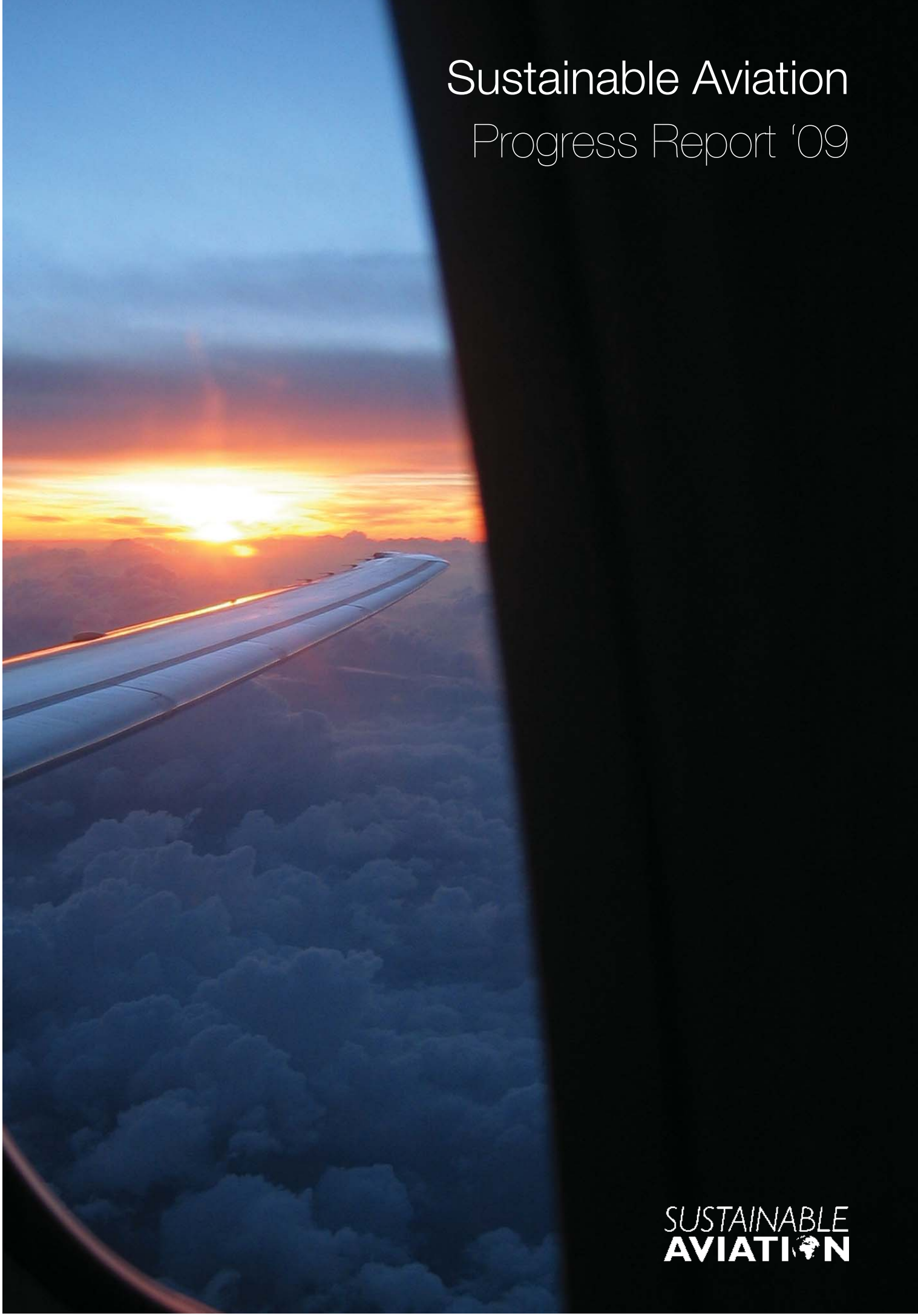


Sustainable Aviation
Progress Report '09

SUSTAINABLE AVIATION

1. Foreword

A perspective from the Stakeholder Panel

We welcome the opportunity to engage with the Council and members of Sustainable Aviation, and hope that we can add benefit to the initiative by highlighting the needs of stakeholders, our priorities and challenges. As the Panel has been set up only recently, we note the positive developments outlined in this progress report, and the ongoing efforts of signatories to meet the commitments in a timely way. While the focus will remain on building upon these efforts, we also look forward to discussing how the full potential of a cross-sectoral strategy can be realised by maximising co-operation between sectors and companies. Few environmental issues can be resolved in isolation, and Sustainable Aviation is ideally placed to promote interaction and joint initiatives between signatories, removing any obstacles to implementation and making further progress towards the strategy's objectives.

Stakeholder Panel members at the time of preparation of this report were:

Tim Johnson, Aviation Environment Federation; Professor Piers Forster, Leeds University; Roger Gardner, Omega[1]; Martin Capstick and Peter Griffiths, Department for Transport.

[1] Omega is an independent, publicly funded, body that works closely with those at the frontline of the aviation community – ranging from industry, to government through to non-governmental organisations – to explore solutions that are practical and deliverable. For more see the box under Commitment 8.

Contents

2. Executive Summary

Sustainable Aviation (SA) is a coalition of UK airlines, airports, aerospace manufacturers and air navigation service providers that are working together to address the future sustainability of the aviation industry.

Established in 2005, SA's objective is to deliver eight goals and 34 commitments, covering the environmental, economic and social impacts of aviation. This is SA's second report reviewing progress against each of these goals and commitments.

The period covered by this report (2007 and 2008) has seen a number of key developments in the area of aviation and the environment, not least of which is tackling the industry's growing contribution to climate change.

CO_2 Roadmap

The most significant development since the last report has been the publication of SA's roadmap for UK aviation, projecting that CO_2 emissions will rise until 2020 but then level off and fall to below 2000 levels by 2050. This projection is based on the Government's forecast of a threefold growth in passenger numbers over the same period. The roadmap is based on efficiencies expected from new airframe and engine technology, improved air traffic management and operations and the development of sustainable fuels. Importantly the roadmap does not take into account the wider CO_2 reductions in other sectors that will be achieved through airlines' participation in Emissions Trading. The Sustainable Aviation roadmap relies critically on the current and forward investments by both industry and government, on the success of the various technology programmes and their incorporation into aircraft fleets.

Emissions Trading

Since SA last reported in 2006 the EU institutions have approved the Directive through which aviation will be included in the EU Emissions Trading Scheme from 2012. The industry has lobbied for aviation's inclusion in the scheme for a number of years as we believe that a pragmatic approach to carbon cap and trade can offer the most environmentally effective and economically efficient mechanism for all sectors, including aviation, to meet the challenge of climate change. In addition, several SA signatories have called for a global sectoral approach to carbon emissions from international aviation in a new global climate agreement to be negotiated at the UN climate summit in Copenhagen in December 2009. Measures to tackle emissions from the international aviation sector, which contributes about 2 per cent of global man-made CO_2 (2006), were excluded from the Kyoto Protocol and these emissions are not currently capped under international law.

Other climate change work

- Air traffic management

NATS has become the first air navigation services provider in the world to benchmark its environmental performance and set targets to reduce air traffic management-related CO_2.

- Non-CO_2 emissions

Good progress has been made towards ACARE (Advisory Council for Aeronautics Research in Europe) 2020 targets for an eighty per cent reduction in NOx emissions, although a full understanding of non-CO_2 impacts is still some years away and our conclusion is that they should be considered separately from the impact of CO_2.

- Sustainable biofuels

There has been substantial progress in the assessment and trial of alternatives to oil-based kerosene fuels. Work by SA member manufacturers and airlines has demonstrated the potential of sustainable, lower life-cycle carbon biofuels, which are likely to be available in the medium to long term future. Strict criteria for alternative fuels are being developed to avoid adverse impact on food-production, water-scarcity and competition for land.

- Fuel efficiency

SA member airlines are setting fuel efficiency targets. While aggregate fuel efficiency has been reasonably consistent since 2000, SA believes that future investment in new aircraft and operational practices will deliver fuel efficiency improvements.

- Carbon Offsetting

Passengers have become increasingly environmentally aware and SA member airlines have responded by establishing carbon offset schemes. In 2007, 84% of SA airline passengers had the opportunity to offset their carbon emissions via their airline's website.

Whilst addressing climate change is and will remain a SA priority, we recognise that sustainability is also about wider environmental issues, as well as economic and social impacts.

Noise

Noise is one of the most sensitive issues for airports and airlines, and the industry is working together where possible to minimise the impacts of noise on communities living close to airports or under flight paths. SA members have contributed to better performance through improved technology and operational practices. Good progress has been made towards the ACARE noise goals. The A380, which achieves the lowest noise levels in the very large aircraft category, is much quieter than the aircraft it is replacing, enabling further reductions in perceived noise levels.

The use of Continuous Descent Approaches (CDA), rather than a stepped approach to landing, now consistently averages 80% of landings at Heathrow, Gatwick and Stansted airports and is a major contributor to reducing noise as well as fuel burn and emissions.

Air Quality & Surface Access

Work by SA members at Heathrow and Manchester airports has helped to build our understanding of the local air quality emissions and their sources around airports. We are building on that work, continuing to develop tools to allow detailed measurement and reporting of air quality. As indicated above, progress has been made against the ACARE goal of an 80% reduction in NOx emissions by 2020. Cleaner vehicles and ground power programmes are in place at a number of airports to reduce NOx and particulate emissions. Surface access strategies are in place which work towards improving local air quality, and encourage passengers and staff to use public transport where possible.

Economic and Social Benefits

Aviation continues to play a vital role in the UK economy, supporting 200,000 direct jobs and 500,000 indirectly. The industry contributes £11.4 billion to the UK's GDP. SA members actively support a variety of community investment and local regeneration projects, both within the UK and internationally, in consultation with their stakeholders. SA members are committed to ensuring that the industry continues to make a positive contribution to the UK economy ranging from local regeneration projects to supporting airlinks and regional development.

Reporting Our Progress

Member companies have made significant progress since 2006 against SA's goals and commitments; and they continue to support and resource considerable effort to achieve further progress. An overview of progress can be found in the graphic below.

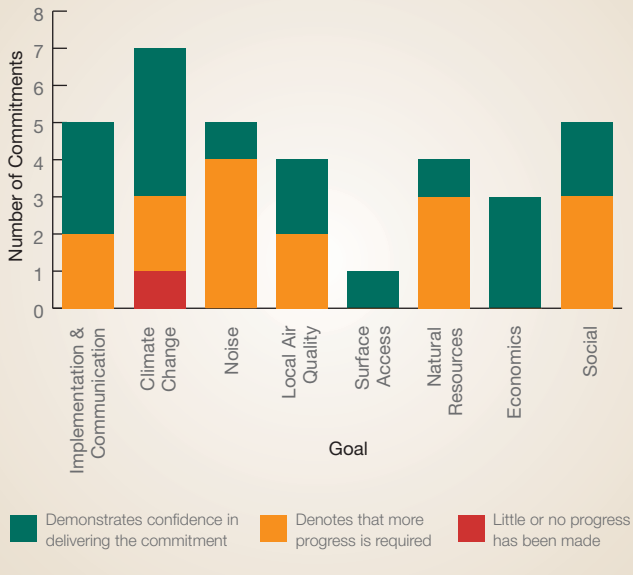
The Way Ahead

Since SA's last report in 2006 a panel of independent external stakeholders has been established and meets regularly with the SA Council. The panel challenges SA to ensure that stakeholders' views and priorities are taken into account by SA members. Our stakeholder panel includes representation from the Aviation Environment Federation, University of Leeds, the Department for Transport and OMEGA (a publicly funded partnership that offers impartial, innovative and topical insights into the environmental effects of the air transport industry and sustainability solutions).

SA has already identified 13 areas of priority for the next reporting period 2009-10. The Stakeholder Panel will help refine this list to form a work programme with key requirements to be delivered. SA has also made 13 recommendations to Government on how it can support and extend sustainability issues through international co-operations, through research projects on environmental, social and economic impacts, and through more effective infrastructure planning.

SA's collaborative approach, which drives forward an ambitious environmental agenda across the whole industry, challenging one another in the process, has never been more important. We are pleased that all the SA signatory members remain committed to the work in hand.

Figure 1. Progress Towards SA Commitments



3. Introduction

Launched in 2005, the Sustainable Aviation (SA) strategy sets out a vision, for 2020 and beyond, where the UK aviation industry meets the needs of society for air travel and transport while removing or minimising any negative impacts on the local and global environment and maximising its contribution to the UK economy. The strategy established eight goals and 34 commitments that will determine the role of aviation in a sustainable society. These cover the environmental, economic and social impacts of the industry. In preparing this report we have systematically covered each of the goals and reported, in varying depth, against them all.

About Sustainable Aviation (SA)

SA is an initiative from a coalition of industry partners:

- **The Airports Operators Association (AOA)** - the trade association that represents the interests of British airports;
- **The British Air Transport Association (BATA)** - the trade association for UK registered airlines;
- **NATS** - provides air traffic control services to aircraft flying in UK airspace, and over the eastern part of the North Atlantic; and
- **The Society of British Aerospace Companies (SBAC)** - the UK's national trade association representing companies supplying civil air transport, defence, homeland security and space.

This collective approach was developed in 2004-5 by these four bodies and some of their constituent companies, with input from a range of stakeholders including representatives of Government, Academia, non-governmental organisations and the industry. The strategy was established with eight over-arching goals and 34 commitments to drive towards these goals. SA is committed to ongoing consultation with key stakeholders and publishes regular biennial progress reports. SA's work is overseen by a Council, composed of senior representatives of the industry associations and 'signatory' companies that have accepted the Goals and Commitments. A number of specific task groups report through the SA Working Group (SAWG). Terms of reference for all groups and work programmes for task groups have been established. Currently, the work is concentrated on climate and noise issues with a new group on social issues meeting in 2008.

For more see http://www.sustainableaviation.co.uk

While the strategy is designed to ensure that the UK aviation industry meets its environmental responsibilities, it also covers the economic and social aspects essential to sustainability. We are committed to reporting on a regular basis on progress towards these commitments. This is the second in a series of such reports, the first having been published in late 2006.

Another specific commitment is to stakeholder dialogue, an area of great importance as the industry takes on the challenge of minimising its part of society's impact on the global climate. We are delighted to report that, beyond broader consultation with stakeholder groups, on which we report in this document, representatives of key organisations have joined a Stakeholder Panel that will meet regularly with the SA Council. We look forward to working with this group to improve our programmes over the next few years. This is in line with the development of our governance structure to enable us to direct our efforts to work together to improve performance in areas of common relevance.

SA is the vehicle by which key decision makers in the industry come together to share best practice from a range of individual initiatives, to drive forward a combined environmental agenda and to work collaboratively to ensure that the goals and commitments are met, challenging one another in the process. We speak for over 90% of UK airlines and airports, as well as the UK's major air navigation service provider and aerospace manufacturers. This indicates the determination of our signatories to work together to address the long term sustainability issues in a way that will enable the industry to speak with a single voice and to ensure its long term future. This report does not aim to provide a comprehensive account of the sustainability programmes and performance of individual companies. Several of the companies that have signed the SA strategy produce their own reports and the reader should refer to these for more information.

Airbus A340-600

Boeing 777

Embraer 195

This report is designed to give readers an understanding of the commitments made by SA and how we are moving forwards. Progress by individual companies often involves interfaces with other SA signatories and contributes to the collective progress towards the SA Goals and meeting the Commitments. The eight goals and the commitments related to each goal are reviewed sequentially. We have increased the number of quantitative indicators to help track our performance[2] and we will continue to work on performance improvement and measurement over the period to our next report, due in 2010. We also outline our plans for work towards our next progress report in the section titled “The way ahead”.

We have assessed progress towards each of the commitments using a simple traffic light system where green demonstrates confidence in delivering the commitment; amber denotes that substantially more progress is required; and red, that no progress has been made. Immediately under each of the commitments we have briefly summarised what progress has been made; this is followed by a discussion which varies in length from commitment to commitment.

Whilst the climate change impacts of aviation receive the greatest attention from outside the industry and remain a priority for us, sustainability is also about addressing economic, social, and other environmental aspects. Our priorities as we enter our next reporting period will be drawn from the following areas:

- **Climate Change** Aviation is a small but growing contributor to climate impact. Addressing the climate impacts of the industry will remain the top priority of SA for the foreseeable future.
- **Local Environmental Impacts** (noise and local air quality).
- **Economic and social issues** Long term sustainability depends on addressing these aspects as well as the environmental impacts.

[2] We have used the most up-to-date information available and extend back beyond 2005 (the launch year of Sustainable Aviation) in some cases to demonstrate trends more clearly.

4. Progress Towards Goals and Commitments
4.1 Implementation and Communication

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

In preparing the present report, we have considered the Goals and Commitments as they currently stand. One new commitment has been added (see Climate Change). A fuller review will be undertaken in the early part of 2009 to ensure the goals and commitments are still relevant and that they take into consideration the changing regulatory and scientific background.

01 Commitment Progressively strengthen the SA goals, and encourage all aviation companies to endorse the strategy and participate in its delivery.

Amber: *While we feel our Goals are robust not all of the commitments are still relevant and we will review our Vision, Goals and Commitments in 2009.*

Since its inception, SA has brought together and encouraged collective approaches to address sustainability issues. Each sector (airlines, aerospace, airports and air traffic management) has taken action to support SA and to develop its own programme. The full list of signatories to SA is included on page 42. Sectors have led activity on commitments where they are best placed to deliver progress.

- In 2008, NATS announced its Sustainability Strategy and became the first air navigation service provider in the world to make a public commitment to reducing its impact on the environment through its three year Vision 2011 strategy and Acting Responsibly brand value. SA partners are central to the achievement of these. **(http://www.nats.co.uk/text/246/nats_and_the_environment.html).**
- The manufacturing sector has established an active sustainability group and prepared a comprehensive series of "Aviation and Environment" briefing papers, in consultation with other SA sectors. **(http://www.sbac.co.uk/pages/92567080.asp).**
- The airport sector has reinforced its internal programmes by continuing to bring airports together through the Airports Carbon Management Group to address climate-related issues. Some airports have set specific targets to become carbon neutral.
- Airline signatories have focused on preparation for the EU Emissions Trading Scheme and BATA has established an annual Emission Trading Workshop for UK airlines.

02 Commitment Report formally and publicly on progress towards SA Goals and Commitments every two years.

Green: *This is our second report, which covers the two year period from 2006-08.*

This report represents our achievements against this commitment, along with the Progress Report published in late 2006, one year after development of the SA Strategy.

03 Commitment A Sustainable Aviation governance framework, to facilitate progress towards achieving the Strategy's goals.

Green: *We have established a governance structure, and have made changes to ensure it is fit for our purpose.*

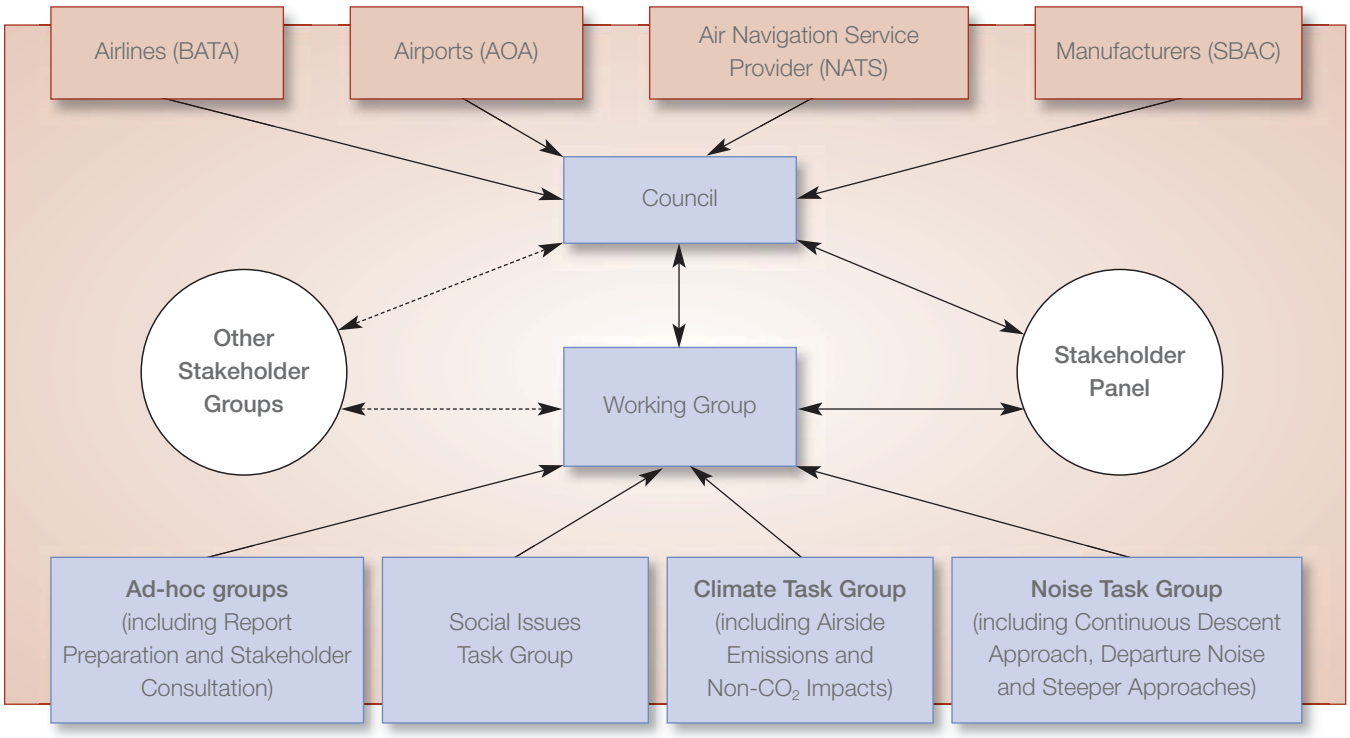
The development of an effective framework is important to drive and monitor progress systematically. The SA framework (Figure1) has been reinforced by the appointment of a part-time Programme Director in September 2007 and by the establishment of a Stakeholder Panel in September 2008. Membership of this panel currently includes:

- Aviation Environment Federation (Tim Johnson);
- Confederation of British Industry (Dr Alice Hume, until October, 2008);
- Academic Science (Professor Piers Forster);
- Department for Transport (Peter Griffith/ Martin Capstick);
- Omega[3] (Roger Gardner).

Further appointments may be made to this panel in order to broaden its scope. SA is committed to consulting the wider stakeholder community. For example, a workshop was held in September, 2008 (see Commitment 5).

[3] For more on Omega see Commitment 8 and http://www.omega.mmu.ac.uk/

Figure 1. The Sustainable Aviation organisation structure - 2008.



The terms of reference of all groups and work programmes for task groups were reviewed in 2008. The relationships between companies, industry associations and SA groups are outlined in Figure 1. Three specific task groups, on climate, noise and social issues cover three of the eight SA goals. Responsibility for addressing the other goals lies with the SA Working Group. These groups play a key role in delivering the progress highlighted in this document and will undoubtedly play an important part in moving forwards towards our objectives.

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

Green: *SA signatories share best practice through a number of groups.*

Examples of best practice include the following:

- The Airport Carbon Management Group received a grant from the Carbon Trust "Networks" programme to expand its scope and membership with the purpose of containing the rise of energy use. The group's activities have been successful - carbon emissions resulting from direct energy use by member airports actually fell slightly (by 0.2 per cent) over 5 years whereas passenger numbers over the same period rose by 16 per cent. The total carbon savings achieved were around 13,000 tonnes of CO_2 per year – equivalent to around 2 per cent of airport carbon emissions. The work of the Airport Operators Association (AOA) and its member airports received an award from the Carbon Trust, recognising this achievement.
- The Society of British Aerospace Companies (SBAC)'s Environmental Working Group has been proactive in supporting the dissemination of best practice relating to SA issues and in 2008 a new group was set up to share best practice on Corporate Responsibility issues within the aerospace sector.
- NATS leads the environmental theme in the EC Framework 6 funded Co-Operative Approach to Air Traffic Services II (CAATS II) project. The objective is to produce a template for best practice in environmental assessments relating to air traffic management (ATM). The best practice guide produced will form the initial guidance material governing environmental assessments within the Single European Sky ATM Research (SESAR, see http://www.sesarju.eu) programme. SESAR involves all aviation players in defining and implementing a new European air traffic management system. Only large collaborative projects of this kind can lead to substantial improvements in ATM performance.

4.1 Implementation and Communication

05 Commitment Provide the means for communication on issues related to aviation and sustainable development, including stakeholder dialogue, through the ongoing SA process.

Amber: *SA communicates through reports, newsletters, and stakeholder events, but we have not yet implemented a comprehensive communication plan.*

SA communication initiatives include progress reports, regular newsletters, comprehensive website updates, position papers on topics of special interest, and stakeholder events. Additionally, SA Working Group and Council members have described the work of SA at a number of UK and international events.

Each of the trade associations involved in SA continues to actively promote the strategy, with their own internal groups dedicated to environmental and other sustainability issues. Within SBAC, the Environmental Working Group continues to deliver on its commitment to encourage the uptake of environmental management systems throughout the aerospace supply chain and has worked extensively to examine the impacts of new regulation such as the EU REACH chemicals regulation. The trade associations have also increased their level of support to SA, with dedicated sessions on the issue at the AOA, BATA and SBAC conferences and events.

In 2008, we redesigned the look and feel of our website (http://www.sustainableaviation.co.uk) and uploaded detailed information about our work and signatories. We have also continued to produce newsletters, placed on the SA website, informing our stakeholders and others of the latest developments related to our strategy.

Stakeholder Consultation, 2008. Our second event, since the publication of the Strategy, for SA stakeholders (including our Stakeholder Panel) was held in London on 18 September 2008. Chaired by Roger Gardner of Omega, the event was attended by key representatives from government departments, academia and non-governmental organisations (such as WWF). The meeting was used to highlight the progress being made in key areas of SA, including airframe and engine technology and development, alternative fuels, operational improvements and air traffic management. Presentations were made by a number of members of the SA Council, including Airbus, Rolls-Royce, TUI, Virgin Atlantic, BATA and NATS. The event was also an opportunity for our Stakeholder Panel to critique our progress and identify areas where new work was required or clarification needed in terms of SA's work. The event was valuable in enabling SA to better understand the requirements of its stakeholder community and proved important in guiding us to prioritise key areas of focus going forward. Matters raised by the external stakeholders included requests to include consideration of work on:

- the cost abatement curve of measures to reduce climate impact;
- explanation of inefficiencies in the ATM system outside the control of the industry;
- global approaches outside ICAO's Committee for Aviation Environmental Protection (CAEP);
- the post Kyoto framework;
- the SA view of the future pattern of UK aviation emissions;
- noise and local environmental impacts;
- further stakeholder engagement;
- collaborative programmes in progress reports options for the replacement of 'single aisle' aircraft;
- a review of the extent to which commitments have been met and the validity of commitments;
- engagement with consumers.

These inputs have been considered in proposals for our way ahead – see Section 5.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- review thoroughly our goals and commitments to ensure that they remain relevant and will deliver our vision of a long-term sustainable future for the UK aviation industry;
- implement an effective communications strategy, which will inform the international aviation industry, and engage with key policy makers;
- promote further engagement from a wider range of SA signatories;
- consider wider scenarios for the sustainable future of UK aviation.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

4.2 Climate Change

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.

SA signatories have worked with UK and European policymakers to develop pragmatic approaches to the design elements for the EU Emissions Trading Scheme (EU ETS). In July 2008, the European Parliament voted to include aviation CO_2 emissions in the EU ETS for all flights in and out of the EU.

06 Commitment 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.

Green: *This has been a priority for SA members in the last two years.*

UK airlines and operators in SA support the inclusion of aviation in the EU ETS, as an interim step towards a global scheme. In the two years since our last progress report, legislation to include aviation in the EU Emissions Trading Scheme has been under development between the European Parliament and Council, through the co-decision process. A number of SA signatory airlines and airports have actively contributed to that debate, supporting the inclusion of aviation into emissions trading on a basis that is economically efficient and environmentally credible. Agreement was reached during 2008 to include aviation in the EU ETS from 2012, an important step towards a global solution. As part of the policy process, SA signatories also contributed to a DEFRA consultation document on "EU Commission's proposals to amend the EU Emissions Trading Scheme from 2013" to assist policy makers in understanding airline and airport views on the inclusion of aircraft CO_2 emissions. BATA airlines held two emissions trading workshops as preparation for the EU ETS, including input from other sectors.

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

Green: *SA signatories have raised the profile of climate issues within international aviation.*

NATS has led work towards more efficient airspace routings, and is active in Eurocontrol, the Civil Air Navigation Services Organisation (CANSO) and the International Civil Aviation Organisation (ICAO). NATS' Chief Executive champions the environment within CANSO, which has made the climate impact of aviation a top priority. An important aspect of the CANSO role is working to establish a global emissions reduction target for the air navigation service provider (ANSP) sector which will inform ICAO's GIACC organisation (Group on International Aviation and Climate Change).

In April 2008, at the third Aviation and Environment Summit in Geneva, Switzerland, SA signatories (through their trade associations or directly) signed up to an aviation industry commitment to "Action on Climate Change". This represents an international declaration on setting the industry on a more sustainable pathway, and echoes many of the SA goals.

SBAC supported SA at the 2008 Farnborough International Airshow. As well as having a dedicated SA area, SBAC also hosted a high level briefing session, bringing together global aviation leaders to discuss the major environmental and sustainability challenges. Before an audience of 200 key stakeholders, including members of the world's media, industry leaders from Airbus, Boeing, British Airways, Cathay Pacific, IATA and Rolls-Royce put forward their visions on how global aviation would reduce its overall environmental and climate change impacts. Some expressed concern that the EU ETS could lead to significant unintended consequences (e.g. carbon leakage, unfair competitive distortions, and increased costs). There was strong support for a global emissions trading scheme.

SA believes that emissions from an international industry such as aviation are best dealt with through a post-Kyoto climate change framework. Policy measures to deal with aviation's contribution to climate change should be developed at a global level to minimise competitive distortion and achieve maximum net environmental benefit. Several SA signatories have been active in lobbying for this and for using the EU ETS as a stepping stone to an eventual international framework.

4.2 Climate Change

We believe it is important to include the following new Commitment in our review of goals and commitments: SA signatories will support efforts to include emissions from aviation in a post-Kyoto international climate change framework, and the development of workable and environmentally efficient policy instruments that will enable aviation to play its role in meeting overall global greenhouse gas emission reduction targets.

08 Commitment 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.

Amber: *SA signatories have worked with the scientific community; however full understanding of the non-CO_2 impacts is still some years away.*

The main non-CO_2 impacts associated with aviation are related to oxides of nitrogen (NOx), water vapour, sulphates (SOx) and soot. When persistent condensation trails (contrails) form they also have an environmental impact and aviation may also modify cirrus cloud formation. Scientific knowledge of the non-CO_2 climate impact of aviation has improved over the last few years but considerable uncertainties remain. There is scientific consensus that the use of the single multiplier, Radiative Forcing Index (RFI), fails to take account of the very different residence timescales of emissions. Thus, while climate metrics have been developed that link the climate impact of CO_2 and non-CO_2 effects, there is no consensus on metric choice. It is known that the total warming effect of aviation is larger than for its CO_2 emissions alone.

Many of the measures being developed to reduce aircraft CO_2 emissions will also lead to reductions in other emissions such as NOx. Contrail formation could be reduced or avoided by adopting different flight patterns, in particular lower cruise altitudes. However, this could have the adverse effect of increasing CO_2 emissions.

Airlines and manufacturers have worked with various scientific projects designed to improve our understanding of the atmospheric impacts of aviation. Airbus has for some years been heavily involved in the European Union funded MOZAIC project which used several A340 aircraft to observe the composition of the atmosphere. This project has formed the basis of IAGOS(http://www.fz-juelich.de/icg/icg-2/iagos), which brings together airlines including British Airways, to work with Airbus and academic establishments, such as Cambridge and Manchester Universities, to investigate the feasibility of installing atmospheric measuring equipment on their aircraft to develop a global measurement system. British Airways is also investigating with Boeing and Airbus whether the equipment could be incorporated into new aircraft on the assembly line. The implementation stage to set up the required European Research Infrastructure, IAGOS-ERI, with the UK partners augmented by the NERC, was launched in September 2008 (see http://www.iagos.org).

Omega. The value in developing knowledge in relation to aviation sustainability is dependent upon its use and application to improve performance and unlock future solutions. The Omega partnership of universities therefore views it as essential to work increasingly closely with all parts of the air transport sector to transfer knowledge that meets defined needs. The Omega programme was developed in response to inputs from a range of stakeholders and many of its ongoing studies map onto the commitments of SA.

Responding to the priorities of SA, much attention is being given to improvement in scientific understanding of the non-CO_2 impacts of aviation. A briefing to disseminate latest knowledge was held in September 2008 and studies related to contrails and induced cirrus cloudiness are nearing completion. Omega work on the global warming agenda has a much wider engagement with SA commitments through work on emissions trading, carbon offsetting, ATM and fleet/efficiency issues. Studies are maturing and the programme of workshops, engaging SA signatories, is in full swing – see http://www.omega.mmu.ac.uk with full reporting during the first quarter of 2009.

Omega is also addressing the ongoing challenges of airport noise and air quality with a focus on interface with communities and travellers, environmental trade-offs linked to emerging technologies and improved characterisation of the problems as well as the processes and metrics used to assess them. These are essential steps to defining effective response action.

At the organisational level Omega and SA are more closely linked: making sure that thinking on knowledge needs reflects the realities of the big problems and industry action already being taken or being considered by the sector to address environmental impacts. It is about academia and the air transport sector working in partnership for a more sustainable aviation future.

SA signatories are also involved in contributing to and assessing the work of Omega. Launched in 2007, Omega (see Box) is a publicly funded partnership that brings together world-class experts from nine UK universities to develop insights into the environmental effects of the air transport industry and to identify sustainable solutions.

SA is closely monitoring the developments in scientific knowledge on the non-CO_2 climate impacts of aviation. It should be noted that research in this area takes a significant time to complete and that an appropriate milestone for updating the science is likely to be the IPCC 5th Assessment Report in 2013. For the present, we have concluded that the impacts of non-CO_2 emissions should be addressed separately from CO_2 and on an individual basis, rather than being expressed and treated as equivalent CO_2 emissions. For more details go to http://www.sustainableaviation.co.uk

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

Red: *SA signatories have proposed that separate mechanisms are used to address the non-CO_2 impacts of aviation.*

There is uncertainty surrounding the science of aviation's non-CO_2 impacts (see above). In view of this uncertainty, our conclusion is that these effects should be considered separately from the impact of CO_2, rather than being treated as equivalent CO_2 emissions. This was accepted by the European Commission when it decided to focus on aviation CO_2 emissions as the basis for including flights in the EU ETS. Sustainable Aviation signatories have engaged with the European Commission as it develops its proposed regulation on dealing with NOx emissions from aviation.

Aerospace companies continue to seek an 80% reduction in NOx emissions from new aircraft in 2020 compared with the equivalent aircraft in 2000 (see Commitments 10 and 19).

Given the uncertainties surrounding this issue, SA signatories will engage in debate with regulators as they develop NOx measures to ensure that policy instruments recognise the trade-offs (see Commitment 21).

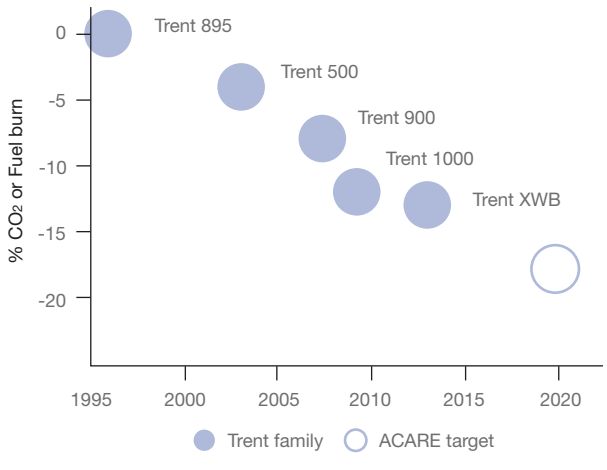
10 Commitment Continual improvements in technology and air traffic management towards ACARE[4] emissions targets.

- 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.

Green: *Good progress has been made towards the ACARE goals.*

Figure 2. Advances in engine fuel efficiency. Source: Rolls-Royce.



(Advisory Council for Aeronautics Research in Europe)

Note: the ACARE target for engine performance is 15-20% (airframe 20-25% and operations/ Air Traffic Management 5-10%). Since our 2006 report the Trent 900 has entered service on the A380, in late 2007.

[4] Advisory Council for Aeronautics Research in Europe

4.2 Climate Change

With regard to the airframe contribution to the ACARE targets, UK manufacturers remain at the forefront of delivering environmental improvements. This includes the development of improved airframe technology, enabling benefits such as reduction in weight and aerodynamic drag reduction. SA signatories are engaged in research into key technologies such as advanced composites and new metal alloys, progressively increasing their use in modern aircraft design. In addition, they are working towards the ACARE targets by integrating other technologies and working with their supply chains to ensure that the full benefits of environmental improvements can be achieved. The Airbus A380 entered into service in 2007 and is redefining the environmental performance of large civil aircraft. The UK industry has an important role in the design and manufacture of this aircraft, including production of the wings and landing gear.

The ACARE Goals Progress Evaluation (AGAPE) project commenced in 2008 and is being led by the Aerospace and Defence Industries Association of Europe (ASD), membership of which includes SBAC. AGAPE will involve participation from several UK and EU manufacturers, European research establishments and regulators. AGAPE will evaluate the overall contribution of European research programmes as well as contributions made by specific national research programmes. Areas where further work is required will be highlighted and the need to set new or revised goals beyond 2020 will also be discussed.

The A380 produces 10 per cent less NOx per seat and burns 12 per cent less fuel per seat than other large aircraft currently in operation, requiring less than 3 litres of fuel per seat per 100km in a standard cabin configuration. The A380 has an efficient structure that incorporates more new material than any other jetliner currently in service, with composite and other lightweight materials accounting for more than 25 per cent of its structure. The A380 also benefits from the latest innovations in aerodynamics, reducing drag to the minimum and improving fuel efficiency further.

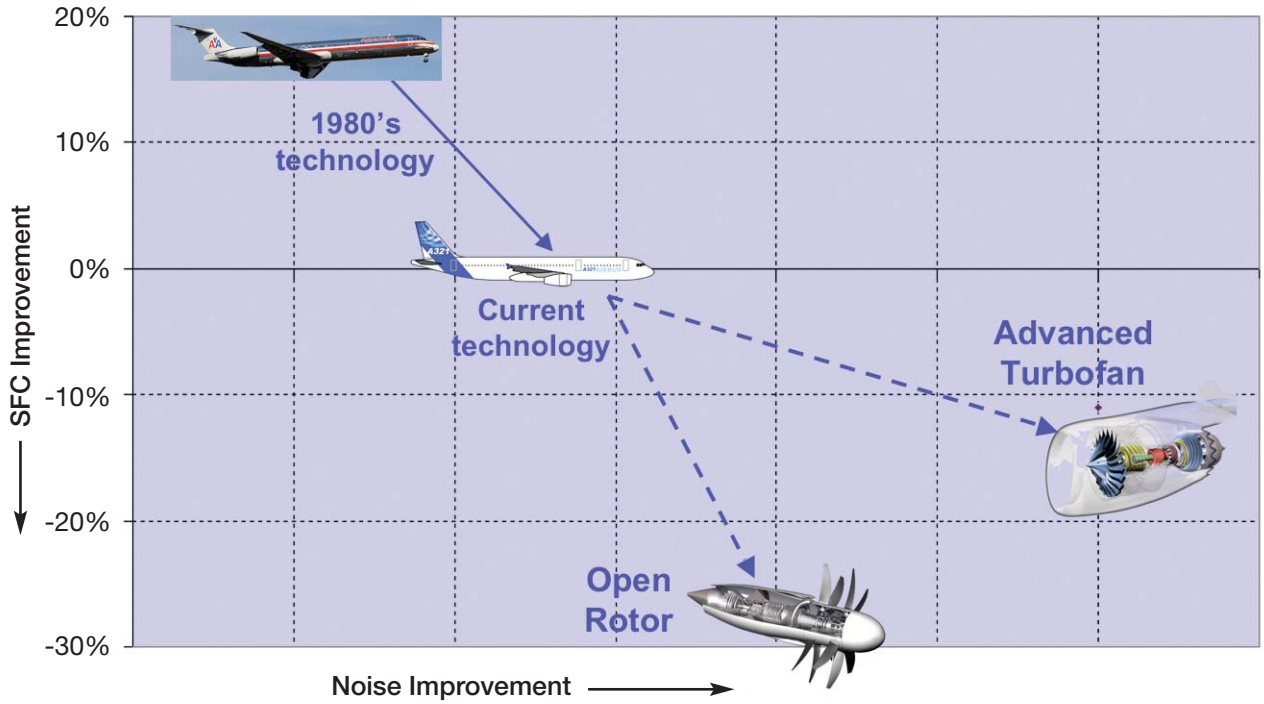
As seen in Figure 2 and in Figure 14, from the aero engine perspective, Rolls-Royce has also made significant progress towards meeting the challenging fuel saving (CO_2) and NOx reduction targets set by ACARE and endorsed by SA. This progress, coupled with a commitment to current and planned research and technology programmes (such as the Environmentally Friendly Engine programme, EFE), provides confidence that the industry is on track to meet its ACARE targets. Options being considered for future new narrow bodied aircraft carry different noise and fuel efficiency benefits (see Figure 3). Further improvements can be made by enhancements in operations and Air Traffic Management.

Aero engine research and technology programmes. EFE is a five year, £95 million UK funded programme, started in 2006, aimed at delivering significant reductions in CO_2 and NOx emissions. Rolls-Royce is leading the consortium of five UK aerospace companies and six universities. EFE will produce and run two validation platforms, a gas turbine core and a nacelle/engine vehicle that will be tested in a wind tunnel. The gas turbine core is based on the Rolls-Royce Trent 1000 engine and will explore new technologies for the “hot end” of the engine:

- A lean burn combustor is being developed and tested as part of the EFE project. It will be designed to limit combustor flame temperature and the time spent at this temperature to reduce NOx formation, whilst ensuring stable operation throughout the flight envelope.
- EFE is utilising many technologies to improve efficiency of the turbine including improved aerodynamics, shroudless turbine blades and improved tip clearance control.

The test programme, consisting of six different engine builds/tests, will allow the technology to be progressively developed, tested and validated. This approach enables advanced technologies to be incorporated into new commercial products in a short time frame with reduced risk.

Figure 3. Different characteristics of future technology options.
Source: Rolls-Royce.



Note: Specific fuel consumption, SFC, is an engineering term that is used to describe the fuel efficiency of an engine design with respect to thrust output. It allows the efficiency of different sized engines to be directly compared.

The Clean Sky Joint Technology Initiative (JTI) which was launched in Brussels in February 2008 is a major EU-wide research programme designed to integrate results of earlier research programmes into large-scale demonstrations. The €1.6 billion, seven year project will develop and validate technologies and operating practices to focus and drive EU research effort towards the ACARE 2020 targets.

Sustainable and Green Engines (SAGE) is one of the six Integrated Technology Demonstrators (ITDs) that make up the Clean Sky JTI. The €425 million validation programme will involve the design and build of five engine demonstrators, including an open rotor engine demonstrator. The open rotor engine demonstrator is envisaged to run around 2011-2012, enabling a product to enter into service in the latter half of the next decade.

Another of the ITDs is the Smart Fixed Wing Aircraft (SFWA). SFWA aims for a 10-20% reduction in fuel burn and CO_2 emissions and a 5–10dB noise reduction for medium to long range aircraft relative to 2000 levels. This will be achieved through the development of an all new, innovative "smart wing" design and the integration of the novel engine concepts from the SAGE ITD.

The "smart wing" design will develop flow control systems, load control systems and integrated flow and load control systems. Flow control technologies designed to reduce the drag of the wing in cruise will include laminar flow control, turbulent skin friction reduction and flow control for low speed and high lift. Further information: http://www.cleansky.eu

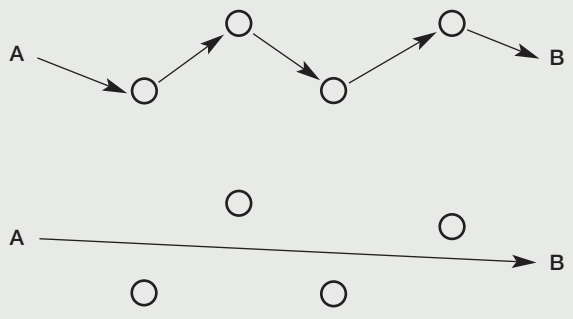
4.2 Climate Change

NATS has already reduced ATM CO_2 emissions by 70,000 tonnes in 2008 by controlling aircraft speed, offering more direct route flight planning and using closer to optimal height and route profiles. This is a small step in the right direction towards more significant savings in the long-term. NATS has also established processes which will enable the tracking of year-on-year progress towards its 2020 target, covering oceanic traffic, traffic airborne in UK domestic airspace, and aircraft manoeuvring on the ground at the 15 UK airports where NATS provides air traffic control services.

During 2008, NATS became the first ANSP globally to establish a detailed ATM CO_2 baseline. The processes used to calculate the baseline have been designed to enable NATS to track year on year performance improvements towards its 2020 target. NATS has also been evaluating optimum flight profiles to determine the opportunities for influencing airspace design, assessing fuel and emissions performance of routes between key UK city pairs and assessing a range of potential improvement measures to determine which will be the most effective in helping achieve its target. This will include assessing the opportunities for efficiency improvements in airspace design, route network, operations, and through new technology.

One technology that assists in implementing more direct routes is P-RNAV. An aircraft reliant on traditional navigation techniques will fly from A to B via a number of intermediate segments dictated by the positions of ground based navigational aids. This routing increases the flight path length, fuel burn and emissions. However, an aircraft equipped with P-RNAV will no longer need to fly near these navigational aids and can fly directly from A to B thereby avoiding this inefficiency (Figure 4).

Figure 4. Difference between traditional navigation and P-RNAV flight paths.



This not only leads to shorter path lengths and greater route flexibility but because aircraft with P-RNAV capable equipment are able to fly within one nautical mile of their designated route, routes can be more closely spaced, helping to free up the busy airspace.

In 2008 SA undertook an exercise to develop a projection for emissions of CO_2 from UK aviation, out to 2050, taking into account improvements in operational efficiency, new technology, and a partial fuel substitution from sustainable sources. SA has projected that emissions of CO_2 from UK aviation will rise until 2020 but will then level off and fall to current levels or below by 2050 (see Figure 5 and www.sustainableaviation.co.uk).

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

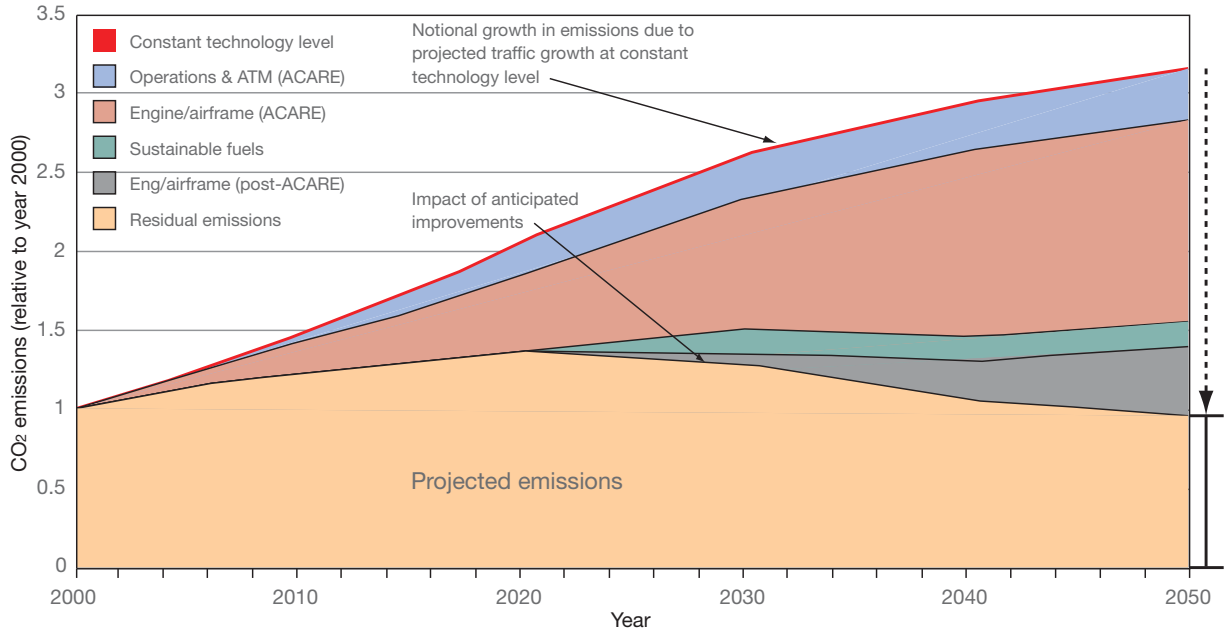
Green: *SA airlines' aggregated CO_2 emissions and fuel efficiency data has been reported in 2006 and in this report.*

This commitment was met in 2006 and SA airlines now report annually on their CO_2 emissions and fuel efficiency in litres per RTK (revenue tonne kilometre). The last SA Progress Report (2006) included graphs showing aggregate emissions and fuel efficiency from 2000 to 2005. The present report includes the same graphs for the period 2000 to 2007.

SA airlines CO_2 emissions grew by about 2% in 2007 (Figure 6) and there are indications that growth will be negative in 2008. Fuel consumption (Figure 7), measured by fuel used per RTK[5], increased by about 1.5 % in 2007. This change has arisen from a combination of factors, including changes to route networks, sector lengths, and cabin configurations.

[5] ACARE targets are expressed in terms of fuel per passenger kilometre. Tonne kilometres take into account freight carried with one tonne of freight being approximately equivalent to 10 passengers.

Figure 5. The SA view of future CO_2 emissions from UK aviation.



Note:

- The uppermost line represents a projection of emissions assuming no changes in fleet composition or technology level. This line has been derived from CAA statistics (up to 2007) and from projections in passenger numbers published by the UK DfT in November 2007.
- The light blue band indicates the reduction in emissions arising from advances in ATM and operations, which contribute towards meeting the ACARE targets by 2020.
- The salmon band shows reductions in emissions arising from engine and airframe technology developments, enabling the availability in 2020 of ACARE-compliant products which are gradually rolled-out across the fleet over the twenty-year period to 2040.
- The green band indicates the reduction in CO_2 emissions anticipated from the use of sustainable fuel-blends which offer a lower life-cycle carbon footprint than 100% kerosene.
- The grey band shows the potential reduction in emissions arising from further developments in engine and airframe technology in the post 2020 period.
- The orange band indicates the projected emissions remaining after all the above steps have been implemented.

Figure 6. SA airlines' aggregate CO_2 emissions. Source: BATA.

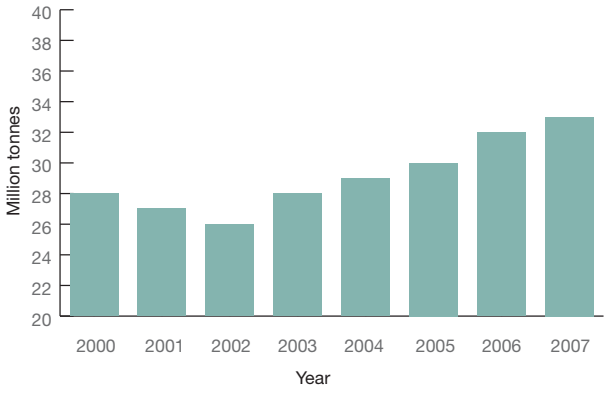
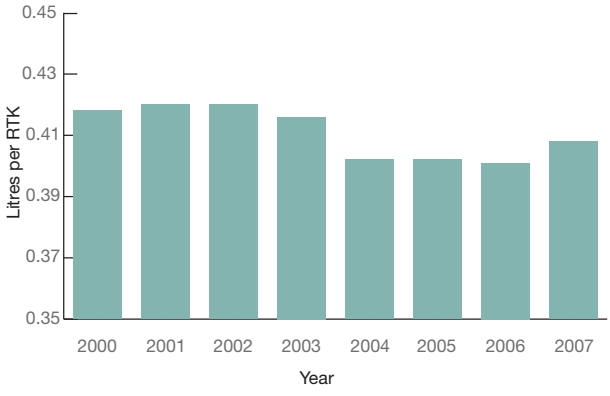
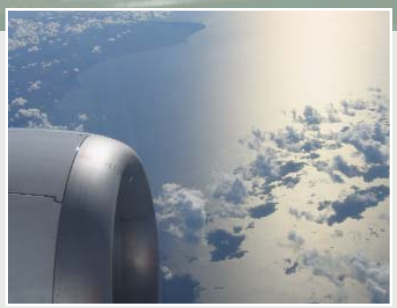


Figure 7. Aggregated airline fuel efficiency in litres per RTK (revenue tonne kilometre). Source: BATA.



4.2 Climate Change

The Rolls-Royce Trent 1000 is 12% more fuel efficient than the first generation of Trent engines



The industry recognises the need for action to minimise impact on the climate

Airbus A380 over the Clifton Bridge

Aggregate fuel efficiency for the SA airlines has been reasonably consistent since 2000. This reflects a fairly stable fleet, with the notable exception of Flybe who have replaced most of their aircraft. Further improvement is expected as SA airlines take delivery of over 80 Airbus A380 and Boeing 787 aircraft during the next few years.

Virgin Atlantic and British Airways have set stretching fuel efficiency targets. Respectively these are; a 30% improvement per revenue tonne kilometre from 2007 to 2020, and 25% improvement in fuel efficiency per passenger kilometre by 2025 (from a 2005 baseline). British Airways has also set a longer term target to reduce net emissions by 50% by 2050, through operational efficiency, technology, and market based mechanisms.

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

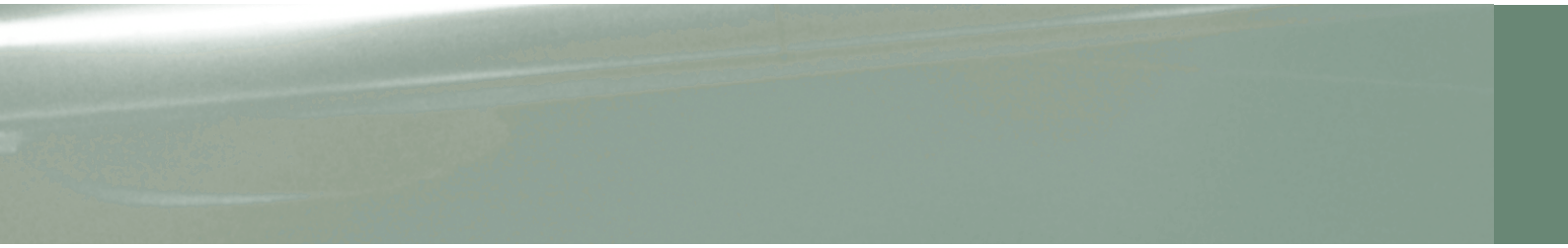
Amber: *Although SA signatories communicate with their passengers on climate change issues using a variety of media, no industry-wide studies have been undertaken to assess the depth of passenger understanding.*

Although the main focus of airlines continues to be on improving efficiency and reducing their own emissions, carbon offsetting represents a useful way of engaging with passengers about the CO_2 produced by their flight and how it fits into their overall carbon footprint. Customers are informed on climate impacts of air travel through a range of approaches.

In 2007, 84% of SA airline passengers were able to offset the emissions from their flights through carbon offset schemes provided by the airlines. This represents over 75% of all passengers carried by UK airlines. Below is a brief summary of the progress made by SA signatories since our last report:

- Virgin Atlantic launched its scheme in 2007, basing it on real fuel burn data and differentiating between economy, premium economy and Upper Class cabins. This is part of a passenger engagement programme on climate change issues through the in-flight entertainment system, magazines and website.
- British Airways channels for informing passengers on climate change include: customer focus groups, a monthly section in the in-flight magazine, an in-flight entertainment channel regularly covering the environment, and a carbon offset proposition on ba.com supported by a 'one destination' website discussing climate change.
- Every time a holiday is booked with one of TUI UK's tour operators (e.g. First Choice & Thomson) a donation can be made to the World Care Fund.
- easyJet offers offsets through UN approved projects, with credits bought direct from initiatives such as the Perlabi hydroelectric scheme in Ecuador.

SA signatories operating offset schemes have selected projects to avoid the potential pitfalls of offsetting, including: ensuring schemes are additional through providing carbon reductions beyond “business as usual”; consideration of the links to other economic and social benefits; and ensuring the permanence of the offsets achieved.



Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- introduce a new Commitment to ensure that aviation plays its full role in negotiations towards setting out a global policy framework on climate change;
- inform and evaluate passenger understanding on aviation's impact on climate change;
- evaluate the environmental aspects of options for the future single-aisle replacement aircraft.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

4.3 Noise

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

Aircraft-related noise continues to be a major focus for communities close to airports or under flight paths. SA signatories have contributed to better performance through improved technology, operational practices and noise mitigation. Many of these measures have subsequently been incorporated into the regulatory framework around airport noise. This is reflected by the delivery of three of the five SA noise commitments.

13	**Commitment**	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 the equivalent new aircraft in 2000.

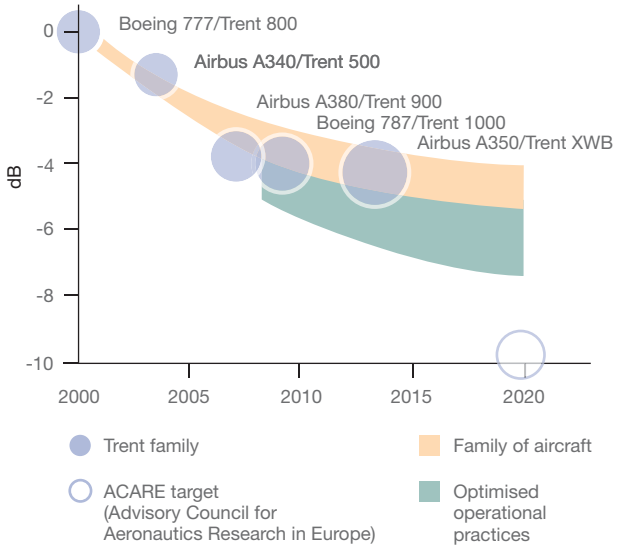
Green: *Good progress has been made towards the ACARE goals.*

Activity on reducing aircraft noise (Figure 8) continues on many fronts, from fundamental research at universities through to the application of new ideas and technologies in aircraft and engine designs and operation. Some of the progress in engine-noise reduction over the last two years is summarised in the following paragraphs.

Through involvement in the EU's SILENCE(R) programme, SA manufacturers are developing a range of noise-reducing technologies, including the following:

- The "negatively scarfed" intake is designed to reflect fan-noise away from the ground. This design was shown to reduce perceived noise by around 2.5dB for an observer at a 60-degree angle to the engine.
- Acoustic liners in the engine intake help to absorb fan noise. Traditionally these liners have been constructed from two or three pieces because of manufacturing and maintenance issues. However improved absorption of fan noise has been demonstrated through the use of a continuous (zero-splice) design, developed by Airbus. This technology is now being used in the Rolls-Royce Trent 900 engine on the Airbus A380, resulting in 4-7 dB reduction in fan tone noise on takeoff and a 2dB reduction on approach.
- Advanced fan blade shapes which have been designed using concurrent aero and noise optimisation, to give lower engine tone levels.

Figure 8. Opportunities for improvements in aircraft noise towards the ACARE target. Source: Rolls-Royce.

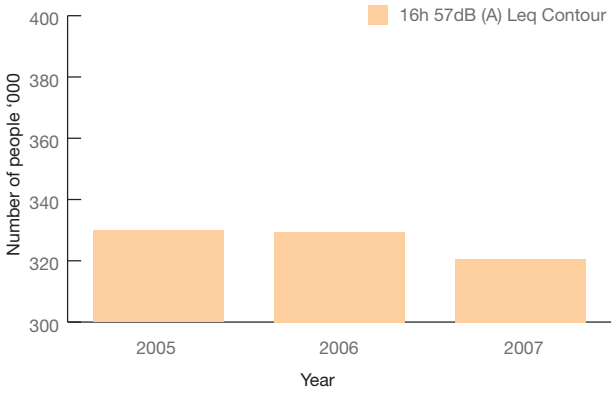


Note: This chart illustrates the role of operational and architectural issues in reducing perceived noise, complementing ongoing advances in engine and airframe noise-reduction technologies.

- The top (brown) band represents the spread of noise signatures within families of aircraft, arising from the challenges presented by growth versions which may be heavier than initial versions of the same aircraft family.
- The lower (turquoise) band represents the potential for noise reduction through such measures as steeper approaches, continuous descent approach and optimised thrust-profile management.
- Further reductions in perceived noise will required novel technologies such as flow control, and novel engine/airframe architectures such as using the airframe as a shield to reduce downward emissions of engine noise.

Not only does the A380 achieve the lowest noise levels by far in the very large aircraft category, it is also pioneering the enabling of Automated Noise Abatement Departure Procedures designed to achieve the best noise reduction over a specified flight segment/ground area. These further reduce the noise perceived from the ground (see Figure 9).

Figure 9. Number of people living within the 57dB(A) contour at six airports (2005-7). Source: AOA (DEFRA).



Note: the six airports are: Heathrow, Gatwick, Stansted, Manchester, Birmingham and Luton.

The Rolls-Royce Trent 1000 has been certificated for the Boeing 787 and incorporates acoustic design that builds on the success of the Trent 900. Rolls-Royce is continually adding technologies to improve the environmental performance of its products. The Rolls-Royce Trent XWB engine - currently in the design phase - will exploit further sophisticated acoustic design tools which will help to identify further noise-reducing features.

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

Amber: *Airport operators will publish Noise Action Plans in 2009 and every five years thereafter, as community-related noise-mitigation planning is now a legal requirement (see also Commitments 16 and 17).*

Several UK airports have had sound insulation grant schemes in place for a number of years. The Environmental Noise Directive (END) requires airport operators to produce Noise Action Plans: these will be designed to manage noise perceptions and impacts arising from aircraft using an airport, including noise reduction measures. The publication of Noise Action Plans for airports supports the Government's aim, as set out in The Future of Air Transport White Paper (2003), to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise. In line with these commitments, the Government has strengthened and clarified powers to control aircraft noise and emissions. In particular, airport operators have been given statutory powers to introduce noise control schemes and fine aircraft operators for any of their departures that breach noise controls. SA signatory airport operators have taken steps to prepare for the mandatory production of Noise Action Plans.

15 Commitment Continue to investigate and promote low-noise flight procedures through the SA 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.

Amber: SA is working on, but has not yet published, guidelines on operational procedures to minimise the impact of noise around airports.

Continuous Descent Approaches (CDA)

Aircraft have traditionally descended from cruise altitude to their destination airport in a series of steps. However, from a fuel burn, emissions and noise perspective, this approach is not ideal.

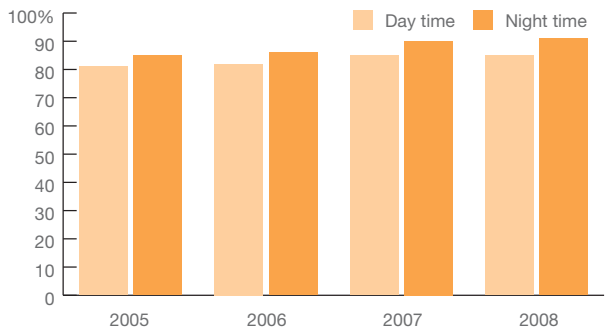
The use of CDA in the UK is well-established; operations at London Heathrow have used CDA for many years, with no impact on the airport's capacity. It is only over the past decade that we have been able to routinely measure achievement through the development and investment in tracking systems at airports. CDA performance at the three London airports (Figure 10) consistently averages 80% throughout the 24-hour period of operation.

Sometimes it is not possible to fly a CDA due to airspace constraints or overriding safety requirements. CDAs need to be agreed by air traffic controllers on a flight by flight basis, according to prevailing weather and traffic conditions. NATS and airport operators have continued to promote and assist in developing the uptake of CDAs, and have been working to improve performance at airports by training controllers in the benefits and techniques of enabling CDA and providing information to pilots to operate CDA approaches.

4.3 Noise

With a **Continuous Descent Approach**, an aircraft descends towards an airport in a gradual, continuous approach with the engine power cut back. By flying higher for longer and eliminating the need for the extra thrust required for the periods of level flight between steps of descent, CDAs result in reduced fuel burn and emissions. Deferring the start of descent also means less noise exposure for communities under the early descent phase of the flight path. The noise benefits that a CDA offers are restricted to locations typically around 10 to 25 miles from the runway. There tends to be no difference between a CDA and a conventional approach once the aircraft using the latter joins the final 3 degree glide-path. This type of procedure can result in noise reductions of up to 5 decibels. CDAs also lead to reductions in emissions as well as improved passenger comfort.

Figure 10. Percentage Compliance with CDA at Heathrow, Gatwick and Stansted airports (Day and Night). Source: NATS.



Note: Day is 0700-2300 and night 2300-0700; data for 2008 is up to and including November.

The environmental performance criteria for airspace design have been enhanced to improve CDA performance wherever possible and a review of en-route airspace will identify any areas that need to be modified to facilitate the use of CDA.

Departures Code of Practice

The SA Noise Group has agreed the framework for a departures code of practice, has produced a background document and is preparing an action plan outlining the activities required to support the drafting of the code. The group has also identified work carried out by other groups including BAA, ICAO and EUROCONTROL, which would complement the development of the code, and has initiated a survey of airlines' standard operating practices on take-off to provide a baseline for any recommendations that appear in the final document, which will be submitted to DfT and CAA for endorsement.

Future Noise Abatement Procedures

The feasibility of using steeper aircraft approaches has been investigated by SA as an option for mitigating noise impacts. In 2008, simulations were carried out to establish: the ability of aircraft to fly steeper approaches; the fuel and emissions impacts of doing so; and the aircraft configuration which will allow an assessment of noise impacts to be made. The simulation found that a 3.25 degree approach, against a standard 3.0 degree approach, was acceptable in terms of operating the aircraft. However, further assessment is necessary for verification, and to quantify potential noise benefits.

The potential incompatibility of steeper approaches with automatic landing systems could prove an obstacle as these currently preclude some aircraft from flying approaches at angles above 3 degrees. This issue is being explored to determine if technology advances would support steeper approaches in the medium to long term.

SA signatories are communicating their findings to ICAO-CAEP (ICAO's Committee on Aviation Environmental Protection).

Steeper approaches have been tested by SA in a Virgin Atlantic Flight Simulator

Noise monitoring at Birmingham International Airport

The Rolls-Royce Trent 1000 engine features advanced noise-reduction technologies

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

Amber: *This is being delivered as a requirement under the Environmental Noise Directive (END), rather than through SA (see also Commitment 14 and 17).*

Operating restrictions which need to conform to the requirements of the "balanced approach" directive (EU directive 2002/30) are one of a range of measures that can be taken to mitigate and reduce the noise impact of airport operations. The statutory Noise Action Planning process will identify those occasions where operating restrictions are the only viable option for effective mitigation. This process will also provide an opportunity for airports to review their plans again by using constructive public engagement.

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

Amber: *This is being delivered as a requirement under the Environmental Noise Directive (END), rather than through SA (see also Commitments 14 and 16).*

Under the Environmental Noise Directive (END), airports are required to work with local stakeholders in the development of a Noise Action Plan. This reinforces processes that have been in place at many airports for some time and will normally be through the local airport consultative forum. Airports will be expected to include representatives of the airline operators, local and regional authorities affected by the airport, any relevant local or national pressure groups and any other relevant local groups in the consultation process. All draft Noise Action Plans will be subject to a formal public consultation by the airport operator, who will have to take public views into account when producing their final plans. This will supplement existing mechanisms for community engagement, particularly airport consultative committees and consultation on master-planning.

SA signatories have been involved in working with key stakeholders impacted by noise. In 2007, BAA launched a new website to provide comprehensive information on aircraft noise for people living around Heathrow, Gatwick and Stansted. The site enables people to find out about aircraft noise in their community, make a complaint or enquiry and view actual flight tracks and the height of aircraft arriving and departing from these airports in relation to where they live and work. In addition, SBAC presented at the 2008 BAA Stansted Noise Seminar, highlighting the technological advances that have led to reductions in aircraft noise.

Birmingham International Airport (BIA) introduced a major new initiative in 2008 called Community Outreach aimed at providing local residents with easily accessible information and advice on airport related issues. These are drop in sessions at local community centres and libraries where airport staff provide clarification on any aspect of airport operations.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year includes:

- publish SA guidance on low noise procedures and promote as best practice at the UK and international levels.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

4.4 Local Air Quality

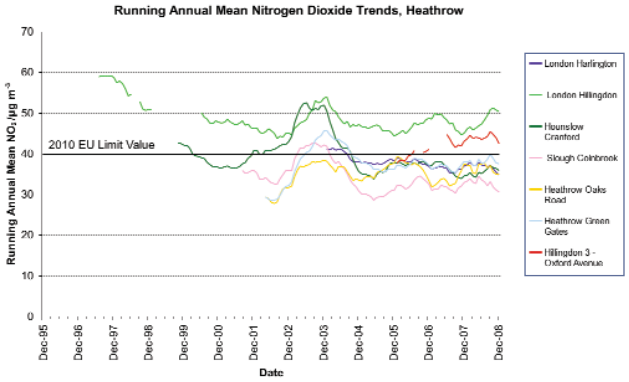
Goal: Industry to play its full part in improving air quality and meeting air quality regulatory requirements at sensitive airport locations.

Work by SA signatories at Heathrow and Manchester airports has helped to build our understanding of the local air quality emissions around airports. BAA and NATS joined the CAA, Highways Agency and the Department for Transport as part of the Project for the Sustainable Development of Heathrow (PSDH), to review, strengthen and update the assessment of air quality around Heathrow.

18	**Commitment**	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.

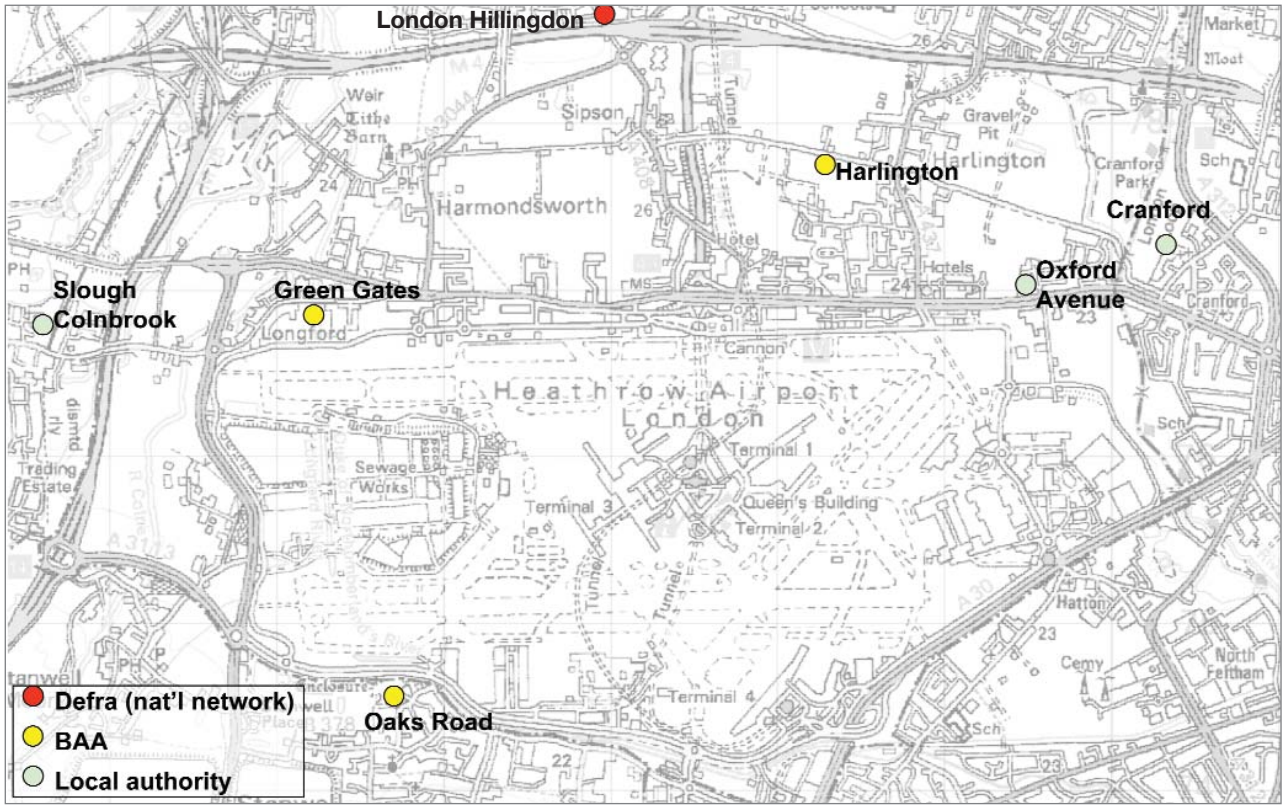
Green: *Detailed measurement and reporting of local air quality is now possible as a result of work undertaken at UK airports.*

Figure 11. Local Air Quality at locations around Heathrow Airport 1995-2008. Source: BAA.



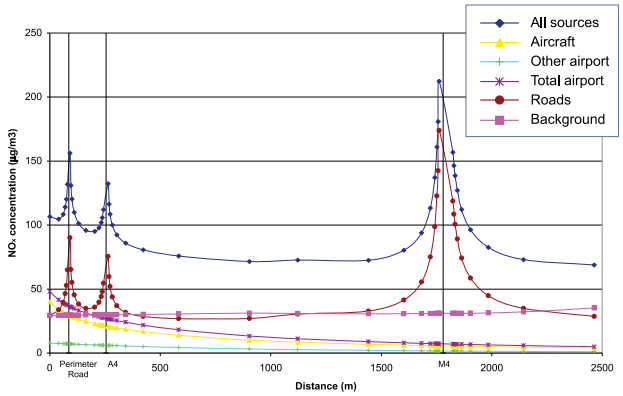
Note: Locations are shown in Figure 12. This illustrates the trends in NO_2 concentration at a number of measuring points close to Heathrow airport and also shows the EU limit value which will apply from 2010. Locations are shown in Figure 12. Some 2008 data are provisional.

Figure 12. Location of air quality monitoring sites – Heathrow area.



As part of the Project for the Sustainable Development of Heathrow, modelling was introduced to strengthen the method of measuring air quality, by using data from point monitoring sites. Figure 11 shows the NO_2 trends from December 2002 to December 2007 at residential sites around Heathrow. The sites are shown on Figure 12. Air quality levels complied with the 2010 EU limits at most locations. The London Hillingdon site, which is just north of the M4, remains above the EU acceptable range. The Hillingdon Oxford Avenue site is just above the 2010 limit, but within the acceptable range defined by the EU. The dispersion model (Figure 13) maps the distribution of total NOx concentrations, showing how air quality varies in the vicinity of the airport. The model is calibrated using data from two air quality monitoring sites. It demonstrates that the influence of airport emissions reduces quickly with distance from the airport boundary and outside the airport perimeter. Major transport routes such as the M4 have a significant impact on air quality. This work is part of a wider programme of air quality monitoring at Heathrow.

Figure 13. Distribution of modelled NOx concentrations (µg/m3) at Heathrow. Source: BAA.



Note: This represents the concentrations at different points along a straight line from an air quality monitoring site located inside the airport boundary just north of the northern runway, across the three roads mentioned. Results generated as part of the Project for the Sustainable Development of Heathrow

Manchester Airport has hosted researchers from the Centre for Air Transport and the Environment (CATE) over the last 2 years. Their work using LIDAR, an optical equivalent of RADAR, and other advanced measurement systems will improve our understanding of the contribution aircraft engine emissions make to local air quality.

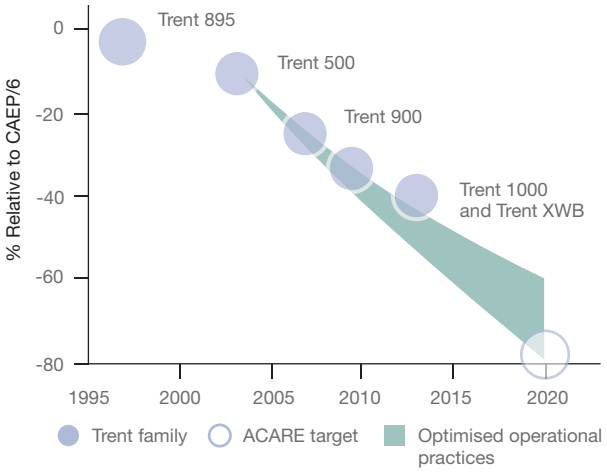
SA signatory airlines are currently evaluating the reductions in fuel and local air quality emissions and other implications resulting from taxiing with one or more engines shut down. Results from the trials which have recently taken place will be used to inform the proposed Departures Code of Practice.

19 Commitment 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.

Green: *Good progress has been made towards the ACARE goals.*

Manufacturers continue to address NOx requirements as part of their work to develop new products for airlines (Figure 14). The aim for manufacturers is to meet stringent ICAO emissions regulations relating to aircraft Landing and Take-off (LTO) cycles and the need to move further towards the ACARE 2020 targets. SA's focus, whilst there remains doubt about the impact of NOx at altitude, is on improving local air quality around airports.

Figure 14. Progress towards the ACARE NOx target. Source: Rolls-Royce.



Note: The CAEP/6 standard, set by ICAO, applies to all new engines certified from January 2008.

Recent orders for the Airbus A380 and Boeing 787 by four SA member airlines will help improve air quality as these models produce lower NOx emissions per passenger relative to the aircraft they will replace. Practical operational measures also contribute to reducing air quality impacts. Many airline signatories use reduced take-off thrust where possible. This is the most effective way of reducing NOx emissions. British Airways is also working with ICAO to help develop guidance on modelling of the aircraft impact on local air quality.

easyJet's latest CFM engines incorporate new combustion technology, improving their emissions performance such that they emit less NOx. This is a good example of the environmental performance of an existing product being improved mid-life.

4.4 Local Air Quality

Stansted airport; cycling can help reduce local emissions

Road traffic close to airports contributes to the air quality burden

Air quality sensing equipment at Heathrow airport

20 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.

Amber: *Cleaner vehicles and fixed ground power programmes are now in place at several airports to reduce NOx emissions. Further work is required to determine the priority areas for further collaboration between the sectors.*

Progress has been made in the availability and use of Fixed Electrical Ground Power (FEGP) to power air conditioning and other systems on board aircraft at stands at airports. Enhanced availability of FEGP has led to a reduction in auxiliary power unit (APU) usage, which is currently estimated to account for 22% of total ground level aircraft NOx emissions.

For example, to increase the use of FEGP, Stansted Airport has worked with key partners, including Boeing and easyJet, to understand the problems faced in using this power source. The outcomes from this partnership included the redesign of plugs to ensure they fit all aircraft types, suitable training for ground staff on the use of FEGP and sharing of best practice with other UK and European airports.

It is estimated that 8% of the total Heathrow airport-related NOx emissions are from airside vehicles. The Heathrow Clean Vehicles Programme, involving several SA signatories, is working to reduce airside vehicle emissions. The voluntary 10-step programme encourages airport companies to reduce exhaust emissions as well as the wider environmental impact of their transport operations. The scheme has 42 members which represent 50% of all airside vehicles. British Airways has been awarded the Diamond rating, the highest award possible under the scheme. The airline aims to achieve a 10% reduction in mileage by 2011 and has purchased a fleet of new buses which meet the latest Euro 5 exhaust emission standards.

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

Amber: *Until there is a better understanding of the trade-offs between NOx, noise and CO_2 SA signatories will continue to engage with UK, European and international policy makers.*

Current scientific understanding of the relationship between noise, CO_2 and NOx shows that exclusively managing for the effects of noise will typically result in a trade-off against the other impacts, with possible long-term climate implications. We believe that when policy makers are specifying noise limits at and around airports they must also take into consideration such trade-offs.

SA signatories are actively exploring options for future single aisle aircraft (see Figure 3) which take account of the balance between noise and engine emissions.

ICAO is evaluating stringency options for NOx for consideration at CAEP/8 in 2010. This will include evaluation of any associated fuel burn penalties and the impacts of any trade-off against noise.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- assess opportunities for NOx and CO_2 reductions through airside operational efficiencies.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

4.5 Surface Access

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

The Air Transport White Paper requires airports to develop master plans which include strategies to encourage more sustainable forms of surface access. Many of these master plans include investment in local public transport infrastructure and SA signatory airports have invested in improving public transport hubs. Manchester, Stansted and Birmingham International airports have been involved in the creation of public transport interchanges. This makes public transport access to airports easier for passengers as they can interconnect with different modes of transport in a single place. SA signatories have supported the London Crossrail project which will enhance public transport access to Heathrow for passengers and staff, while support has been expressed for a new and improved rail station at Gatwick.

22 Commitment 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.

Green: *Airports have established surface access strategies.*

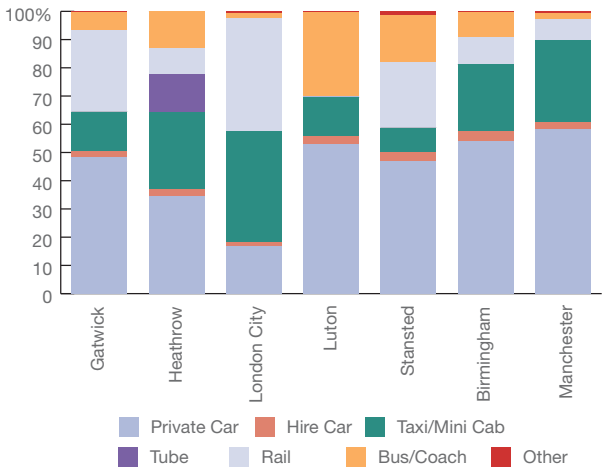
SA airlines have also played an important part in improving the sustainability of journeys to airports (Figures 15 and 16). As well as raising awareness of airport travel plans amongst their staff, SA signatory airlines provide frequent shuttle bus services between transport hubs, airport sites, and office facilities, to encourage the use of public transport by staff and visitors. Discount schemes have been negotiated with local rail and bus operators and car share schemes are operated at some locations.

Through the Air Transport Forums, SA airports have worked with local bus service providers to implement more frequent services. Birmingham International Airport supports a Metro Link to the Airport. Plans have also included the improvement of services by coach operators to link more routes to airports. At Heathrow local bus services operating on the perimeter and within the airport are free and subsidised local rail and bus travel is available to employees.

Figure 15. Passengers using public transport for access to three London airports. Source: BAA.

Note: public transport includes taxis, minicabs, underground, rail, bus and coach.

Figure 16. Surface Access by Passengers to some UK Airports 2006. Source: AOA/CAA.



Note: percentages are by mode.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- develop a position on an integrated transport policy in the UK.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

4.6 Natural Resources

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

SA has yet to reach a point where it is possible to aggregate all signatories' environmental performance data. However, most individual signatories regularly measure and report their environmental performance and are undertaking a range of initiatives at the company or sectoral level. Many individual initiatives involve co-operation with other SA signatories.

23 Commitment 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.

Amber: *Individual signatories regularly measure and report their progress on environmental performance, but SA has not yet established a common reporting framework.*

Examples of progress include the following:

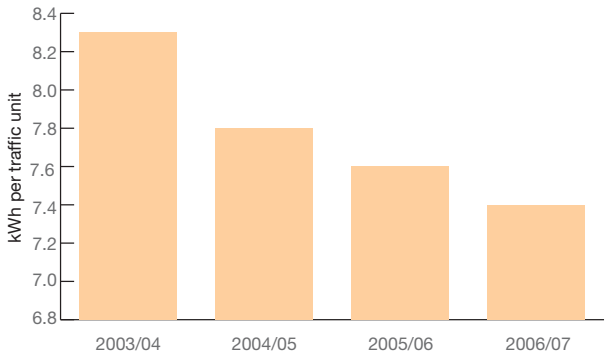
- In 2007, SBAC quantified the environmental performance of its SA manufacturing signatories including CO_2 equivalent (CO_2e) emissions, water usage and waste management. The approach used guidance developed by DEFRA and conversion factors to convert energy usage into greenhouse gas emissions (http://www.DEFRA.gov.uk/environment/business/envrp/pdf/envkpi-guidelines.pdf).

  An improvement of more than 20% over a 2 year period from 2004-6 was demonstrated for CO_2 emissions normalised per employee.

- Airports have also quantified their energy and water consumption (Figures 17 and 18).

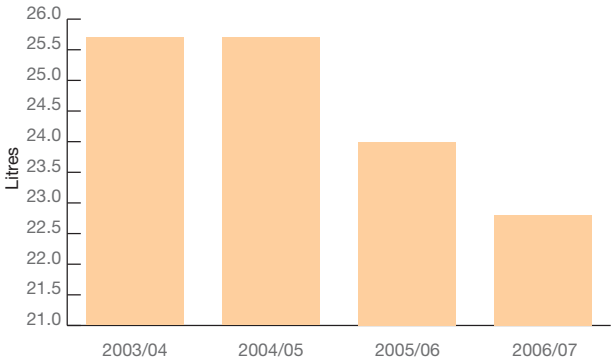
- The proposed Heathrow East terminal will be the first major development in London to use biomass gasification to generate combustible gas from wood. This will be used as a fuel to heat and power the terminal. Through improved energy efficiency and renewable generation the terminal will produce around 40% less CO_2 emissions than current building regulations require.

Figure 17. Energy use per passenger across 9 SA airports. Source: AOA.



Note: Airports represented are: Aberdeen, Birmingham, Cardiff, Gatwick, Heathrow, Manchester, Luton, Newcastle and Stansted. One Traffic Unit is defined as one passenger, or 0.1 tonnes of freight.

Figure 18. Water consumption per passenger across 9 SA airports. Source: AOA.



Note: Airports represented are: Aberdeen, Birmingham, Cardiff, Gatwick, Heathrow, Luton, Manchester, Newcastle and Stansted.

- NATS has set an objective to have a carbon neutral estate by 2011.

- BAA has also incorporated leading edge sustainability features in the proposed expansion plans at Stansted. The proposed plans will deliver infrastructure that is 50% more energy efficient than current building regulations require and which will not increase demand from the public water supply. Recycling targets have been set at 70% and no waste will be sent to landfill by 2030.

Paint spraying at Bombardier Aerospace, Belfast

Sustainable bio-fuels are becoming an increasingly viable option

Harmondsworth Moor, a park created by British Airways with and for the community

- Bombardier Aerospace, Belfast, has implemented a number of strategies to ensure more environmentally prudent operations. It has made major progress in reducing carbon emissions at its main site. Since the scheme was set up in January 2005, CO_2 emissions from energy use have been reduced by 69%.
- Airbus is voluntarily promoting the reduction of all hazardous substances through phase-out and substitution schemes and through the development of clean technologies.
- Between 2005 and 2007, as part of an ongoing programme to reduce operational greenhouse-gas emissions through a combination of energy efficiency, fuel-switching and reductions in process emissions, Rolls-Royce reduced its greenhouse-gas intensity (normalised on turnover) by over 14%.
- Using 2007 as its baseline, Virgin Atlantic has set itself challenging targets to reduce: energy consumption (10% by 2012, and 20% by 2020); water consumption (10% by 2012); paper use (25% by 2012); and divert 50% of waste, from both its aircraft operations and ground facilities, away from landfill by 2012. Following an energy review facilitated by the Government's Carbon Trust scheme in 2007, Virgin Atlantic has already begun to implement a variety of energy saving measures and is developing an energy policy to encourage staff buy-in of the energy target.
- In 2008 British Airways achieved its target of a 10% reduction in energy use on the ground between 2006-08, and has targets to achieve zero waste to landfill and 50% recycling in the UK by 2010.
- Flybe introduced its industry-first eco-label scheme in 2007. The label, modeled on those used in the sale of white goods such as fridges and washing machines, shows a full range of environmental indicators for each aircraft.

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

Amber: *Signatories have made some progress in limiting supply chains' environmental impacts; however, there is significant scope for further improvement.*

SA signatories are regularly each other's suppliers. In 2008 Virgin Atlantic and Rolls-Royce announced a $2.6 billion order for Trent 1000 engines to power the Boeing 787 "Dreamliner", an aircraft that will be around 27% more fuel efficient than the aircraft it will replace in Virgin Atlantic's fleet. This order formed the basis of a new environmental partnership between Rolls-Royce and Virgin Atlantic, which will aim to identify further opportunities to reduce aircraft fuel burn during the operational life of these engines.

Through its Environmental Working Group, SBAC has been engaged in an ongoing programme to promote the implementation of Environmental Management Systems (EMSs) in the supply chain and support, especially for Small and Medium Enterprises (SMEs), centred on the British Standard (BS8555) and the 'Acorn' scheme (administered by the Institute of Environmental Management and Assessment (IEMA)). This has included a SBAC facilitated programme of supplier events in south-west England leading to several companies attaining Level 3 (of 5, with 5 representing full ISO14001 implementation). Similar programmes will be offered in the future.

While many companies, in adopting the international standard (ISO 14001) for environmental management systems (EMS), concentrate largely on site-based aspects, Airbus joined forces with SBAC and other European trade associations to develop an innovative approach to environmental management which covers both sites and products throughout their lifecycle. This integrated approach has enabled Airbus to target appropriate improvements, in particular from the earliest design stage.

4.6 Natural Resources

Recycling point at Edinburgh airport


Recycling at Newcastle airport


Paper recycling at Manchester Airport

Since our 2006 progress report, the ACADEMY/LIFE project has led to the development of comprehensive guidelines, covering all aspects of environmental management at site and product levels, including "Design for Environment", maintenance and repair, environmental reporting and end of life initiatives.

British Airways "responsible procurement plan" builds environmental considerations into decision-making from macro-scale (such as aircraft purchase) to micro scale (such as hybrid vehicles for the sales team). Sustainability by Design is a theme of the airline's One Destination Corporate Responsibility Plan. In 2008 a carbon lifecycle study of the traveller cabin produced a hierarchy table of the various materials for use in future decision making.

Among airport signatories, BAA works closely with its suppliers to reduce the use of environmentally sensitive materials in their construction projects. These include concrete, fluorinated gases, PVC, formaldehyde and other hazardous chemicals. A target has been set to source 100% Forestry Stewardship Council (FSC) construction timber by 2010. Supplier performance has been reviewed against targets since 2008.

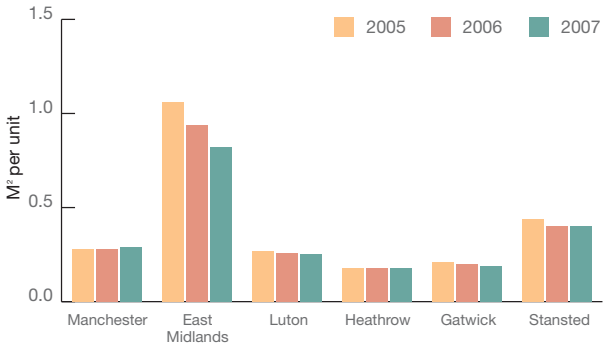
25 Commitment For new developments requiring land, avoid the loss of natural and man-made heritage wherever possible.

Green: *Since the last Progress Report changes have been made to the Stansted proposals to minimise the loss of natural and man-made heritage; there have been no other significant airport developments.*

In 2008, BAA submitted planning proposals for a second runway at Stansted to increase capacity at the airport from the current limit of 35mppa to 68mppa. These proposals are due to be considered at an independent public inquiry starting in the early part of 2009. BAA undertook an extensive public consultation on the proposals, which involved the National Trust and English Heritage as well as local communities, local authorities, business leaders and other regional and national organisation. The submitted development proposals will have less impact on the local environment and community than the option outlined in the Government's 2003 White Paper. The land required has fallen from 700 to 442 hectares which has reduced the number of residential buildings that will be lost as well as the number of listed buildings affected, many of which will be dismantled and re-built.

The leading airports, in terms of movements, are highly effective in the use of land as indicated in Figure 19.

Figure 19. Land use at some UK airports in square metres per traffic unit. Source: AOA.



Note: One Traffic Unit is defined as one passenger, or 0.1 tonnes of freight.

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

Green: *Since the publication of the last progress report in December 2006, there has been substantial progress in the assessment and trialling of alternative fuels.*

Alternative fuels must be sustainable. The challenge is that for a candidate fuel to become a viable alternative to kerosene:

- it must be suitable for use in existing aircraft, engines and fuel systems, meeting or exceeding current fuel specifications;
- it must also be derived from sustainable sources without adversely impacting food-production, land-use or water-scarcity, and must show a reduction in carbon dioxide emissions over its lifecycle;
- industrial-scale production must be economically feasible.

In February 2008 Virgin Atlantic, in partnership with Imperium Renewables, Boeing and GE, flew a Boeing 747 from London to Amsterdam with one of its four engines powered by a 20% biofuel, 80% kerosene blend. This was the first ever flight by a commercial jet aircraft using biofuel. Subsequently, in September 2008, Virgin Atlantic with Boeing, fuel technology company UOP Ltd and several other airlines, signed a pledge committing to using only sustainably sourced, lower life cycle greenhouse gas emissions biofuels.

Also in February 2008, Airbus conducted a three-hour test flight of an A380, using synthetic kerosene derived from natural gas as a component of the fuel for one of its four Rolls-Royce engines. Analysis of data from this test flight will provide valuable information concerning the suitability of gas-to-liquids fuel as a replacement for kerosene, and is seen as a step towards alternative synthetic fuels derived from biomass.

In July 2008, British Airways and Rolls-Royce announced a programme to test up to four alternative fuels on a highly-instrumented indoor engine test-bed, as a means of establishing the suitability and emissions-performance of potential replacements for kerosene. The results of this testing will be made public.

In December 2008, in conjunction with Air New Zealand and others, Rolls-Royce took part in a joint test-flight initiative in which a Rolls-Royce RB211 engine was powered by a second-generation biofuel consisting of a 50:50 blend of kerosene with fuel derived from jatropha plants, which can be grown in arid and otherwise non-arable areas, avoiding competition with food crops. The two hour test flight showed that this fuel offers the potential for a 'drop-in' replacement for kerosene in the medium/longer term.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- Collaborate, as SA signatories, on evaluating lower carbon, sustainably produced, alternative fuels.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

4.7 Economics

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

SA signatories directly employed some 353,000 full time equivalents worldwide in 2007. In the UK the aviation industry employs a total of 200,000 and 500,000 people directly and indirectly, respectively[6]. Within an island economy reliant on trade, aviation has an important role to play in connecting the UK to the rest of the world. More than 228 million passengers used UK airports in 2007 while approximately 2.5 million tonnes of freight was carried from the UK. Aviation contributes £11.4 billion to the UK's Gross Domestic Product which represents 1.1% of the overall economy.

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

Green: *SA signatories recognise that a skilled and sustainable local labour force is important to the industry as well as supporting a range of initiatives to optimise the local economic benefits of their activities.*

SA signatories are responsible for job creation on a large scale, which includes roles in many high knowledge areas such as air traffic control and engineering. We ensure that local people benefit from training schemes and employment opportunities. Initiatives of particular importance include the following (see also Commitment 30):

- BAA has established the Retail Academy at Heathrow which was recognised by Business in the Community (BiTC) in 2008 in their annual awards. BAA has also committed to investing £200,000 over four years in the Stansted Airport Employment Skills Academy. The Academy will provide a centralised recruitment and training function for employers and employees at Stansted and it will become a base for the Airport Skills Training Programme which aims to train local people and enable them to obtain employment at the airports.
- At Manchester Airport, the in-house Community Relations team are now the lead sponsor of a new City Academy in Wythenshawe which aims to improve job prospects from an early age for the Academy's attendees by developing the school's academic strategy.
- "Job Junction", launched by Birmingham International Airport in conjunction with partner organisations, aims to place people on Incapacity Benefit, lone parents, people with disabilities or those who have been unemployed for 6 months or more into employment at the Airport. In the 3 years to March 2008, 150 people had completed the 'Job Junction Training' and 90 have found full-time employment at the Airport.
- The British Airways Community Learning Centre has welcomed 45,000 young people and adult learners since its opening in 1999. Interactive, airline focused, programmes relevant to the school curriculum are delivered to local school students. Areas covered include: customer service; environmental education; languages; and Information and Communication Technology.
- In April 2008, NATS introduced a social responsibility fund, administered to support worthy causes and to encourage its employees to support local community projects.
- Bombardier Aerospace, Belfast, through its charitable foundation donates two per cent of its pre-tax profits to charities based in Northern Ireland, focusing on education, equal opportunities, the environment and economic regeneration programmes.
- Rolls-Royce has endowed Community Foundations around its major sites and runs a range of education activities designed to inspire pupils to pursue further studies related to the aerospace sector. Several of the Company's learning centres are open to the local communities and free spaces are available to community representatives on many of its training programmes.

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

Green: *SA signatories play a vital role in supporting the UK economy through the provision of air services, including a network of regional destinations.*

[6] Oxford Economic Forecasting, The Economic Contribution of the Aviation Industry in the UK, 2006

The Eddington Study[7] noted that the "connectivity of the UK's airports is particularly important for supporting certain types of business activity, such as the financial services and banking sector". The report went on to state that two key determinants of connectivity were the range of destinations served, and the frequency of connections.

In 2004 UK aviation paid £3.6 billion in direct taxes to the Exchequer of which approximately £1 billion was raised through APD[8]. In 2007, APD raised £1.8 billion after rates were doubled in February of that year. The Autumn Pre-Budget Report announced further increases in APD in November 2009 and November 2010 which, together, are expected to raise an additional £700 million each year by 2011.

Air freight has grown by around 5% nationally since 2003. Some airports have seen marked increases in their freight business, whilst others have seen a decline (Figure 20). Heathrow saw an increase of 7.2% whilst Gatwick saw a decrease of 23% over the same period. Some regional airports including Kent International and Bristol have seen significant declines, whilst at others, notably Leeds Bradford, Manchester and Nottingham East Midlands, there have been significant increases in air freight (31%, 35% and 21% increases respectively).

In 2008, SA established a new working group which will be examining in more detail the social and economic impacts of aviation in local communities. As a first step, the group will commission a scoping study to better understand these issues.

Figure 20. Regional air freight carried (tonnes). Source: AOA.

Note: Freight handled in the South West and North East airports was less than 5,000 tonnes for all years.

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

Green: *SBAC is actively promoting the maintenance and development of UK civil aviation manufacturing as a world-class industry .*

As well as briefing Ministers and senior officials from key government departments on the value of UK aerospace manufacturing, SBAC worked alongside other SA signatories to promote the work of SA at the 2008 Farnborough International Airshow. In particular, SBAC hosted a major conference on SA featuring international aviation leaders, with support from British Airways, Rolls-Royce and Airbus.

In 2009, SBAC will produce its first Aerospace Industrial Strategy which will highlight the importance of the UK as a centre for world class manufacturing and examine practical ways in which this can be supported. Bombardier Aerospace, Belfast, represents around 10% of Northern Ireland's manufacturing exports. Additionally, the Airbus A380 contains 25% composites, and A350-900 XWB will contain more than 50% of composites materials in its structure. Airbus is committed to further development of composite technology in its wing manufacturing centre of excellence and will support expansion of composite manufacturing capability in the UK, which in turn will help keep UK at the forefront of civil aviation manufacturing.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- work with the stakeholder group and signatories to redefine the economic Goal and Commitments to ensure that they remain relevant and will deliver our vision of a long-term sustainable future for the UK aviation industry.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

[7] The Eddington Transport Study, 2007. http://www.dft.gov.uk/about/strategy/transportstrategy/eddingtonstudy/

[8] Oxford Economic Forecasting, The Economic Contribution of the Aviation Industry in the UK, 2006

4.8 Social

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

SA signatories place a significant emphasis on corporate responsibility, and many have dedicated teams and strategies in place.

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

Green: *SA signatories invest significantly in training their employees, which is critical to achieving a highly skilled and motivated workforce.*

Examples of individual initiatives include the following:

- Virgin Atlantic's award-winning European Aviation Safety Agency (EASA) approved four year apprenticeship scheme turns out skilled engineering technicians.
- In 2008 British Airways became the first airline to be recognised as a training centre by the City & Guilds and new entrant cabin crew now achieve an NVQ Level 2 qualification.
- Thomson and First Choice have also introduced NVQ training in Customer Service for overseas staff and have been recognised by the Department for Innovation, Universities and Skills for their commitment to vocational training in the airport community.
- Flybe was the first airline to be granted awarding body status by the Qualifications and Curriculum Authority. It has developed a new engineering apprenticeship scheme in partnership with Exeter College and the University of Exeter. The first 34 apprentices started their CAA and Learning and Skills Council approved course in September 2008 and have been guaranteed a job offer by the airline on successful completion of the course.
- Under Birmingham International Airport's "Skills for Life" Programme 119 employees were recognised for their achievement in 2007/8 for obtaining a nationally recognised qualification – this represents 19% of the Airport Company's workforce.
- BAA's virtual university provides people with access to learning, and in 2008 nearly 3000 training courses were run in leadership, business and technical skills. In addition, since January 2006, more than 200 current employees and new recruits have gained qualifications through the Heathrow Retail Academy, giving them opportunities to develop their skills and careers.
- Rolls-Royce spent approximately £30M on training last year, with a strong focus on health and safety management across Rolls-Royce facilities. This has helped to support a reduced incidence of occupational injury (down 5.5%) and occupational illness (down 43%) compared with 2006.
- Airbus' extensive community programme is governed by three themes: education, youth, and the environment.
- NATS has formed a Community Affairs Support Team and is working with Business in the Community to establish appropriate local links.

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

Amber: *The industry has continued to investigate consultative approaches. This commitment will be reviewed in 2009.*

Many airport signatories have, in previous years, constructively reached agreement with planning authorities to improve local facilities, under Section 106 of the Town and Country Planning Act 1990. For example, in 2001, after extensive local consultation, BAA entered into a legal agreement which specified ways in which it would manage a variety of Gatwick's environmental and other impacts, in return for which it secured local authority support for the principle of Gatwick's growth to handle 40 million passengers a year. That agreement was replaced in December 2008 replaced by a new one, of similar purpose and character. SA signatories continue to keep under review the options for similar approaches at other airports, however no such approaches were developed during the reporting period. In producing the White Paper, government took a decision to include a location-specific consideration of the ability of airports to expand to meet demand. Where

airports were considered appropriate for expansion they were required to develop and consult on master plans which set their intentions out clearly. Members of the public were also invited to participate in airport consultative committees. Airports are, therefore, regularly consulting with the public as they develop their commercial infrastructure and operations. Plans submitted to increase capacity at Heathrow and Stansted airports have been shaped by several extensive public consultations. This commitment will be reviewed as part of the wider review of SA's commitments due to take place in early 2009.

32 Commitment Deliver high quality service to passengers.

Amber: *In order to maintain a high quality of service, SA signatories actively solicit feedback from their customers, feeding the results into product and service design.*

SA signatories' focus on the customer has been widely recognised, with SA airlines winning a variety of awards for their product and service offerings.

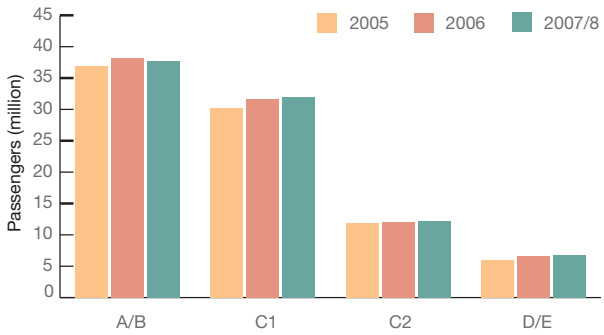
With facilities at many airports under pressure, in particular at the world's busiest two-runway (Heathrow) and one-runway (Gatwick) airports, operational resilience is from time to time fully tested by events such as adverse weather conditions. Airlines work closely with NATS, airports and manufacturers to enhance the passenger experience through better airport facilities, a focus on punctuality and improved baggage handling procedures.

In March 2008, Terminal 5 opened at Heathrow increasing the terminal capacity at the airport and cutting congestion. Although service was affected by initial operational difficulties, the terminal is providing passengers with a high level of service and the extra capacity will allow BAA to develop the other existing terminals and relocate airlines to improve transfer times.

33 Commitment Continue efforts to meet requirements of people for access to aviation.

Green: *UK aviation continues to expand and maintain its route network to provide access to aviation.*

Figure 21. Passengers by social group 2005-2007. Source: CAA.



Note: this is not confined to SA signatory airlines. Brief definitions of Socio-Economic Groupings: A Professional people; B Middle management executives; C1 Junior management; C2 Skilled manual workers; D Semi-skilled and unskilled manual workers; E Those entirely dependent on the State, casual workers [Market Research Society (1991): Occupation Groupings – A Job Dictionary (4th Edition 1991)].

This commitment relates to both the wider access of social groups to aviation and to passengers with disabilities. Access to aviation has become wider (Figure 21). A voluntary code of practice on access to air travel for passengers with disabilities has been followed by SA signatory airlines and airports since its publication in 2003. In July 2008 this was superseded by an EU Regulation which clarifies the responsibilities of airports, airlines and passengers with reduced mobility. SA airports and airlines have worked together to implement these new regulations and to ensure all our passengers continue to enjoy convenient access to air travel (Figure 21). SA is considering establishing a specific social issues task group. Part of its work could be to examine access to aviation by different socio-economic groups and to assess the most appropriate role for SA in delivering this commitment.

4.8 Social

British Airways customer donations finance the UNICEF "Change for Good" programme. Willie Walsh, BA CEO, visits a project in Tanzania.

Bringing people together

SA signatories support responsible tourism projects at many destinations

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

Amber: *SA signatories have played an active role in engaging with the tourism industry in developing a collaborative approach to sustainable tourism, but this has not been coordinated though SA.*

Several SA airline signatories are members of the Travel Foundation, an independent UK charity which aims to help industry stakeholders manage outbound tourism more sustainably. They have been active in a range of projects such as ensuring that the communities in the Masai Mara in Kenya receive direct economic benefit from tourist excursions to their villages.

Some signatories have commenced a programme of auditing their hotels to check that they are operating in an environmentally and socially responsible way, using the criteria of the Federation of Tour Operators' Travelife Sustainability Award. Using this scheme, hotels are rewarded with Bronze, Silver, or Gold awards according to their sustainability performance, and recommendations are made on how to improve.

A number of signatories are also working with Forum for the Future, a sustainable development organisation, on the Tourism 2023 project which is designed to help the UK outbound industry and some key destinations.

Looking forward to 2010

SA's initial list of priorities for 2009-10, to be confirmed and refined during the course of the year, includes:

- work with the stakeholder group and signatories to redefine the social Goal and Commitments to ensure that they remain relevant and will deliver our vision of a long-term sustainable future for the UK aviation industry.

In the first quarter of 2009 the SA Working Group will set out a work plan to deliver the priorities identified by the SA Council.

5. The Way Ahead

Whilst the climate change impacts of aviation receive the greatest attention from outside the industry and remain a priority for us, sustainability is also about addressing the full range of the industry's environmental impacts, as well as its economic and social contributions. For example, work is currently underway on developing a Code of Practice for aircraft departing from airports in order to reduce noise under the flight path. Work is also underway on "rolling out" continuous descent approaches across the UK's airports and on assessing the benefits of steeper approaches to airports. The Council is committed to considering the potential for specific work to understand better the social and economic impacts of the industry.

In November 2008 the Sustainable Aviation Council and Working Group met to discuss priorities for the 2009-2010 reporting phase. The initial list of priorities identified is reported below. Further work is needed to identify key deliverables and to refine this list into SA's 2009-10 work programme. It is our intention to seek the Stakeholder Panel's input to this process and the final work programme will be published on our website when available.

- a thorough review of SA's goals and commitments, to ensure that they are still relevant and deliver progress towards the SA vision of a sustainable future for the UK aviation industry;
- maintaining an up-to-date position on the future emissions of CO_2 from UK aviation and developing our understanding of the non-CO_2 impacts;
- supporting efforts to include aviation in the post-Kyoto global climate change framework;
- evaluating the potential of emerging lower carbon, sustainably produced, alternative fuels;
- developing a better understanding within the industry, and amongst the wider stakeholder community, of the potential technology trade-offs between reductions in CO_2, NOx and noise;
- engaging with passengers on climate change issues;
- working with industry in the UK and internationally to implement "low noise" arrivals and departures procedures;
- establishing a working group which will develop and share expertise on operational opportunities to reduce airside NOx and CO_2 emissions;
- encouraging greater access to airports by public transport and the development of integrated transport policies for the UK;
- assessing the potential contribution of future single aisle replacement aircraft to achieving SA's goals;
- achieving wider engagement of SA signatories;
- undertaking "blue sky" scenario planning, looking at the future of aviation in a carbon constrained world;
- implementing a robust communications strategy, targeting key stakeholders in the UK and internationally.

6. Recommendations To Government

Recommendations to Government – 2008

1. Continue to work through ICAO, GIACC and other relevant international organisations to incorporate international aviation within the post-Kyoto framework, to be agreed at Copenhagen in 2009. This must be underpinned by 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.

2. Continue to work with policy-makers in Europe on the legislation to include aviation in the EU ETS to ensure that aviation participates on a basis that allows the sector to contribute proportionately to meeting EU climate change targets, is economically efficient and minimises competitive distortion and the risk of carbon leakage. As part of this process, the Government should actively seek input from the industry on its economic and competitive performance to inform the definitions of sectors at risk from carbon leakage.

3. Continue to take a leading role in ensuring the delivery of the National Aerospace Technology Strategy led by the Aerospace and Defence Knowledge Transfer Network through the coordination of government resources identified in the Aerospace Innovation and Growth Team (AeIGT) Implementation Report. Ensuring funding mechanisms are available to enable manufacturers to maintain the drive towards technological and operational targets and to maximise opportunities to reduce aviation's overall environmental impact worldwide.

4. Encourage and facilitate studies on technical and economic impacts and on trade-offs, in association with academic studies on the environmental impacts of aviation. This joint approach should also include active support for an internationally connected vehicle to link research in this area through networking and knowledge transfer, building on the US-UK link established by Omega.

5. Better understanding and measurement of the non-CO_2 effects of aviation is crucial. Government should look to build on Omega through commissioning research and promoting collaboration with the scientific community into the non-CO_2 effects of aviation, as well as providing guidance on prioritisation and ensuring funding for this vital scientific work. This should include active support for a knowledge transfer network to link research in this area.

6. Encourage the UK Airspace Regulator, the CAA, to design a streamlined process for implementing airspace changes where there are potential environmental benefits, reducing current average request to approval timescales significantly. This streamlined procedure should be in place by the end of 2009. Discussions with government have commenced, but have not been successfully completed. We would ask the CAA and DfT to consider this as a matter of urgency.

7. Ensure that aviation covers the cost of its environmental externalities, not through taxes but primarily through the EU Emissions Trading Scheme which remains aviation's preferred economic instrument in the absence of a fully international agreement. We would also encourage the Government to ring-fence the monies raised through air passenger duty or other environmental taxes, and through the auctioning of EU ETS permits, in order to invest in measures to mitigate aviation's environmental impacts.

8. Commission authoritative work on the social and economic impacts of UK aviation, which should form the basis of any impact assessment for government policies that affect the aviation industry.

The following recommendations from the 2006 progress report are retained as they remain relevant.

9. Action by government to complement initiatives from the aviation industry should be undertaken to address NOx issues on roads near airports.

10. 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.

11. Recognise the importance of improved surface access links to airports within its integrated transport plans and actively consult the industry on proposals to link airports to national rail networks, and in particular any proposals to link Heathrow airport to a high-speed-rail network.

12. Review the relationship between provision of land for airport use within Regional Spatial Strategies and Regional Transport Plans.

13. 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 various government departments.

Glossary

A

ACARE: Advisory Council for Aeronautics Research in Europe

AEA: Association of European Airlines

AeIGT: Aerospace Innovation and Growth Team

AGAPE: ACARE Goals Progress Evaluation

ANSP: Air Navigation Service Provider

AOA: Airport Operators Association

APD: Air Passenger Duty

APU: Auxiliary power unit

ATM: Air traffic management

ASD: Aerospace and Defence Industries Association of Europe

B

BATA: British Air Transport Association

BIA: Birmingham International Airport

BS 8555: Guide to implementation of an Environmental Management System

C

CAA: Civil Aviation Authority

CAATS II: Co-operative Approach to Air Traffic Services II

CAEP/8: 8th meeting of the Committee on Aviation Environmental Protection of ICAO

CANSO: Civil Air Navigation Services Organisation

CATE: Centre for Air Transport and the Environment, Manchester Metropolitan University

CDA: Continuous descent approaches

Clean Sky: Clean Sky Joint Technology Initiative

D

dB: Decibel, a standard unit of expressing and measuring noise

DEFRA: UK's Department for Environment, Food and Rural Affairs

E

EASA: European Aviation Safety Agency

EC: European Commission

EFE: Environmentally Friendly Engine programme

EMS: Environmental management system

END: European Environmental Noise Directive

EU ETS: EU Emissions Trading Scheme

EU's SILENCER: collaborative European research on new technologies for reducing aircraft noise

F

FEGP: Fixed electrical ground power

FSC: Forestry Stewardship Council

G

GDP: Gross domestic product

GIACC: Group on International Aviation and Climate Change

I

IAGOS: IAGOS is a study involving observations of atmospheric composition, aerosols, clouds and contrails on the global scale from commercial in-service aircraft.

IATA: International Air Transport Association

ICAO: International Civil Aviation Organisation

IEMA: Institute of Environmental Management and Assessment

IPCC: Intergovernmental Panel on Climate Change

ISO 14001: an international environmental management systems standard

ITD: Integrated Technology Demonstrators - part of the Clean Sky programme

L

LTO: Landing and Take-off cycle

M

MOZAIC: a European research programme to help understand the atmosphere and how it is changing under the influence of human activity, with particular interest in the effects of aircraft.

N

NPR: Noise preferential route

NVQ: National vocational qualification

O

Omega: an independent, publicly funded organisation working with those at the frontline of the aviation community

P

P-RNAV: allows Terminal Airspace RNAV (Precision Area Navigation) operations that are consistent in the various European States, based on a common set of design and operation principles, ensuring consistent levels of flight safety.

PSDH: Project for the Sustainable Development of Heathrow

PVC: Polyvinyl chloride

R

REACH: Registration, Evaluation, Authorisation and restriction of CHemicals

RFI: Radiative forcing index

RTK: Revenue tonne kilometre

S

SAGE: Sustainable and Green Engines research project, one of the ITDs

SBAC: Society of British Aerospace Companies

SESAR: Single European Sky ATM Research

Single European Sky: The Single European Sky initiative, launched by the European Commission puts forward a legislative approach to solving the air traffic management (ATM) issues that currently affect air transport as well as enabling ATM to cope with future demands

SME: Small and medium enterprise

Signatories to Sustainable Aviation

Signatories to Sustainable Aviation

Airline signatories: British Airways, bmi, easyJet, Flybe, Monarch, Thomas Cook, TUI Travel, Virgin Atlantic.

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

NATS

SBAC signatories: Airbus UK, BAE Systems, Bombardier Aerospace, Cobham, Doncasters, Farnborough Aerospace Consortium, GE Aviation, GKN, Goodrich, Marshall Aerospace, Meggitt, Messier-Dowty, QinetiQ, Rolls-Royce, West of England Aerospace Forum.

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