aviation: Towards the ACARE Targets*).

#### Operational improvements

The creation of a noise abatement task group has been an important step in moving forward our Commitments on addressing noise through operational improvements. Cross sectoral communication and understanding of sustainability issues is one of the key strengths of *Sustainable Aviation*. The SA noise abatement group brings together airports, airlines, NATS and manufacturers to identify and move forward noise abatement efforts around airports (see *Task Group to Lead Initiatives on Noise Abatement*).

NATS has also launched a Continuous Descent Approach (CDA) outreach programme to publicise and inform airports and airlines about the benefits of this operating technique, where operational circumstances permit its introduction. The benefits include reduced noise from aircraft on approach, and reduced fuel burn and emissions. As part of this process NATS is also playing a key advisory role in Eurocontrol's CDA Focus Group. The group has been tasked with working up harmonised guidance for the implementation of CDAs throughout Europe.

The second edition of the *Arrivals Code of Practise* was collated by a cross-sectoral group including BAA, British Airways, easyJet, MyTravel, Virgin Atlantic, Civil Aviation Authority (CAA), DfT and NATS. The code is available on the DfT's website, along with the first progress review.

### Night Flights

After a two-stage consultation in 2004 and 2005, the Government announced its conclusions for the night flights regime at the designated London airports. The regime runs from 2006-12 and, sets up strict limits on the number of night flights that are permitted, together with their noise rating. For Heathrow in particular, the number of night flights was capped at present levels in view of community concerns over noise impacts. These airports will also shortly introduce new noise insulation schemes to further protect local communities from night flight noise impacts, and within the context of the balanced approach, noise emission standards of new aircraft will continue to have an important role.

### Mitigation - local property related initiatives

The Government's ATWP of 2003 set out a range of policies to address local noise impacts around airports. A number of airports already had community-related mitigation initiatives in place when our Strategy was launched in June 2005. As part of the process of producing Masterplans, airports have continued to consult with local communities on new or revised mitigation initiatives. For example, at Heathrow Airport, a new Community Trust with charitable status was established to co-ordinate implementation of new noise mitigation initiatives for schools, hospitals, community buildings and libraries.

Final Masterplans have now been published by a number of airports. The *Sustainable Aviation* website, provides links to airport websites and their published Masterplans, which provide much more detailed information.

### Community engagement - tailoring communication to noise affected communities

The way that aircraft noise is described to local communities is vital in developing trust and understanding. Signatory airports have continued to engage with local communities to develop appropriate communication and reporting strategies.

UK airport companies have been exploring a major new initiative to make the complex issue of noise as accessible as possible to stakeholders. Flight-track replay facilities give web users the ability to look at flight tracks at airports and see how high planes are flying in relation to where they live and work, and access information on aircraft noise in their communities. Nottingham East Midlands airport launched their system, 'WebTrak', in September, becoming the first airport in Europe to enable people to access all aircraft operations within a 30 mile radius (with the exception of aircraft above 15,000 feet and some light aircraft). By visiting the airport's website (www.nottinghamema.com) the public can now interrogate the system for themselves to obtain information such as the aircraft's track, altitude, airline and aircraft type. BAA is developing a similar facility, in consultation with stakeholders, for airports such as Heathrow, and has produced tailored publications for its South East airports, explaining in accessible terms the noise issues for each location.

#### TASK GROUP TO LEAD INITIATIVES ON NOISE ABATEMENT

Sector-wide communication and understanding of sustainability issues is one of the key strengths of the Strategy. The Sustainable Aviation Industry Forum, held in March 2006, was an example of such engagement. One of the activities identified as part of that brainstorming event was the need for a SA group aimed specifically at identifying and moving forward noise abatement efforts around airports.

The first meeting of the Sustainable Aviation Noise Abatement Group was held in June, with signatories present from Newcastle, Manchester, Liverpool and Birmingham airports, BAA, MyTravel, British Airways and First Choice Airways. NATS and the AOA were also present at the meeting.

The terms of reference for the group were set to include activities such as cross-industry information sharing, maintaining awareness, attempting to influence the research agenda and providing the SA Working Group with suggestions for future strengthening of Commitments. Actions have included CDA outreach, potential future noise abatement operating procedures and Commitment strengthening, which will be reported in future updates on *Sustainable Aviation* progress.

A best practice guide for environmentally-optimum departure procedures has been investigated by the noise abatement group and the group has reviewed future operational methods to reduce noise around airports. A target list of potential future procedures – with associated technical, operational and regulatory hurdles to be overcome – has been identified. The next step now is to identify how *Sustainable Aviation* might overcome the barriers to implementation.

## AIR QUALITY

Air quality remains an issue of concern at a number of airport locations. There is concern that EU standards for the annual mean concentrations of nitrogen dioxide ($NO_2$, a component of NOx) and, possibly, particulates (PM10), will be breached at residential dwellings near some airports. The $NO_2$ burden in the vicinity of airports is comprised of contributions from aviation as well as from other sources, principally road traffic, which is responsible for a substantial proportion of the emissions. The aviation industry clearly has a role in ensuring that local air quality standards are met. For example, it is recognised that Auxiliary Power Units (APUs) that provide power during boarding and disembarkation of passengers when the main engines are not running, contribute to ground level NOx emissions near airports. This could lead to work for ICAO's Committee for Aviation Environmental Protection (CAEP) on certification for APU emissions. The provision of Fixed Electrical Ground Power (FEGP) is increasing and preconditioned air at the aircraft stands will reduce the need for APUs and lead to a further improvement in emissions.

Our Strategy committed signatories to contribute to research aimed at improvement of the assessment of air quality at and around airports. Over the last year, the major UK research to understand air quality around airports has taken place through PSDH (see box below). The relevant SA signatories – particularly Heathrow airlines and BAA – have provided technical support to the air quality elements of this project.

At a local level, Airport Masterplans developed over the past year have required airports to develop a number of strategies to minimise local emissions. The *Sustainable Aviation* website provides links to airport websites and their published Masterplans, which provide much more detailed information.

Further technological progress will also play an important role in addressing air quality. The ACARE goals for long-term technological progress include air quality, where the aim is an 80 per cent reduction in NOx by

#### PROJECT FOR THE SUSTAINABLE DEVELOPMENT OF HEATHROW (PSDH)

The Government's 2003 Aviation White Paper supported, in principle, the further development of Heathrow, by adding a short third runway and – after a second runway at Stansted – or by making better use of the existing runways, but only if strict conditions on air quality, noise and surface access could be met, specifically:

- compliance with the mandatory air quality limit values that will apply from 2010 (as set down in EU Directive 1999/30/EC), and in particular the annual mean limit of 40 µg/m3 for $NO_2$;
- no increase in the net size of the 57dBA Leq noise contour compared with summer 2002, a contour area of 127 sq km;
- a proposition which would address the pressures on already congested road and rail networks, the presumption being a need to improve public transport and to consider the scope for managing demand on the road network.

PSDH was set up in 2004 to consider whether, and how, these environmental conditions might be met. The PSDH work programme has included a number of workstreams, notably:

1) Operational and airspace issues
2) Noise assessment
3) Surface access arrangements
4) Review of air quality methodology and modelling
5) Infrastructure

For the air quality assessment work, three technical panels were set up to examine the air quality modelling approach and tools that would be used to forecast the air quality impacts of potential developments and determine whether the air quality limit could be met. The results of that work were set out in a full technical report published by the Department for Transport (DfT) in July 2006 and the recommendations have been taken into account in framing the subsequent modelling and assessment work.

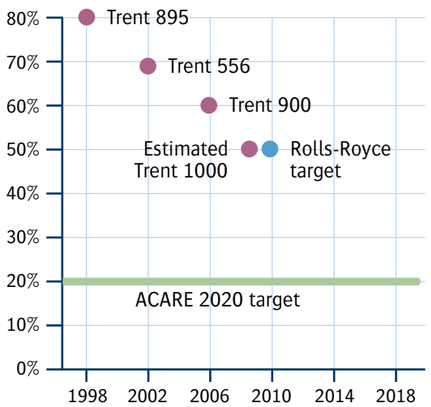
The results of continuing work examining both mixed mode and runway 3 will form the basis of future Government consultations.

BAA and British Airways have provided technical input to this DfT-led project, including input to the air quality modelling and assessment.

2020, for new aircraft in 2020 compared to equivalent new aircraft in 2000. The SBAC and signatory manufacturers have continued to make progress towards that goal (see both *Meeting the Technology Challenges of Sustainable Aviation: Towards the ACARE Targets* and the NOx reduction graph on the following page).

## NOx reduction

**NOx Emissions Relative to CAEP 2 Standard**



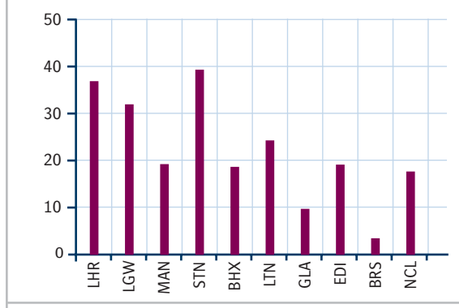

Standard established at the second meeting of ICAO's CAEP

## SURFACE ACCESS

The industry remains committed to playing its role in the development of an integrated transport system. Airport Masterplans developed over the past year have required airports to encourage more sustainable surface access to the airport. In many cases, those Masterplans build on a long-standing track record of promoting public transport alternatives.

In conjunction with the DfT, the AOA organised a National Surface Access Forum, which brought together experts from across all transport modes and regulatory and planning bodies to find ways to accelerate the delivery of more sustainable access to airports. This group intends to convene again in 2007 and will begin by looking at a more accurate definition of transport modal split, as well as ways of integrating airport transport plans into wider spatial strategies.

INDICATOR: Modal split for transport access by passengers at the top ten UK airports - % access by public transport




LHR - Heathrow, LGW - Gatwick, MAN - Manchester, STN - Stansted, BHX - Birmingham, LTN - Luton, GLA - Glasgow, EDI - Edinburgh, BRS - Bristol, NCL - Newcastle

Due to surface access strategies reflecting the unique circumstances of every airport, public transport access figures are calculated differently from airport to airport. Following the 2006 Surface Access Forum, UK airports agreed to work on a common metric, which will be reflected in the 2008 *Sustainable Aviation* report.

## ENVIRONMENTAL MANAGEMENT

Rolls-Royce is continuing to reduce the environmental footprint of its operations through substantial improvements in areas of significant impact. Improvement programmes are delivered using management systems that are certified by third parties to the international Environmental Management System (EMS) standard ISO 14001. The company has also extended EMS into the supply chain in recognition of the significant cumulative impact of the supply chain and a desire to work with the best-performing suppliers. Rolls-Royce has a publicly declared environmental policy that requires suppliers to implement an appropriate EMS comparable with the requirements of ISO 14001. The company is also currently piloting a phased approach to EMS implementation based on BS8555, with a view to making this more widely available in 2007.

Airbus has sought to extend ISO 14001 to provide a single certification across its entire European operations through its Site and Product-Oriented Environmental Management System (SPOEMS) initiative, with its site at Filton already certified, and its site at Broughton having participated in the initial pilot project. Airbus has chosen to innovate by building an EMS that integrates both its manufacturing processes and its products through a life-cycle approach. Such a technique will enable Airbus to systematically assess the environmental impact of its products for their entire life cycle and target improvements at the earliest design stage. SBAC is playing a key role in the dissemination of the programme's results.

## ENVIRONMENTAL GUIDANCE FOR AIRPORTS

To assist airports to develop strategies addressing local impacts, and in response to Commitments in the original SA Strategy, the AOA launched its revised Environmental Guidance Manual (www.aoa.org.uk), with the aim of allowing airports and their stakeholders to benchmark and improve best practice across a range of environmental areas.

**Background**

In 2000 the AOA published its first Environmental Guidance Manual (EGM) for Airports. This covered 11 operating areas, as well as developments in policy and legislation. The Manual was endorsed by the Environment Agency and established as the premier resource for airport environmental management at that time.

However, the Manual has fallen out of regular use as new legislation and techniques have emerged in the last six years. With the advent of *Sustainable Aviation*, the AOA recognised that an important opportunity had arisen for the Manual to be substantially updated and brought into line with the SA Commitments. The AOA engaged ENTEC, the consultants who produced the original Manual, to create a new, web-based document that would reflect all the latest policy and thinking, would set benchmarks for airport environmental performance and reflect the *Sustainable Aviation* Commitments. The new EGM will also be updated regularly.

**Purpose**

The AOA considers that the Environmental Guidance Manual for Airports can play a core role in setting a standard benchmark for airports in terms of source material, guidance, and targets in relation to environmental issues. The Manual also provides concise 'state of the art' advice that eases the route to legislative, regulatory and policy compliance; as well as stimulating further improvements in environmental performance at individual airports, demonstrating industry intent and leadership in terms of environmental performance and Corporate Social Responsibility and showcasing specific case studies of environmental excellence.

The technical guidance notes in the 2006 EGM reflect the important developments that have occurred in areas such as emissions trading and environmental legislation, specifically: Biodiversity; Climate Change; Community Matters; Land Quality; Cultural Heritage; Emissions to Air; Landscape Management; Noise; Supply Chain Management; Surface Access; Use of Water and Energy; Waste; and Water Management and Pollution Prevention.

It is hoped that the Environmental Guidance Manual will be endorsed by leading third-party organisations such as the Environment Agency, and will become the major environmental management resource for airports, their stakeholder groups and planning authorities.

## 1.3 GOVERNANCE AND COMMUNICATIONS

**SUSTAINABLE AVIATION GOAL:**

Full industry commitment to sustainable development, and a broader understanding of the role of aviation in a sustainable society

The successful implementation of *Sustainable Aviation* is essential if the UK aviation industry is to fulfil its sustainable development objectives. Current progress varies across the industry and further progress will depend on successful communication amongst those involved on the issues and the ways in which to address them.

KEY INITIATIVES:

### Governance structure

- Council and Working Group established

### Communication

- Regular communication to SA signatories
- Stakeholder dialogue
- Dissemination of best practice
- National and international outreach

Following our launch in June 2005, we created the Sustainable Aviation Working Group consisting of a representative from each of the trade associations and NATS, with the assistance of expert help from signatory companies. The Working Group is overseen by a *Sustainable Aviation* Council consisting of the heads of the three trade associations, plus senior representatives from NATS and two signatory companies in each sector. Members of the Working Group and the Council over this reporting period are listed in Appendix III.

The Working Group organised an industry forum to gain momentum for future action. In particular, two working groups – on Climate Change and Noise Abatement – were set up following this event

All three trade associations established internal communications structures to disseminate the strategy amongst their members. In addition the Working Group organised an industry forum bringing together representatives from across the signatory companies, to raise awareness of the Strategy and gain momentum for future action. In particular, two working groups – on Climate Change and Noise Abatement – were set up following this event. This forum brought together a number of representatives from a range of aviation companies along with senior representatives from government.

The dissemination of best practice is essential to the setting of high standards across our industry, and is an essential part of the work of trade associations and their leading members. NATS participated in consortia that submitted two successful bids with an environmental focus in the EC Sixth Framework Programme. 'Co-operative Approach to Air Traffic Services II' (CAATSII). This is a project in which NATS is running the environmental best practice work package. The second was Environmentally Responsible Air Transport (ERAT), which seeks to embed environmentally-optimised operating procedures in the European air traffic management system. SBAC began a series of 'roadshows' run by its Environment Working Group, focusing on the identification and spread of best practice throughout industry supply chains.

We have produced a number of newsletters informing signatories of the latest developments concerning the strategy, and these have been placed on the *Sustainable Aviation* website for access from stakeholders and the general public. In addition, a stakeholder event was held to allow non-signatories with an interest in the Strategy to discuss and scrutinise the development of the Strategy (see *Stakeholder Consultation 2006*).

Representatives from the Working Group and many individual SA signatory companies have taken the opportunity to showcase the Strategy to international partners and peers.

### STAKEHOLDER CONSULTATION 2006

The first event for *Sustainable Aviation* stakeholders since the publication of the Strategy was held at the DTI Conference Centre in London on Monday 10th July 2006. The day was chaired by Professor Callum Thomas of Manchester Metropolitan University and was attended by over fifty representatives from aviation and related industry, environmental organisations, airport consultative groups, government and the academic community. A number of group discussions identified stakeholder views on the strengths and weaknesses of the Strategy and how they felt it should be taken forward. The feedback was summarised and circulated after the event to all those who attended.

Three issues in the feedback are being treated as short-term priorities:-

- Reporting progress
- Developing a road-map for the Climate Change strategy
- Clarifying the *Sustainable Aviation* mission and scope

A full list of other organisations represented at the event is shown in Appendix IV.

## 1.4 ECONOMIC AND SOCIAL BENEFITS

### *SUSTAINABLE AVIATION* GOALS:

A competitive and commercially viable aviation industry making a positive contribution to the UK economy

An industry with constructive relationships with employees, local communities, customers and industry partners, meeting society's air transport needs

We operate in a highly competitive and challenging global market place and the industry's economic aim is to maintain and develop a competitive and commercially viable sector, which can continue to make a sustainable contribution to the UK economy and to local economies close to all of its major sites.

In partnership with the UK Government, airlines and airports commissioned a major study by Oxford Economic Forecasting (OEF) on air transport's contribution to the UK economy[9]. The study concludes that air transport directly contributed £11.4 billion to UK GDP in 2004, 1.1 per cent of the overall economy and directly employed 186,000 people. It also helped to support over 520,000 jobs in total, including those employed in its supply chain and in travel agents as well as those jobs dependent on the spending of its employees.

In addition, aerospace manufacturing is a UK success story and provides high value and highly skilled employment. Recent research shows that aerospace manufacturing directly employs 124,000 people and remains the largest aerospace industry outside the USA, with a turnover of £22.7 billion[10]. It has seen record levels of new orders, some £30 billion in 2005. In 2005, self-financed research and development in aerospace was worth £0.89 billion, 76 per cent of which was for the civil sector. UK aerospace manufacturing remains globally competitive and exports 67 per cent of its total sales.

In addition to aviation's direct contribution to the UK economy, it assists other sectors to operate more efficiently and to compete in the global economy, supporting productivity and economic growth across 'UK plc' as a whole.

A wide range of international connections to and from the UK support international trade and this is a key consideration in determining investment by new and existing businesses. The OEF study found that, with some 55 per cent by value of the UK's non-EU manufactured exports being transported by air, our services are particularly important for UK trade with fast-growing emerging economies, such as China and India, and for trade in high-value services. In addition, air services are important for the growth sectors on which the UK's future economic success will depend, such as high-tech companies and financial and business services. Regionally, the aviation industry is also an important factor in generating local economic growth and encouraging greater competitiveness.

Aviation supports tourism with nearly three quarters of international visitors to the UK arriving by air, generating 170,000 jobs. It also contributes to social inclusion, cultural exchange and international communication. Aviation links enable UK citizens to access a wide range of overseas destinations for leisure, business and to visit friends and family.

[9] *The Economic Contribution of the Aviation Industry in the UK*, Oxford Economic Forecasting, October 2006
[10] UK Aerospace Industry Survey 2006, SBAC



2

# Next Steps

The initiatives undertaken by *Sustainable Aviation* over the last year have confirmed that the original Strategy provides a strong foundation from which to build. This will be important as the industry responds to the continued attention being given to its environmental performance.

## CLIMATE CHANGE

### Emissions trading

Support will continue to be given to the UK Government's goal of integrating aviation into the EU ETS as soon as possible. This will include continuing our work with European industry partners to build support for carbon trading. There has been significant progress towards this Goal, with draft legislation to include aviation in European carbon trading expected by the end of 2006. We see this first step as a precursor towards a truly global scheme and we will continue to work through international organisations such as ICAO to achieve this aim.

UK aviation companies expect to introduce carbon offsets. We believe that there is a role for government to provide guidance to business and consumers and to provide reassurance on the validity of such schemes. We are working with government and other stakeholders to help promote effective schemes as an interim measure towards aviation's full integration into the carbon trading market. Offsetting also has the benefit of raising public awareness about the impacts of travel.

### Improving understanding of climate change

We will continue to closely monitor the developing science of climate change and will continue to work with the academic research community, including the OMEGA initiative, to further develop knowledge of aviation's environmental impacts.

### Technological improvements

The National Aerospace Technology Strategy and related activities are part of the industry's road-map to attain the ACARE targets and are indicative of what can be achieved in partnership between government and industry. We nonetheless recognise that an evolutionary approach to technology development is insufficient if the ACARE targets are to be met in the timeframe available and that radical improvement in the way aircraft and their key systems are designed, manufactured and integrated hold the key to future success. However, revolutionary or step changes in performance are only likely to be deliverable via substantial and co-ordinated long-term investment by all stakeholders, both public and private sector.

The Industry will continue to work with the DTI to ensure that the Aerospace Innovation and Growth Team (AeIGT) initiative is adequately funded for the future implementation of the National Aerospace Technology Strategy. Other jointly-funded collaborative research investment vehicles emerging more recently include the Environmentally Friendly Transport Innovation Platform within the DTI Technology Programme and the proposed EC Framework 7 'Clean Skies' Joint Technology Initiative.

Promoting the efficient and effective support and exploitation of these mechanisms, as well as the National Aerospace Technology Strategy and company-specific research, will be a major focus for aerospace manufacturers in the next reporting round to ensure an integrated programme of activity towards delivering the ACARE targets. We will continue our work to agree a methodology to measure progress towards the ACARE Goals and expect to be in a position to publish that in our next report.

### Airline emissions and fuel efficiency data

We will continue to monitor and report on SA signatory airlines fuel efficiency and $CO_2$ emissions.

## LOCAL ENVIRONMENTAL IMPACTS

### Noise

We will strengthen the work of our Noise Task Group over the next year. The Task Group will continue to investigate and promote low-noise flight procedures and, by the end of 2007, will publish a strategy on the implementation of future noise abatement procedures. By the end of 2008, the group is also committed to publishing a best practice guide for environmentally-optimal departure procedures, balancing both noise and local air quality requirements.

Signatories will continue to develop their approaches to communicating on noise, including considering reporting supplementary metrics to improve information provided to communities, relating to both day and night noise. Each airport will require a locally-tailored strategy that is responsive to local community needs, for example, through working with established consultative groups.

### Local Air Quality

We will continue to play our full part in improving air quality and meeting air quality regulatory requirements at sensitive airport locations.

### Surface Access

Following the inaugural Surface Access Forum in 2006, a working group will be established to progress the key issues identified as barriers to progress on surface access to airports. Specifically in discussion with stakeholders, by 2008 airports will agree a common metric for measuring total vehicle journeys to airports, with a view to establishing an industry benchmark.

## GOVERNANCE AND COMMUNICATIONS

*Sustainable Aviation* is committed to continuous improvement in its governance, stakeholder engagement, reporting, and wider communications. Specific steps over the next year will include the following:

- Clarify our mission and scope in relation to other aviation industry initiatives.
- Improve the external communication of our work. Our focus will remain the implementation of the Strategy but we will also commit to producing a stakeholder engagement strategy. We will communicate progress to a range of different audiences on a regular basis, including the Non-Governmental Organisation(s) (NGO) community.
- Further develop appropriate Indicators which reflect progress towards the Strategy's Goals and Commitments.
- Engagement with the aviation industry in Europe and internationally to promote our strategic approach. *Sustainable Aviation* represents a leadership position and it is critical to continue and broaden this engagement with international aviation industry partners, regulators and other stakeholders.

# 3

# Appendices

# APPENDIX I:

# GOALS AND COMMITMENTS INCLUDING AMENDMENTS

## IMPLEMENTATION AND COMMUNICATION

### THE GOAL

Full industry commitment to sustainable development, and a broader understanding of the role of aviation in a sustainable society

**COMMITMENT 1.**

Progressively strengthen the *Sustainable Aviation* goals, and encourage all aviation companies to endorse the Strategy and participate in its delivery

**COMMITMENT 2**

Report formally and publicly on progress towards *Sustainable Aviation* Goals and Commitments every two years, with the first review in the autumn of 2006

**AMENDED COMMITMENT. Report formally and publicly on progress towards *Sustainable Aviation* Goals and Commitments every two years**

**COMMITMENT 3**

A Sustainable Aviation Governance Framework, to facilitate progress towards achieving the Strategy's goals

**COMMITMENT 4**

UK aviation companies will develop, implement and encourage best practice among industry partners across sustainable development issues

**COMMITMENT 5**

Provide the means for communication on issues related to aviation and sustainable development, including stakeholder dialogue, through the ongoing *Sustainable Aviation* process

## CLIMATE CHANGE

### THE GOAL

Aviation incorporated into a global policy framework that achieves stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous man-made interference with the climate system

**COMMITMENT 6**

Airline and airport signatories to build support and assist policymakers in developing practical solutions for inclusion of aircraft $CO_2$ emissions in the EU Emissions Trading Scheme by 2008, or as soon as possible thereafter, as a first step towards a global approach

**COMMITMENT 7**

Take a proactive role towards securing a positive engagement from the international aviation community to support measures to address climate impacts

**COMMITMENT 8**

Provide relevant data and expertise for the scientific community to enhance understanding of the non-$CO_2$ atmospheric effects of aviation, and support improvements in metrics for quantifying and reporting effects

**COMMITMENT 9**

Propose appropriate mechanisms by 2012 for mitigating non-$CO_2$ effects based on a consensus of scientific understanding

**COMMITMENT 10**

Continual improvements in technology and air traffic management towards ACARE emissions targets

- Improve fuel efficiency by 50% per seat kilometre including up to 10% from ATM system efficiencies
- Reduce NOx emissions by 80%
- By 2020 based on new aircraft of 2020 relative to the equivalent new aircraft in 2000

**For more information on all Commitments see www.sustainableaviation.co.uk**

**COMMITMENT 11**

Develop and implement common reporting of total $CO_2$ emissions and fleet fuel efficiency by airline by end 2005

**AMENDED COMMITMENT. Develop and implement common reporting of aircraft $CO_2$ emissions and fleet fuel efficiency by airline, from 2006**

**COMMITMENT 12**

Inform passenger understanding of the climate impacts of air travel, including evaluating carbon offset initiatives as a practical short-term measure. Provide an update by the end of 2006

**AMENDED COMMITMENT. Inform passenger understanding of the climate impacts of air travel, including evaluating carbon offset initiatives as a practical short-term measure**

## NOISE

### THE GOAL

Limit and, where possible, reduce the number of people affected by aircraft noise in the UK

**COMMITMENT 13**

Continual improvements in technology and operations towards the ACARE goal of 50% reduction in perceived external noise

- By 2020 based on new aircraft of 2020 relative to equivalent new aircraft in 2000

### COMMITMENT 14

Where appropriate and not already in place, plans for property-related mitigation initiatives to be completed by 2007

### COMMITMENT 15

Develop and promote low-noise flight procedures through evaluation of future operational methods and implementation of best practice, for example:

- evaluate implementation of steeper and curved approaches for noise abatement at relevant airports
- complete a CDA outreach programme at all main UK airports by end 2006
- assess the feasibility of a best practice guide for environmentally optimum departure procedures, balancing both noise and local air quality requirements, by end 2006

**AMENDED COMMITMENT. Continue to investigate and promote low-noise flight procedures through the Sustainable Aviation Noise Abatement Task Group, for example:**

- **implement CDA procedures where possible at UK airports**
- **develop a best practice guide for environmentally optimum departure procedures, balancing both noise and local air quality requirements, by end 2008**
- **by end 2007, identify a strategy for the implementation of future noise abatement procedures**

### COMMITMENT 16

Support operating restrictions at particular airports, where these are shown to be proportionate and necessary, and less restrictive solutions are not available

### COMMITMENT 17

Continue to engage with noise-affected communities and develop local airport noise communication programmes by 2007, tailored to the needs of those communities

## LOCAL AIR QUALITY

**THE GOAL**

Industry to play its full part in improving air quality and meeting air quality regulatory requirements at sensitive airport locations

### COMMITMENT 18

Contribute to air quality measurement programmes and aid research to improve the assessment of aircraft and airport emissions to enable a better understanding, by 2007, of their actual contribution to local air quality close to airports

### COMMITMENT 19

Continual improvement in technology towards ACARE target of 80% reduction in NOx emissions

- By 2020 based on new aircraft of 2020 relative to equivalent new aircraft in 2000

### COMMITMENT 20

Deliver continued improvements in airport ground vehicles, supply of ground power services, operational practice and the availability of cleaner fuels, in order to reduce NOx emissions. Report on progress by end of 2006

**AMENDED COMMITMENT. Deliver continued improvements in airport ground vehicles, supply of ground power services, operational practice and the availability of cleaner fuels, in order to reduce NOx emissions**

### COMMITMENT 21

Quantify trade-offs between NOx, noise and $CO_2$ emissions, so that these are taken into consideration by relevant regulators when setting future requirements

## SURFACE ACCESS

**THE GOAL**

Industry playing its full part in the development of an integrated transport system

### COMMITMENT 22

Completing, by 2007, establishment of surface access strategies for each airport and those companies located at airports, within Air Transport Forums, for staff, freight and passengers

## NATURAL RESOURCES

**THE GOAL**

Continue to manage and limit the industry's overall environmental footprint

### COMMITMENT 23

Achieve continuous improvement in the efficiency of use of energy and water use, and the management of waste, chemicals, water quality and environmentally sensitive materials

### COMMITMENT 24

Make substantial progress in further limiting the environmental impact of supply chains

### COMMITMENT 25

For new developments requiring land, avoid the loss of natural and man-made heritage wherever possible

**COMMITMENT 26**

Review periodically the potential and practicalities of alternative fuels to aviation kerosene

## ECONOMICS

### THE GOAL

A competitive and commercially viable aviation industry making a positive contribution to the UK economy

**COMMITMENT 27**

Play an active, on-going role in local economies close to all major sites, promoting regeneration and employment opportunities

**COMMITMENT 28**

Maintain and develop commercially viable air-links to support the UK economy and regional development

**COMMITMENT 29**

Promote the maintenance and development of UK civil aviation manufacturing as a world-class industry

## SOCIAL

### THE GOAL

An industry with constructive relationships with employees, local communities, customers and industry partners, meeting society's air transport needs

**COMMITMENT 30**

Make a positive contribution to the skills, knowledge and motivation of all employees and provide a safe, healthy work environment

**COMMITMENT 31**

Investigate consultative approaches leading to binding agreements as an agreed approach to the development of commercial airport infrastructure

**COMMITMENT 32**

Deliver high quality service to passengers

**COMMITMENT 33**

Continue to meet the requirements of people for access to aviation

**COMMITMENT 34**

Engage with the tourism industry to coordinate approaches to sustainable development issues and clarify areas of responsibility





## APPENDIX II

## RECOMMENDATIONS TO GOVERNMENT

In the inaugural *Sustainable Aviation* report (2005), the importance of working with government was clearly recognised. A number of specific points were raised and we look forward to these being addressed in the ATWP Progress Report.

1. Continue to work, through ICAO and other relevant international organisations, to define solutions at an international level.
2. Continue to take a leading role in ensuring the delivery of the National Aerospace Technology Strategy through the coordination of government resources identified in the Aerospace Innovation and Growth Team (AeIGT) Implementation Report and ensuring funding mechanisms are available to enable manufacturers to maintain the drive towards technological and operational targets.
3. Encourage and facilitate studies on technical and economic impacts and on trade-offs, aimed at meeting environmental targets, in association with academic studies on the environmental impacts of aviation.
4. This joint approach should also include active support for an internationally connected vehicle to link research in this area through networking and knowledge transfer.
5. Commission research and promote collaboration with the scientific community into the non-$CO_2$ effects of aviation through raising priority of this work, providing guidance on prioritisation and ensuring sufficient funding. This should include active support for a knowledge transfer network to link research in this area.
6. Agreement should be sought through the UN Framework Convention on Climate Change (UNFCCC) on an allocation methodology for international aircraft emissions that reflects the global competitiveness of the industry, the need for consistency across states and the goal of integrating aviation into the global approach to address climate change by 2012.
7. Work with the scientific community and industry to develop sufficient understanding of aviation's non-$CO_2$ climate effects to define which policy approaches, technological, regulatory, voluntary or economic, are appropriate, by 2012.
8. Encourage the UK Airspace Regulator, the CAA, to design a streamlined process for implementing airspace changes, for example, where there are potential environmental benefits, reducing current average request to approval timescales significantly. This streamlined procedure should be in place by end 2006.
9. The forthcoming revision of PPG24 (Planning Policy Guidance) is an opportunity to establish a consistent policy of more rigorous examination of planning permission for new noise sensitive buildings within specific noise impact areas such as 57 Leq and to seek to protect areas where aircraft noise impact has been recently reduced.
10. Action by government to complement initiatives from the aviation industry should be undertaken to address NOx issues on roads near airports.
11. Pursue and develop an integrated framework, covering all sources affecting air quality at, and in the vicinity, of the airport. These should then be integrated within the Action Plans of the local councils, as required by the UK Air Quality Strategy.
12. Ensure the airports receive proper recognition within its integrated transport plans including the development of surface access links.
13. Review the relationship between provision of land for airport use within Regional Spatial Strategies and Regional Transport Plans.
14. Delivery of effective land use planning to protect present and potential communities around airports, and manufacturing supply centres, through full integration of the policies and strategic goals of the Office of the Deputy Prime Minister[11] with other key government departments.

[11] Now Department for Communities and Local Government

## APPENDIX III

## SUSTAINABLE AVIATION COUNCIL AND WORKING GROUP MEMBERS

| Sustainable Aviation Working Group |
|---|
| Paul Everitt, SBAC |
| Chris Goater, AOA |
| Matt Gorman, BAA |
| Ian Jopson, NATS |
| Andy Kershaw, British Airways |
| Mike Steeden, SBAC |
| Mark Watson, SBAC |
| Roger Wiltshire, BATA |

| Sustainable Aviation Council |
|---|
| Jonathan Bailey, Manchester Airports Group |
| Colin Beesley, Rolls Royce |
| Danny Bernstein, Monarch Airlines (Chair) |
| Martin Boyce, Airbus UK |
| Sarah Brookes, Manchester Airports Group |
| Paul Everitt, SBAC |
| David Hilton, NATS |
| Sally Howes, SBAC |
| Keith Jowett, AOA |
| Andy Kershaw, British Airways |
| Helen Murley, BAA |
| Andrew Sentance, British Airways |
| David Welsh, Rolls-Royce |
| Roger Wiltshire, BATA |

## APPENDIX IV

## ORGANISATIONS REPRESENTED AT THE 2006 STAKEHOLDER EVENT

| July 2006 | |
|---|---|
| ABTA | Association of British Travel Agents |
| AEF | Aviation Environment Federation |
| AUC | Air Transport Users Council |
| BARUK | Board of Airline Representatives in the UK |
| Cambridge University | |
| CBI | Confederation of British Industry |
| Cranfield University | |
| DEFRA | |
| DfT | |
| DTI | |
| Forum for the Future | |
| FTO | Federation of Tour Operators |
| Gatwick Consultative Committee | |
| Greener by Design | |
| Green Skies Alliance | |
| MMU | Manchester Metropolitan University |
| POST | Parliamentary Office of Science and Technology |
| SASIG | Strategic Aviation Special Interest Group |
| SDC | Sustainable Development Commission |
| Shell | |
| Scottish Government | |
| TUC | Trades Union Congress |

## APPENDIX V

## GLOSSARY

| | |
|---|---|
| ACARE | Advisory Council for Aeronautics Research in Europe |
| ACMG | Airport Carbon Management Group |
| AeIGT | Aerospace Innovation and Growth Team |
| APU | Auxiliary Power Unit |
| AOA | Airport Operators Association |
| ATM | Air Traffic Management |
| ATWP | Air Transport White Paper |
| BATA | British Air Transport Association |
| CAA | Civil Aviation Authority |
| CAEP | Committee for Aviation Environmental Protection |
| CAATS | Co-operative Approach to Air Traffic Services |
| CDA | Continuous Descent Approach |
| $CO_2$ | Carbon Dioxide |
| DB(A) | Decibels (A-Weighted) |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DfT | Department for Transport |
| DTI | Department for Trade and Industry |
| EFE | Environmentally Friendly Engine |
| EGM | Environmental Guidance Manual |
| EMS | Environmental Management System |
| ERAT | Environmentally Responsible Air Transport |
| ETS | Emissions Trading Scheme(s) |
| EU | European Union |
| FEGP | Fixed Electrical Ground Power |
| ICAO | International Civil Aviation Organisation |
| IPCC | Intergovernmental Panel on Climate Change |
| NGO | Non-Governmental Organisation |
| NOx | Nitrogen Oxides |
| OEF | Oxford Economic Forecasting |
| OMEGA | Opportunities for Meeting Environment Growth of Aviation |
| PM10 | Particulates |
| PPG | Planning Policy Guidance |
| PSDH | Project for the Sustainable Development of Heathrow |
| SA | Sustainable Aviation |
| SBAC | Society of British Aerospace Manufacturers |
| SESAR | Single European Sky ATM Research |
| SPOEMS | Site and Product-Oriented Environmental Management System |
| UNFCCC | United Nations Framework Convention on Climate Change |

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