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THE VOICE OF UK AIRPORTS

Sustainable Airports

IMPROVING THE ENVIRONMENTAL IMPACT OF THE UK'S GLOBAL GATEWAYS

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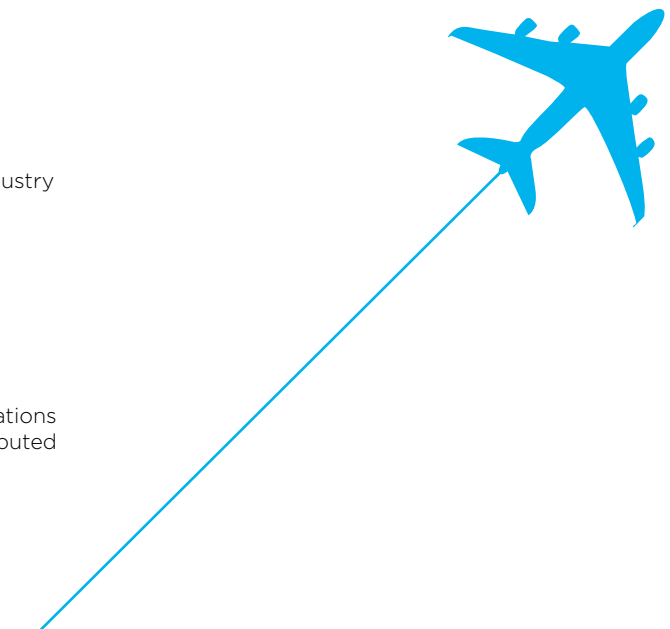
The views and recommendations in this report are to be attributed to the AOA only.



Foreword

Aviation is vital to the UK. Not only is it crucial in sustaining around 1 million jobs and £50 billion GDP, and providing £8 billion in taxes to the Treasury, it is also essential to the wider success of UK plc.[i] It supports tourism, exports, manufacturing, services, and foreign direct investment; and it enables us to take holidays and visit friends and family, both around the world and also to different parts of the UK. It really is crucial infrastructure, sometimes called the real World Wide Web, and it provides the connectivity which a modern, dynamic economy, such as the UK's, needs to link up with existing and emerging economies both now and in the future.

The UK airports sector needs to grow. Increasing passenger numbers over the next 40 years, and the need to improve our connections with the economies of the future, mean our point to point and hub capacity need to expand.

The UK's Transport Secretary, the Rt Hon Patrick McLoughlin MP, says in his foreword to the Department for Transport's (DfT's) 2013 *Aviation Policy Framework*, "The Government believes that aviation needs to grow, delivering the benefits essential to our economic wellbeing, whilst respecting the environment and protecting quality of life."[ii] What's more, the DfT's own 2013 passenger forecasts show that this need for growth is national, "The central [passenger demand] forecasts suggest that all the South East airports would be at capacity at around 2030 and the larger airports outside the South East from about 2040."[iii]

On the issue of the UK maintaining its leading status as an aviation hub, Sir Howard Davies's independent Airports Commission's 2014 *Interim Report* says that there is a "clear case for at least one net additional runway in London and the South East by 2030" and "there is likely to be a demand case for a second additional runway to be in operation by 2050."[iv]

With both Government and the Airports Commission forecasting and backing airport growth, the challenge is – as the Transport Secretary puts it – to do so in a way which respects the environment and quality of life. This report, *Sustainable*

[i] *Economic Benefits from Air Transport in the UK*, Oxford Economics, 2011.

[ii] *Aviation Policy Framework*, Department for Transport, 2013

[iii] *UK Aviation Forecasts*, Department for Transport, 2013

[iv] Airports Commission: *Interim Report*, 2013

[v] *Aviation Policy Framework*

Airports: Improving the environmental impact of the UK's global gateways, written by the Airport Operators Association with external research provided by consultancy Glenigan, demonstrates what airports have been doing in recent years to deliver growth and sustainability, in terms of limiting carbon and noise impacts.

On carbon emissions, the report provides clear analysis that the UK airport sector is keeping to its side of the bargain. Between 2010 and 2012, airports representing 95% of air travellers in the UK grew by more than 5% in terms of passenger numbers and almost 2% in terms of Air Traffic Movements, yet they reduced their carbon footprint by almost 3%. Of course, aircraft are the main contributors in terms of carbon emissions: as analysis by the industry coalition Sustainable Aviation shows, a combination of newer fleets and better operational measures can help to reduce the carbon used by airport partners in aviation. If the Government helps the UK develop sustainable aviation fuels and promotes a global Emissions Trading Scheme, such as the one being discussed by the International Civil Aviation Organisation currently, it can help ensure that aviation can grow to 2050 with neither its airports nor its airlines seeing any significant increase in carbon emissions. So we need to work in partnership with policy makers on this.

On noise, the report highlights a serious problem with UK policy-making. The *Aviation Policy Framework* states that, "reflecting Government noise policy, [its] National Planning Policy Framework is quite clear that the planning system should prevent new development being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution" and "within some noise contours around airports, the number of people has increased regardless of any change in noise."[v] However, our report finds that since April 2011 over 5,700 homes have been given planning permission or have started or completed construction in areas where the Government expects some people will experience annoyance at aircraft noise. Whilst Sustainable Aviation is clear that UK aviation can almost double its Air Traffic Movements to 2050 without increasing noise, the sector cannot control housing development. Government policy should not ask airports to limit and reduce the number of people inside noise contours *whilst also* enabling developers to introduce thousands of new households into those contours. And at a local level, it is clear that local authorities need national policy guidance to help them build much needed, quality homes in areas that are compatible with airports and other infrastructure, but which does not cut across national aviation policy.

Sustainable Airports: Improving the environmental impact of the UK's global gateways shows the impressive work UK airports have been doing recently to deal with carbon and noise as they grow; it details in various case studies the innovations individual airports are conducting to lead the way on sustainable growth. It also highlights the phenomenal lengths airports are going to, to engage local communities and work with them to ensure airports and the people who live and work around them are aware of and share in the benefits of these extraordinary international and regional gateways.

We hope you find it as interesting to read as we have to produce it.

Ed Anderson
AOA Chairman

Darren Caplan
AOA Chief Executive

Executive Summary

Airports are the UK's gateways to the world: they are hives of commercial and social activity that drive our international and domestic connections, our business trips and holidays. But they are also responsible businesses that need to meet the objectives and expectations of policy makers and local communities. In this report, the Airport Operators Association (AOA) – the trade body for UK airports – demonstrates that airports are taking their environmental responsibilities seriously and are working to reduce their impact.

In its 2013 Aviation Policy Framework (APF) the Government demanded that the sector prove its sustainability in order to be able to grow. According to the APF, UK aviation produces 6% of UK carbon emissions,[1] mostly through flights but also through ground operations at airports. Within the sector, airports can play a role by reducing the emissions they can directly control through their business operations, and using their influence to help to deliver reductions in other parts of the aviation industry. In this report we find that airports are indeed playing their part to meet the objective of reducing carbon emissions[2] whilst growing at the same time. **The report shows that the cumulative carbon footprint of the UK's 18 biggest airports has shrunk by 3% since 2010, whilst passenger numbers have increased by 5%.**[3] Between them, these airports account for over 95% of passengers using UK airports.[4] Eight of those 18 airports include the carbon emissions from flights in the landing and take-off cycle at the airport; their carbon emissions have reduced by 2% whilst air traffic has increased by 2%.

However, airports only account for a small proportion of aviation's carbon emissions. Airports, airlines, air traffic service provider NATS, and aircraft manufacturers – working together through the Sustainable Aviation (SA) coalition[5] – have published a joint plan to reduce UK aviation carbon emissions to 50% of 2005 levels by 2050, whilst growing.[6] To help aviation further reduce its carbon emissions, the Government should help support wider initiatives including the introduction of sustainable aviation fuels and a global carbon trading scheme.

The report also shows that whilst airports have reduced the area in which there are higher levels of aircraft noise by 45% since 1998,[7] airports alone cannot reduce the number of people within those areas. The acute need for housing in the UK, coupled with the removal of guidance about aircraft noise in the Government's overhaul of planning policy, means that some local authorities are allowing developers to build new homes and other noise-sensitive

1 *Aviation Policy Framework*, Department for Transport, 2013

2 This objective is set in the *Aviation Policy Framework*. See Introduction: Policy Context for further details.

3 See Chapter One: Carbon for figures and analysis.

4 These 18 airports (based on all passengers at the airport for the year 2013, released by CAA in March 2014) account for 96.3% of all passengers at UK airports. See CAA data at: bit.ly/1vrRIPK Full CAA data for 2013 available at: bit.ly/VHXBfh

5 See Sustainable Aviation: www.sustainableaviation.co.uk

6 The partners in the Sustainable Aviation (SA) initiative have developed a CO_2 Road-Map, 2012. For more details see Chapter One: Carbon.

7 The area of the 57 Leq noise contours of 6 major airports shrunk from 409.6 km2 in 1998 to 225.6 km2, according to the Sustainable Aviation Noise Road-Map (p62), a decrease of 44.92%. See Chapter Two: Noise for further details.

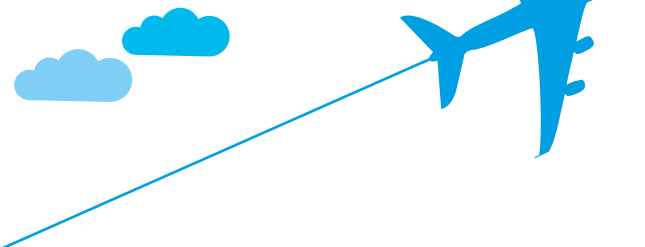
8 This objective is set in the *Aviation Policy Framework*. See Introduction: Policy Context for further details.

buildings closer to airports. We looked at the 57 L_{Aeq} noise contours of the UK's 18 biggest airports, this contour being the geographical area around each airport that the Government uses to mark the onset of annoyance from communities.[8] Following changes to planning policy brought about in the National Planning Policy Framework, there are no policies to manage the type and quality of new building developments, including housing, inside noise contours. **Our research reveals that in the last three years over 5,700 homes have been given planning permission or have started or completed construction in areas where the Government expects some people will experience annoyance at aircraft noise.** New housing is essential but it must be balanced with existing infrastructure. If the quality of life within specific areas is questioned by Government then local authorities should reconsider planning policy for new homes within those areas by, for example, managing the specific location of homes or ensuring developers improve the quality of noise insulation.

At the same time, airports are engaging directly with local communities that already experience noise. **Of the 18 airports in this report, 14 airports (78%) undertake five or more types of community engagement activity and four airports (22%) undertake seven or more different activities.** Seventy-two per cent of airports evaluate the effectiveness of their engagement and use the findings to improve their work. As a result of these activities, local communities receive direct information about airport changes that could affect them, have a say in those changes and in how they receive that information, and receive support for local projects that matter to them. This is in addition to the local community funds and financial programmes for noise insulation run by a number of airports.

The figures in this report speak for themselves, and they are illustrated with case studies and surveys that demonstrate how airports are reducing their carbon emissions and managing noise. From large airports like Heathrow, Gatwick and Manchester to smaller airports like Bristol and Belfast City, airports and their staff are working hard on initiatives that reduce the fuel used in their buildings, encourage carbon reductions with their partners such as airlines, and engage with local communities to find ways to tackle noise annoyance.

Airports are showing progress in meeting the sustainable objectives set by Government and are reducing their local environmental impacts. But they need policy and stakeholder support to further reduce the size of communities experiencing noise and to help work with partners in the aviation sector to achieve further carbon reductions. Central Government must ensure its policy framework supports sustainable growth at all airports and local governments must ensure their planning policies support airports in growing, and in managing noise impacts from operations and growth.



Based on the evidence in this report, the AOA makes the following five recommendations to policy makers and stakeholders to support the sustainable growth of the UK's airports, so that our economy and society can reap the business and leisure benefits offered by aviation.

Delivering sustainable growth

1. Airports are already meeting policy objectives to ensure their sustainability; therefore, in light of airports' proven commitment, **all political parties** should support the growth of airports as essential national economic and transport infrastructure. This includes committing to acting on both the 2013 Aviation Policy Framework (APF) and the Airports Commission, when it reports in 2015.

Reducing carbon emissions

2. Airports are reducing their carbon emissions, but their emissions are only a small proportion of those created by the UK's aviation sector. To help the aviation sector achieve greater carbon reductions, the **Department for Transport** (DfT) should help make two important initiatives successful: the development of sustainable aviation fuels and a global Emissions Trading Scheme. The DfT should:

a) Provide an incentive framework to stimulate investment, research and development, and commercialisation for **sustainable aviation fuels**. The fuels should be eligible for incentives in the same way that credits are awarded to qualifying road transport fuels under the Renewable Transport Fuel Obligation.

b) Press for agreement on and support implementation of a **global carbon-trading** solution encompassing all of aviation and ensuring a level playing field for all participants.

3. **Airports** that have not already done so should **commit to a scheme to reduce as well as monitor their carbon emissions.** One option available to them would be the ACI Carbon Accreditation Stage 2: Reduction.

Reducing noise

4. The location of noise sensitive developments like housing needs to work alongside airports and other existing infrastructure. The **Department for Communities and Local Government** should help airports to further manage noise by reversing the policy change to national planning guidance, so that in future **Local Plans include the noise metrics in the APF**. By reversing this policy change, developers and local authorities would rightly have to meet the same policy expectations as the aviation sector by managing the specific location and noise insulation of new homes.

5. If a new home or other noise sensitive building is to be built within the Government's defined noise contour (the 57dB L_{Aeq} 16 hour contour), then the **housing developer should provide adequate sound insulation *and* make people aware of aircraft noise before they buy or rent a property.**

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Introduction: Policy context

The national need for a growing aviation sector

It is widely accepted that aviation is of significant benefit to the economy and to society. In its own policy papers, most recently the Aviation Policy Framework (APF) of March 2013, the Government estimates that the UK aviation sector's turnover in 2011 was around £53 billion and that it generated around £18 billion of economic output, whilst employing around 220,000 workers directly and many more indirectly.[9] Other economic estimates have produced even higher figures, with Oxford Economics finding the sector supports 921,000 jobs and contributes £49.6 billion to the economy (3.6% of UK GDP) and £8 billion tax revenues.[10] Millions of people use our airports every year for holidays and to visit friends, and tourism contributes £127 billion in GVA, which accounts for 9% of UK GDP.[11]

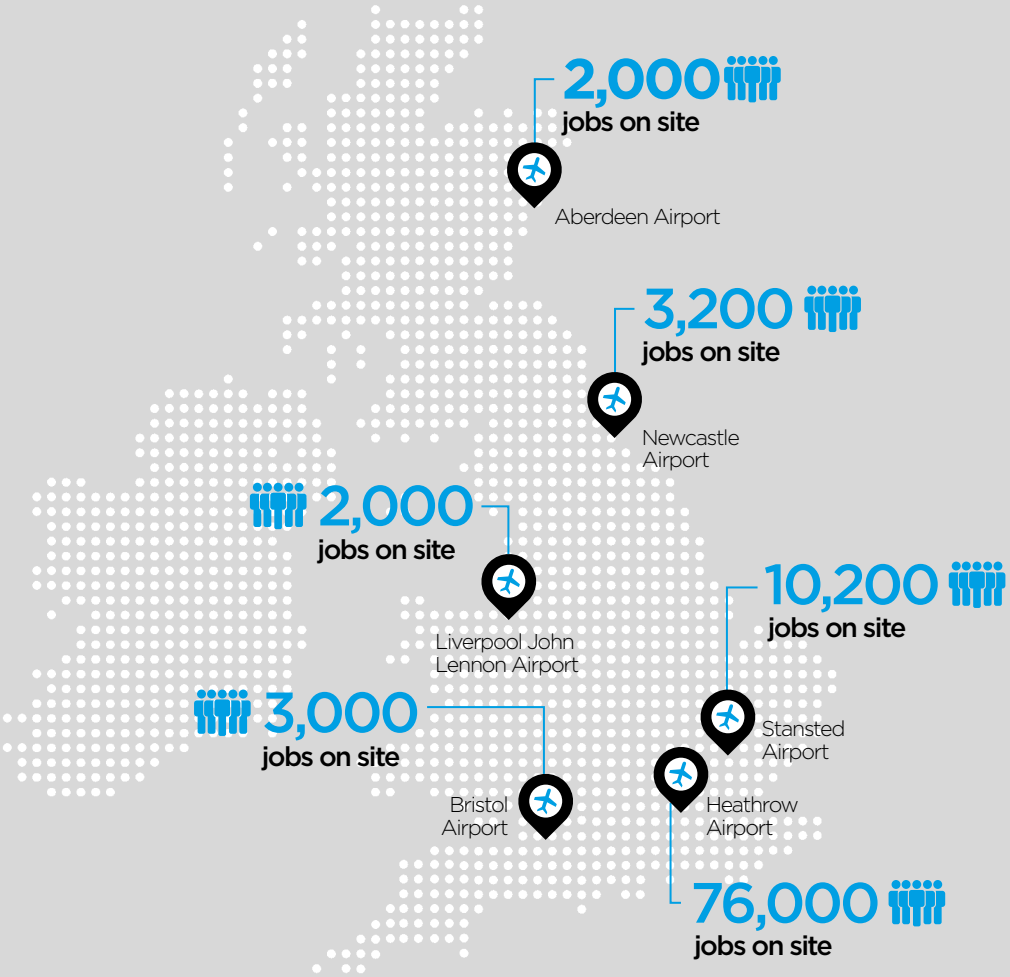
9 *Aviation Policy Framework,* Department for Transport, 2013.

10 *Economic Benefits from Air Transport in the UK,* Oxford Economics, 2011.

11 *Tourism: jobs and growth,* Visit Britain, Deloitte and Oxford Economics, 2013.

12 *Airports in the Community: the story of how UK airports help their local communities,* AOA, 2014. The full report is available here: www.aoa.org.uk/publications/.

Locally, airports drive city economies and connect regions to one another and to the world beyond our shores. The graphic below shows for example the number of jobs supported on site at six airports across the UK.[12]

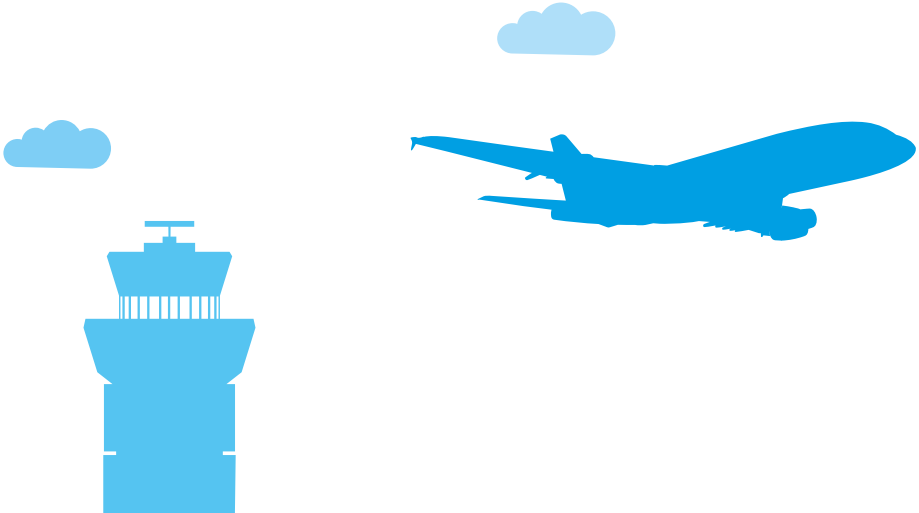


© Heathrow Airport

Airports are also employment hubs and valuable community assets. In its June 2014 report, *Airports in the Community*, the AOA detailed some of the employment figures, charity donations and community programmes directly supported by a range of UK airports.[13] The details within that report demonstrate the local importance of airports, just as the Oxford Economics report demonstrates their essentiality to the national economy. The Department for Transport's (DfT's) statistical release *Public experiences of and attitudes towards air travel: 2014* shows an increase in public support for airport expansion since 2010.[14] Now, 59% of respondents agree that "people should be able to travel by plane as much as they want to, even if new terminals/runways need to be built" and 57% agree that "in order to boost the economy, new terminals and runways should be built." **In terms of their local airport, 47% said they would support expansion and only 20% opposed it.**

Nationally, analysis of UK connectivity suggests that we are losing ground to our neighbours and competitors. The UK currently has a strong position, but there is mounting evidence that it will struggle to maintain it. Since the recession began in 2008, UK connectivity has declined by 4.9%, whereas Germany's has increased by 4.3% and France's by 3.4%.[15] Oxford Economics has found that, in proportion to the size of its economy, the UK does not rank as highly as it could on air connectivity.[16] Aviation assists trade and the expansion of many UK markets. The Confederation of British Industry states that adding just one additional daily flight to each of the eight largest high-growth markets would increase UK trade by as much as £1billion a year, with every increase in 1,000 passengers generating up to £920,000 in new business.[17]

Socially and culturally, people want to travel. There were almost 33 million visits to the UK in 2013, a 5.6% increase since 2012.[18] In the 2014 version of its four-yearly public opinion barometer, the DfT found that (48%) of adults surveyed had flown at least once in the last 12 months.[19] But with aviation as the only transport mode to most international destinations, it is surprising that more than half the population haven't flown in a year.
The DfT's report states that frequency of flying increases with income and socioeconomic group. Everyone in the UK should have the right to travel, and the success of the UK's national network of airports is crucial in providing a competitive choice of travel destinations. The DfT's report also reveals that survey respondents were least satisfied with the number of destinations served by their nearest airport, with only 55% of respondents satisfied. Airports are keen to grow and work with airlines to provide new routes to business and tourism destinations, to deliver the services the public want.



13 *Airports in the Community.*

14 *Public experiences of and attitudes towards air travel: 2014,* Department for Transport, July 2014. The full report is available here: bit.ly/1rDHSM0

15 *Global Competitiveness Report,* World Economic Forum, 2008-2012

16 *Economic Benefits from Air Transport in the UK.*

17 *Trading Places,* CBI, 2013. Available at: bit.ly/1ti4OyE

18 Office for National Statistics annual tourism figures for 2013, released 8 May 2014. The full statistics are available here: bit.ly/1pFrtEv

19 *Public experiences of and attitudes towards air travel: 2014.*

Government policy for sustainable growth

The facts are clear: aviation contributes significantly to the national economy and it is in the UK's interests to have a thriving aviation sector with successful and growing airports. In public and political discussions, the aviation sector is repeatedly called upon to prove its sustainability if it is going to be supported in its growth. Government policy calls for aviation's benefits to be balanced in comparison to aviation's costs, particularly its contribution to climate change and noise.[20] The APF sets clear policy objectives which include ensuring "the aviation sector makes a significant and cost-effective contribution towards reducing global emissions" and working to "limit and where possible reduce the number of people in the UK significantly affected by aircraft noise."[21]

The call for a more sustainable aviation sector is echoed by major decision-makers and influencers in and outside Government. Various politicians have made it clear that climate change and noise are a crucial element of their decisions about airport expansion.[22]

The Airports Commission is an independent review set up by the Government and chaired by Sir Howard Davies. This Commission is tasked with examining the need for additional UK airport capacity and making recommendations to the Government as to how this can be met in the short, medium and long term, delivering its final report after the General Election in 2015. In December 2013 the Commission delivered its Interim Report in which it concluded that the UK needs a new runway before 2030 and shortlisted three potential sites for the runway in London and the South East of England, and predicted that a second runway would be needed by 2050. In addition to the Commission-led debate about new runway capacity, airports across the country need to be successful to support local and national economies, and to provide people with a range of travel choices. Analysis undertaken by the Airports Commission supports the need for airports to grow. They predict that if the Government ignores the capacity constraints outlined in their Interim Report, costs over a 60 year time period could amount to £18-20 billion to users and providers of airport infrastructure and £30-45 billion of costs to the wider economy.[23] The modelling undertaken in the report finds that "by 2030 aviation capacity constraints could depress GDP by between 0.03% and 0.05%."[24]

In its Interim Report the Airports Commission assessed demand for aviation against environmental concerns in reaching its conclusion that additional net runway capacity is needed, stating that "aviation demand is likely to increase significantly between now and 2050, even when 2050 carbon emissions are capped at a level which is consistent with the UK meeting its legislated climate commitments."[25] Backing the need for airport expansion, the Airports Commission maintain that they "remain confident that a solution can be found, which allows the UK to maintain its strong position in world aviation, while respecting the inhabitants of those communities which most feel the side effects."[26]

For the Government to support aviation's growth and help airports meet public demand for more flights and services, airports need to prove their sustainability. In the following pages of this report we do just that.

20 *Aviation Policy Framework.*

21 *Aviation Policy Framework.*

22 Deputy Prime Minister Nick Clegg praised the Airports Commission's Interim Report in a radio interview, and said he would not agree to any expansion at Heathrow or Gatwick that would increase existing levels on noise and air pollution or would breach Britain's climate change targets. He said: "Where I am very rigid is on the environmental tests in of this. That is why I have been skeptical. I don't like the idea of turning our back on our climate change commitments." Read about the interview in this article, published Thursday 19 December 2013: bit.ly/1c3Fmpl. Shadow Transport Minister Mary Creagh has also talked about the importance of sustainability to aviation. See, for example, this interview published Monday 18 November 2013: bit.ly/1oYYAVc

23 Airports Commission: *Interim Report,* 2013

24 Airports Commission: *Interim Report.*

25 Airports Commission: *Interim Report.*

26 Airports Commission: *Interim Report,* Chair's foreword.

Carbon and noise: the role of this report

This *Sustainable Airports* report demonstrates how airports are working to meet the Government's objectives in the APF. We then set out steps that the Government can take to help airports further reduce both carbon emissions and the impact of noise, and support airports that want and are able to grow. The growth of the aviation sector is essential to the UK economy, and in showing that carbon emissions and the areas impacted by noise are both being reduced, the sector is showing that it is meeting Government objectives that are laid down to ensure growth is sustainable.

This report gives a national picture based on the environmental impact of the UK's 18 biggest airports, as defined by the number of passengers using each airport in 2013. Between them, these airports account for over 95% of passengers using UK airports.[27] Those airports are, in order of passenger numbers:

- Heathrow
- Gatwick
- Manchester
- Stansted
- Edinburgh
- London Luton
- Birmingham
- Glasgow
- Bristol
- Newcastle
- East Midlands
- Liverpool John Lennon
- Belfast International
- Aberdeen
- London City
- Leeds Bradford
- George Best Belfast City
- Southampton

We asked each airport to give us their most up to date information on carbon emissions and noise, and to tell us what they are doing to manage these environmental impacts. This is not to deny the other environmental impacts of airports.[28] Airports also manage waste, recycling, odours and other local effects. However, this report focuses in detail on the policy objectives of reducing global carbon emissions and limiting the number of people affected by aircraft noise, which are clarified in the APF and are relevant at all UK airports.[29]

27 These 18 airports (based on all passengers at the airport for the year 2013, released by CAA in March 2014) account for 96.3% of all passengers at UK airports.

28 It is argued in the APF that non-CO_2 emissions from aviation can have both cooling and warming effects on the climate, with a possible warming impact on the atmosphere.

29 *Aviation Policy Framework.*

In **Chapter One** we assess an airport's role in the carbon emissions produced by aviation, and how airports can control, guide or influence the fuel used and carbon produced by the aviation sector. We combine the total carbon emissions from all 18 major UK airports for 2010 and for 2012 (some airports were able to share their 2013 emissions at the time of writing this report, and where possible we include those too). We find that the total carbon footprint of these airports has decreased whilst their passengers and flights have grown in number.

In **Chapter Two** we assess local noise at airports and how it is monitored, and annoyance from communities at aircraft noise. We assess evidence that the area in which noise is experienced has shrunk, and we survey airports to find out how they are engaging local people whilst trying to manage noise. We took the noise contour of each airport and looked at new buildings being built within that area. We find that activity beyond the control of airports – namely local planning and building development – means airports cannot control the number of people within their noise contours.

Airports are the essential physical infrastructure of the aviation sector, and as such they play a vital role in helping aviation to manage its environmental impacts. Airports do not own and operate aircraft, which are the main source of aviation carbon emissions and noise – but they do help to develop and lead the initiatives which reduce carbon emissions and noise. This report proves that the carbon emissions from airports are reducing, showing that as buildings and businesses airports are putting their house in order and showing leadership in the aviation sector. Case studies show how airports work with their partners in aviation to encourage more sustainable behaviour throughout the sector, including leading initiatives to reduce carbon emissions and noise from flights.

In the **Conclusion** we offer five recommendations that policy-makers and other stakeholders should act upon to support the sustainable growth of the UK's airports. Airports are essential to the health of both the UK's economy and its society: now that we have proven their ability to grow sustainably, their growth should be given a green light by Government.

© Birmingham Airport

Chapter One:
Carbon

Introduction

In this chapter we define aviation carbon emissions and their contribution to man-made climate change, before summarising UK policy on aviation and climate change and the aviation industry's response to the policy. We focus in more detail on the role of airports in the aviation sector: whilst airports produce carbon on the ground and provide the physical support for flights, they do not own or operate aircraft, which are the main source of carbon emissions. Having put the role of airports in context, we present the carbon footprint of the UK's 18 biggest airports and find that this footprint has reduced since 2010.

Defining aviation carbon emissions and contribution to Climate Change

The United Nations Intergovernmental Panel on Climate Change (IPCC) says that climate change is occurring across the globe.[30] Key drivers of climate change are carbon dioxide (CO_2, also referred to as carbon) along with a mix of non-CO_2 gases. Carbon dioxide is a natural gas present in the earth's atmosphere, but its presence has increased due to the burning of fossil fuels such as gas, coal or oil in various industries. The increase of carbon, methane and nitrous oxide in the atmosphere has an impact on the earth's climate,[31] and as a result, industries that produce significant amounts of carbon emissions – including transport, due to the fuels burned by vehicles – are working to reduce their emissions and manage their environmental impact.

There are a number of ways in which the aviation industry produces carbon emissions, the largest being the burning of jet fuel for flights. Aviation is dependent on liquid hydrocarbon fuels[32] most notably kerosene.[33] Fuel burn and fuel burn excess are significant contributors to aviation's environmental impact.

To put aviation's carbon emissions in context, global aviation produces around 2% of the world's human-made emissions of carbon dioxide according to the IPCC. As global aviation grows to meet increasing demand, particularly in fast-growing

30 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. See www.ipcc.ch/report/ar5/

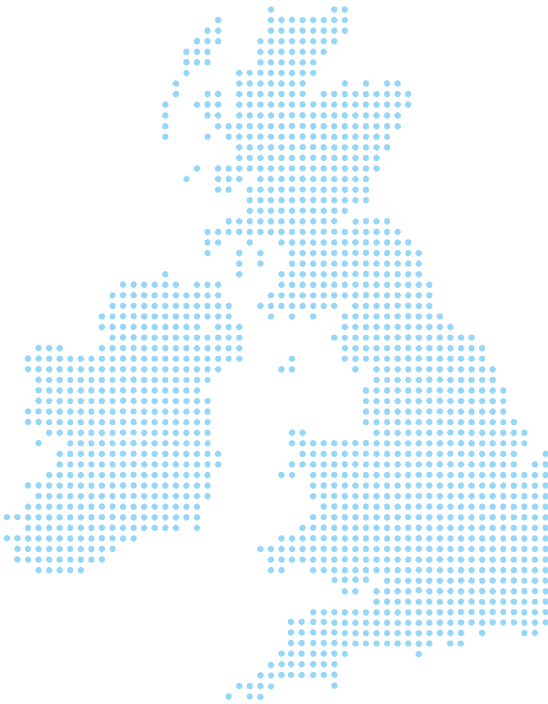
31 IPCC Fifth Assessment Report

32 *CO_2 Road-Map*, Sustainable Aviation, 2012.

33 For a useful summary see The Airports Commission Discussion Paper 03: Aviation and Climate Change, 2013. Available at: bit.ly/1whFnSx

emerging markets, the IPCC forecasts that its share of global human-made carbon emissions will increase to around 3% in 2050.[34]

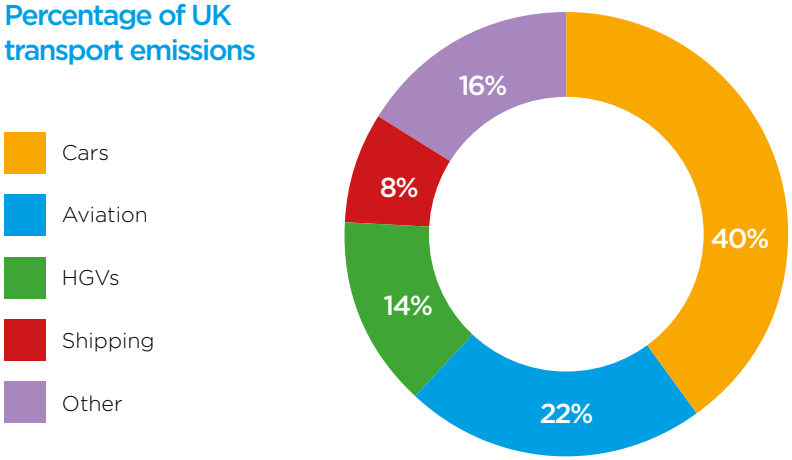
Sir Nicholas Stern's review of 2006, *The Economics of Climate Change*,[35] states that the largest contributor to human-induced carbon is power generation (24%), mostly produced in coal and gas fired stations. Next is land-use change at 18%, then agriculture, industry and transport at 14% each (with aviation part of transport). Buildings (8%), other energy related activities (5%) and waste (3%) make up the rest.



UK policy for aviation and carbon emissions

The UK Government's Aviation Policy Framework (APF) of 2013 says that globally, the aviation sector is responsible for about 1 to 2% of greenhouse gas emissions and in the UK, domestic and international aviation emissions account for about 6% of total greenhouse gas emissions.[36] This equates to 22% of the transport sector's greenhouse gas emissions, compared to 40% emitted by cars, 14% by heavy goods vehicles and 8% by domestic and international shipping – but the APF predicts that aviation is likely to make up an increasing proportion of the UK's total greenhouse gas emissions if other sectors decarbonise more quickly.[37]

Percentage of UK transport emissions



The APF follows on from the Climate Change Act of 2008, which set out a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% below base year levels by 2050. The target does not currently include aviation, as in 2012 the UK Government deferred its decision about whether to include international aviation emissions within the UK's net carbon account, due to uncertainty over the international framework for reducing aviation emissions, including the EU Emissions Trading System (ETS).[38]

The APF clarifies this approach, stating that the UK will not have a national emissions target until there is greater certainty over the EU ETS and the outcome of the International Civil Aviation Organisation (ICAO) negotiations towards a global deal on aviation emissions – if these are successful, they would apply from 2020.[39]

34 IPCC Fifth Assessment Report

35 *The Stern Review: The Economics of Climate Change*, Sir Nicholas Stern, 2006

36 Aviation Policy Framework, Department for Transport, 2013. This is calculated by gross emissions (the total amount of emissions emitted by the sector) and net emissions (which account for the emissions allowance or international project credits that a sector has traded with other sectors) – see APF p.42.

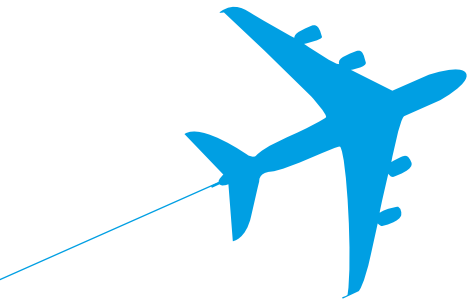
37 *Aviation Policy Framework.*

38 *UK Carbon budgets and the 2050 target: international aviation and shipping emissions,* DECC, 2012.

39 *Aviation Policy Framework.* For details of ICAO's work on a global ETS, see bit.ly/VHXXT4

In April 2014 the European Council adopted a regulation amending the EU ETS directive to cover only flights within the European Economic Area until 2016, in view of the implementation by 2020 of an international agreement applying a single global market-based measure to international aviation emissions.[40] The ETS agreement will play an important role in helping aviation offset its carbon emissions; and as a global ETS develops, airports and other organisations in the sector will need to continue work to reduce carbon emissions wherever possible.

The aviation industry's response to climate change and carbon emissions



Recognising the need to reduce aviation climate change emissions, in 2008 global aviation leaders established a climate plan[41] which set the following targets:

- From 2009 until 2020: average 1.5% efficiency improvement per year;
- From 2020: Capping emissions growth from aviation; and
- By 2050: halving net emissions based on 2005 levels.

In the UK the aviation industry responded to this plan, as well as national policy, through Sustainable Aviation (SA), the world's first aviation industry-wide coalition, which explored in detail a range of opportunities to disconnect future growth in UK aviation from growth in carbon emissions.[42] The results were published in the CO_2 Road-Map[43] in 2012. This work demonstrated the global targets set in 2008 can also be achieved in the UK through a mix of improved aircraft and engine technology, more efficient aircraft operations, a growing use of sustainable jet fuels and supporting an effective global carbon trading scheme. Together these measures mean the UK aviation sector could grow to 2050 whilst reducing carbon emissions.

The CO_2 Road-Map[44] predicts that specific changes for how operations, the introduction of new aircraft and the use of sustainable aviation fuels will reduce the industry's carbon emissions as follows:

Mitigating carbon emissions: proportion of emissions reduced by current and future changes in aviation

CO_2 Road-Map action		Anticipated carbon reduction	
Flight management and operations		9 %	
Sustainable Fuels	2030	8 %	
	2050	18%	
New aircraft efficiency improvement relative to 2000	to 2020	NB[45] 13%	WB[46] 17–20%
	2020–2030	NB 35%	
	2030–2040		WB 50–54%
	2040–2050		
Carbon Trading	2050	As required to reduce net CO_2 emissions to 50% of 2005 levels	

The CO_2 Road-Map shows that operational changes, sustainable aviation fuels, new aircraft and carbon trading will together enable the industry to reduce its carbon emissions to 50% of

40 For details of the 15 April changes see bit.ly/XFDhwz

41 For details of the 2008 Aviation & Environment Summit in Geneva, see bit.ly/1saU6bz

42 Sustainable Aviation: www.sustainableaviation.co.uk

43 *CO_2 Road-Map,* Sustainable Aviation, 2012. See www.sustainableaviation.co.uk for all Sustainable Aviation papers and report.

44 CO_2 Road-Map. Since 2012 Sustainable Aviation has published further information showing progress in CO_2 reduction in its 2013 Progress Report plus in July this year it published a discussion paper on *Fuelling the Future,* exploring the sustainable aviation fuel issue in more detail.

45 NB: narrowbody aircraft, corresponding to the *"single-aisle"* category – see *CO_2 Road-Map* for details.

46 WB: widebody aircraft, corresponding to the *"twin-aisle"* and *"very-large"* aircraft categories – see *CO_2 Road-Map* for details.

2005 levels by 2050. Whilst the industry is in a place to directly lead operational changes and the technological development and introduction of new aircraft, they rely upon other industries and on the Government to ensure that sustainable aviation fuels and carbon trading are available. In July 2014 SA published a discussion paper, *Fuelling the Future,* setting out barriers to the production of sustainable aviation fuels and welcoming evidence as to how these barriers can be overcome to scale up production. The UK Government can help the industry achieve this scale up by supporting a framework of incentives to stimulate investment, research and development, and commercialisation for sustainable aviation fuels.[47]

The role of airports in aviation carbon emissions

Carbon emissions around UK airports arise from a mix of sources. Whilst aircraft emissions dominate, substantial emissions also arise from vehicles coming to and from the airport plus those operating at the airport. A further significant source is from emissions generated in heating and providing power at the airport. The type of route an aircraft follows can affect how much fuel it uses. For example 'Continuous Decent Approach' and 'Continuous Climb Departure' are landing and taking off techniques that can reduce carbon emissions by using less fuel.[48] Aircraft also emit carbon while grounded: taxiing aircraft, holding and lengthy queues all increase the amount of fuel used.[49]

As the ground-based infrastructure of the aviation industry, airports play a role in the sector's carbon emissions. Although airports do not own or operate aircraft, they can influence and help to guide the fuel and carbon emissions aircraft use. But there are other types of carbon emissions from airports, which are not specific to aviation but are created by their buildings and business operations, such as the energy used in their retail spaces and staff journeys to work. Some of these emissions are more directly in the control of airports and contribute to their overall carbon footprint.

All airports use similar methods, often externally verified, to measure their carbon emissions, calculated first and foremost by monitoring the fuel used to run their buildings (for example, the fuel used to provide heat, light and energy to run technology). Whilst all airport operators monitor the carbon emissions they create directly, others also monitor those they can guide and influence (a list of how the carbon was calculated for each airport is available in the appendices to this report). For example, an airport is responsible for the fuel it burns on site to run its premises and staff operations, but can only guide the type of transport its staff use to get to work, and can only influence the amount of fuel burned by the aircraft operating out of the airport.

One of the more common methods, used by eight of the 18 airports in our report, is to categorise the type of carbon emissions into 'scopes' of activity, as advised by the Green House Gas (GHG) Protocol.[50] This provides an effective way to assess the direct and indirect emissions produced by an airport, and is similar to an assessment of whether airports can control, or guide, or influence the source of emissions.

47 *Fuelling the Future,* Sustainable Aviation, 2014.

48 For further details about operational procedures that reduce carbon emissions, see *Reducing the Environmental Impacts of Ground Operations and Departing Aircraft: An Industry Code of Practice,* June 2012 and *The SA Noise Road-Map: A Blueprint for Managing Noise from Aviation Sources to 2050,* April 2013, both by Sustainable Aviation.

49 *CO_2 Road-Map.*

50 For more information see: www.ghgprotocol.org/about-ghgp

Airport carbon emissions defined by Scopes

To give a practical example, this graphic illustrates the sources used to calculate each scope by two airports that use similar sources, Heathrow[51] and Glasgow.[52]

1

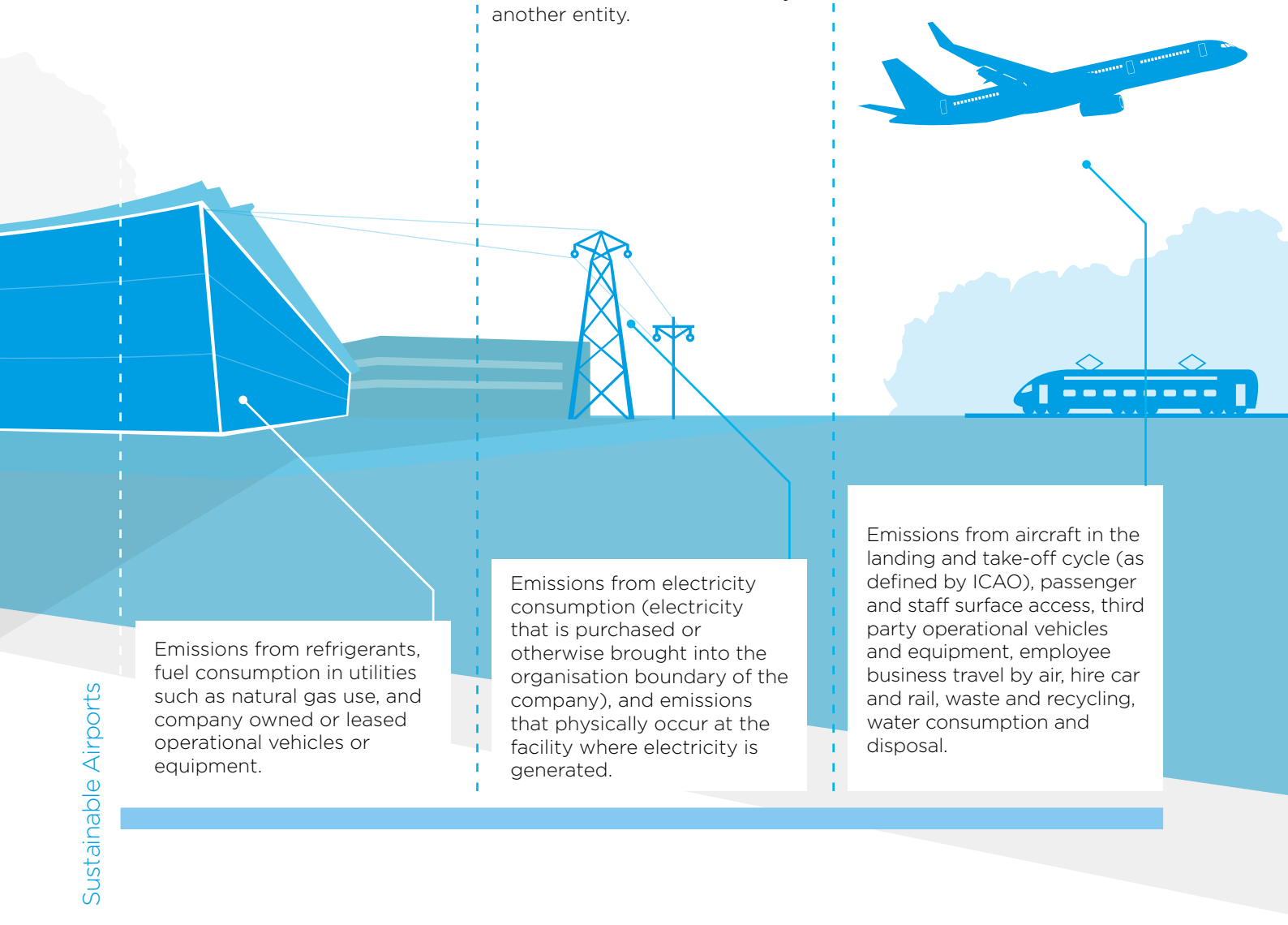
Emissions an airport can usually control; the GHG Protocol describes Scope 1 as all direct emissions, meaning sources that are owned or controlled by the reporting entity.

2

Emissions an airport can usually guide; the GHG Protocol describes Scope 2 as indirect emissions from consumption of purchased electricity, heat or steam. Indirect emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

3

Emissions an airport can usually influence; the GHG Protocol describes Scope 3 as other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, and other similar activities.



Emissions from refrigerants, fuel consumption in utilities such as natural gas use, and company owned or leased operational vehicles or equipment.

Emissions from electricity consumption (electricity that is purchased or otherwise brought into the organisation boundary of the company), and emissions that physically occur at the facility where electricity is generated.

Emissions from aircraft in the landing and take-off cycle (as defined by ICAO), passenger and staff surface access, third party operational vehicles and equipment, employee business travel by air, hire car and rail, waste and recycling, water consumption and disposal.

Airports may calculate emissions from other categories of activities without referring to them in 'scopes', but counting similar sources and resulting in similar metrics. Many airports will also use an external body to verify their calculations, or sign up to a verified scheme. One such scheme is 'Airport Carbon Accreditation', the airport carbon management programme set up by ACI Europe.[53] In January 2014, 78 European airports in 24 countries were accredited through the programme.

The ACI Europe Airport Carbon Accreditation scheme assesses how airports manage and reduce their carbon emissions through four levels of certification:

1. Mapping: airports must measure their carbon footprint, usually with a focus on Scopes 1 and 2 and verified by an independent third-party. The management of the airport must make a policy commitment to reduce the carbon emissions.

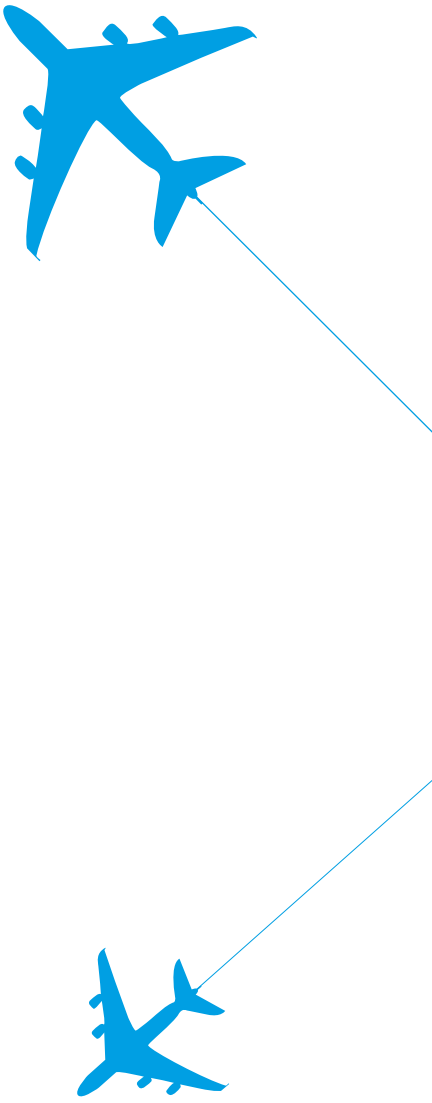
2. Reduction: airports must manage their carbon emissions and make progress towards a reduced carbon footprint, showing an average reduction of CO_2 emissions for three years.

3. Optimisation: in addition to levels 2 and 3, airports must widen the scope of their carbon footprint to include a range of Scope 3 emissions such as landing and take-off cycle emissions, staff business travel emissions and surface access to the airport by passengers and staff. This means the airport must engage third parties such as airlines, catering companies, air traffic control and other service providers working on the airport site.

4. Neutrality: airports must not only fulfil all other levels but also offset remaining Scope 1 and 2 carbon emissions to achieve carbon neutrality (when the net CO_2 emissions over an entire year are zero).

Levels 3 and 4, by including Scope 3 emissions, start to take into account carbon emissions from flights in the landing and take-off cycle. Airports therefore work with their partners to help reduce the fuel used to fly aircraft; one of the ways they do this is through involvement in the Sustainable Aviation (SA) coalition.

Through partnerships with SA and their own individual environmental plans, airports are working hard to manage their carbon emissions. Looking at the 18 biggest airports in the UK, we have found that their work has been effective and, nationally, airport carbon emissions have reduced in recent years. The scopes airports use to calculate their carbon emissions vary slightly, as explained above. Whilst all airports measure the fuel used to run their premises and staff operations, eight of the 18 airports also include Scope 3 emissions, which include staff and passenger travel to the airport and aircraft in the landing and take-off cycle. For this reason we cannot compare individual airports. However, airports have used a consistent methodology each year, so we can compare their emissions over time.



51 The emissions used to calculate each scope are defined in *Heathrow's report 2012 Sustainability Performance Summary: Towards a Sustainable Heathrow* at bit.ly/1AEs7Gh

52 The emissions used to calculate each scope were shared by Glasgow airport with the AOA directly, and are published here with the airport's permission.

53 For full details of the ACI programme see: bit.ly/1llGg7Z

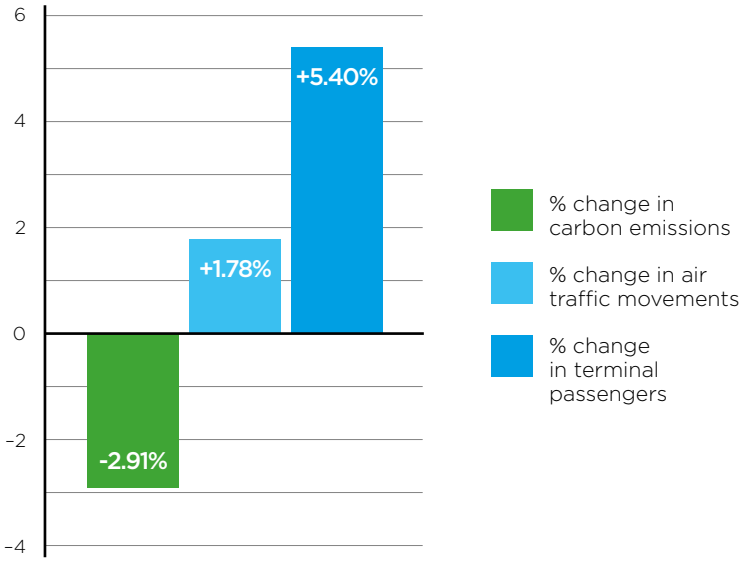
Carbon reductions at UK airports

Eighteen UK airports shared their individual carbon emission figures[54] for 2010 and for 2012. **The total carbon emissions in 2012 were reduced by 2.91% compared to 2010; at the same time, passengers at the airports increased by 5.4% and their flights (Air Traffic Movements) increased by 1.78%.** This proves that airports are committed to sustainability and are working to improve their environmental impact and reduce their carbon emissions whilst growing.[55]

This chart shows the percentage by which carbon emissions reduced and air traffic increased in 2012 compared to 2010 at the UK's 18 biggest airports.

Airport carbon emissions in 2010 and 2012

18 biggest airports in UK	2010	2012	Change	%
Total annual CO_2 (tonnes)	4,015,160	3,898,488	-116,672	-2.91%
Terminal passengers[56]	201,667,719	212,560,735	+10,893,016	+5.40%
Air traffic movements[57]	1,794,000	1,826,000	+32,000	+1.78%



Changes in airport carbon emissions between 2010 and 2012

2 airports kept their carbon emissions **roughly the same** (showing an increase of 0.1% and 0.007% each)

13 airports **decreased** their carbon emissions

3 airports **increased** their carbon emissions

54 These airports all reported their emissions in Scopes 1 and 2, and some of them in 3. The specific year (calendar or financial) over which they calculated emissions, their methods and verifying bodies, were different: see the Appendix for further details as to how emissions were calculated.

55 As noted previously, some of the airports included Scope 3 emissions and others did not. This means that aircraft emissions produced during the landing take off cycle are included for some airports and not others. Individual figures are not published in this report but Appendices show how each airport calculates emissions.

56 Based on CAA Terminal Passenger figures in 'Table 10 3 Terminal Pax 2003 2013' available at bit.ly/1saSVsA

57 Based on CAA Air Transport Movement figures available at bit.ly/1saSVsA

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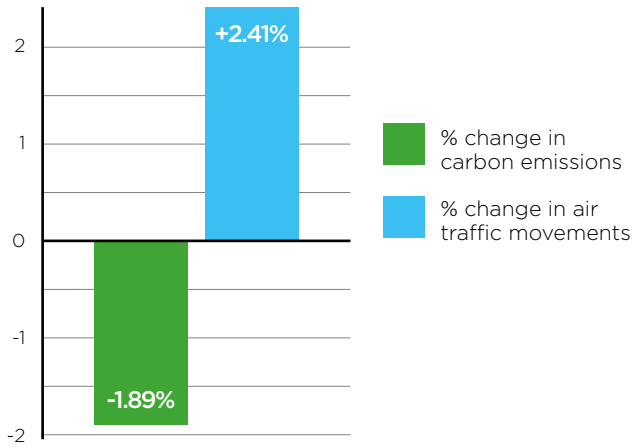
Some airports include Scope 3 emissions in their total carbon emissions and some do not. Scope 3 usually includes the landing and take-off cycle of aircraft, and therefore includes some reflection on aircraft movements and the carbon emissions they generate. On this basis, Scope 3 figures show a more specific reflection of the aviation sector's carbon emissions, as emissions from flights are included in Government estimates and some of the Scope 1 and 2 emissions at airports are not (as they reflect emissions that any business or public building would have).

It is therefore worth looking at the annual carbon emissions of airports that do include Scope 3 in their calculations and assessing whether these have decreased in relation to air traffic movements. The figures show that these airports also decreased their carbon emissions whilst increasing the number of flights:

Scope 3 airport carbon emissions in 2010 and 2012

8 airports that include scope 3 in their emissions

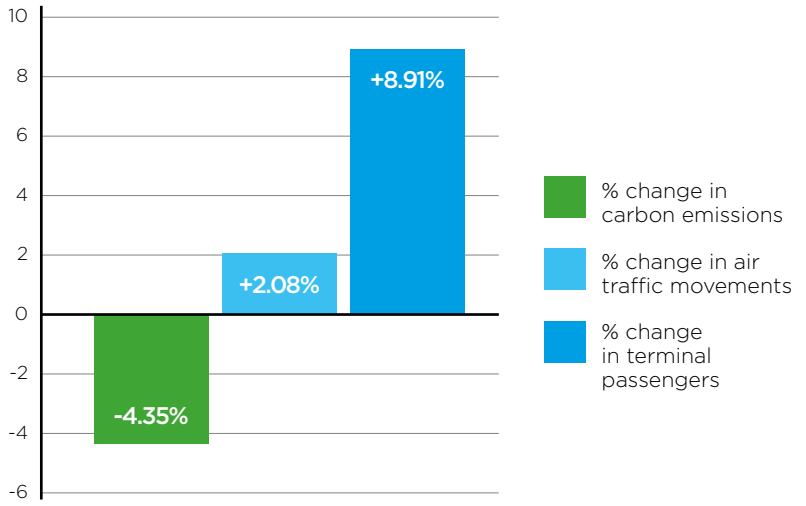
	2010	2012	Change	%
Total annual CO_2 (tonnes)	3,850,116	3,777,339	-72,717	-1.89%
Air traffic movements	1,163,000	1,191,000	+28,000	+2.41%



Some airports were also able to share 2013 carbon emissions with us at the time of researching this report. We have only included those that used the same calculation methods for their 2010 emissions, so that the data remains comparable. Fourteen airports shared comparable data for 2013: the chart overleaf shows the percentage by which carbon emissions reduced and air traffic increased in 2013 compared to 2010 at 14 airports that were able to share their 2013 carbon emissions.

Airport carbon emissions in 2010 and 2013

14 airports for which 2013 figures are available				
	2010	2013	Change	%
Total annual CO_2 (tonnes)	406,889	389,209	-17,680	-4.35%
Terminal passengers	77,422,149	84,321,138	+6,898,989	+8.91%
Air traffic movements	867,000	885,000	+18,000	+2.08%



There are a number of ways in which airports are achieving these reductions. The case studies in this report give some examples, but activities include:

Alternative power sources for aircraft

Airports play a vital role in ensuring there are more sustainable ground-energy sources available for aircraft. Within the Sustainable Aviation CO_2 Road-Map, airports committed to developing auxiliary power unit (APU) substitution. This means using power other than the aircraft's APU to reduce emissions at the airport, which could reduce carbon by 0.3-0.6%.[58] Significant savings may be possible as APUs burn about six times as much fuel as mobile Ground Power Units , which in turn, burn more fuel and thus emit more carbon than other, terminal-based energy sources.[59]

Improving surface access

Improved public transport links and more efficient use of road and rail networks can enhance access to airports for passengers, airport employees and freight. This provides more sustainable travel choices, thereby helping to reduce airport related congestion and emissions. Airports publish and invest in surface access strategies, which include targets for the proportion of passengers using public transport to reach the airport. Some examples of surface access improvements are included in a case study in this report. A better integrated transport policy from the UK Government would help to realise surface access improvements to airports.

58 *CO_2 Road-Map.*

59 The voluntary *Departures & Ground Operations Code of Practice* that was developed by industry bodies in June 2012 recommends the ground power hierarchy of using airport terminal-based Fixed Electrical Ground Power (FEGP) and Preconditioned Air (PCA) where available first; then mobile ground-based Ground Power Units (GPUs) and air conditioning trucks; followed by aircraft Auxiliary Power Units (APUs) as a last resort. For further details about alternative power sources and their sustainability, see the voluntary *Code of Practice.*

Energy efficient buildings and business practice

Airports are setting up carbon saving initiatives inside their buildings and through their infrastructure. These include:

- **Energy saving initiatives:** Airports are using smarter meters and computer software to track energy use, and investing in energy efficiency equipment (such as lighting replacement programmes, switching to energy saving LED lighting and sensor movement lighting, to prevent wastage in empty areas).
- **Insulation:** New airport terminals often demonstrate energy efficient design and use high performance glazing and insulating materials. In existing buildings, airports can use alternative energy sources for heating and cooling their buildings.
- **Recycling:** Many airports are committed to whole site recycling, making sure that contractors also recycle waste.

Some examples of sustainable terminal design and smart building operational systems are included in the case studies in this report.

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Conclusion

At a national level, airports are reducing their annual carbon emissions whilst increasing their passengers and flights. The 2.91% reduction between 2010 and 2012 carbon emissions is less than 0.1% below the average 1.5% annual improvement in efficiency recommended by global aviation leaders. Airports will not stop here: they have their own environment plans that show how they have achieved their carbon reductions, and strategies to reach further reduction targets. They should continue this good work, and consider signing up to a recognised scheme to reduce, as well as monitor, their carbon emissions – ACI's Carbon Accreditation (Stage 2), Reduction – is one such scheme. The next steps to achieving greater reductions in carbon cannot be achieved by airports alone, nor by the wider aviation sector – they need Government policy support.

To help the aviation sector achieve greater carbon reductions, the Department for Transport (DfT) must help make two important initiatives successful.

- First, it needs to support the development of sustainable aviation fuels. The DfT should provide an incentive framework to stimulate investment, research and development, and commercialisation for sustainable aviation fuels. The fuels should be eligible for incentives in the same way that credits are awarded to qualifying road transport fuels under the Renewable Transport Fuel Obligation.
- Second, the DfT can press for agreement on, and support for, implementation of a global carbon-trading solution, encompassing aviation and ensuring a level playing field for all participants.


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Case studies: Managing carbon emissions

Heathrow
Making every journey better

Heathrow: sustainable terminal design

Heathrow airport is on course to meet its target of reducing carbon emissions from energy used in buildings by 34% by 2020 (compared to 1990 levels). The new Terminal 2, which opened in 2014, is the latest step towards this target and part of £11 billion invested by the airport since 2003.

Design

The architectural design of Terminal 2 prioritises sustainability and passenger experience. The size of the terminal and its proximity to Heathrow's runways help to reduce aircraft taxi times and therefore the fuel needed to move aircraft around the airport, in order to save carbon emissions. The terminal was also planned to accommodate larger, more efficient aircraft, such as Airbus A380s, which have very low fuel burn per seat and emit half the noise of comparable large aircraft. Inside the terminal, 10-metre-high windows maximise natural light, while the roof's north-facing skylights reduce the need for artificial lighting.

Construction

Working in collaboration with Heathrow, the Building Research Establishment (BRE) developed the first bespoke standard for airport terminals to assess, recognise and encourage construction sites managed to reduce resource use, energy consumption and pollution. Terminal 2 is the first airport terminal to undertake and achieve the new BREEAM (BRE Environmental Assessment Methodology) assessment, with a score of 72.3% (Excellent) for the main terminal and 62.2% (Very Good) for the supporting satellite building. This was achieved through building initiatives such as recycling over 90% of construction waste.

Energy supply

Twenty percent of the energy supplied to both Terminals 2 and 5 comes from Heathrow's Energy Centre, one of the UK's largest biomass initiatives. The renewable energy created by the Centre will save 13,000 tonnes of CO_2 each year than would be produced by gas and grid electricity, so that Terminal 2 is 40% more energy efficient than required through Building Regulations. Heathrow also ensures that 75% of the woodchip needed is sourced from a 50 mile radius of the site, to support local businesses whilst reducing haulage times and associated emissions.

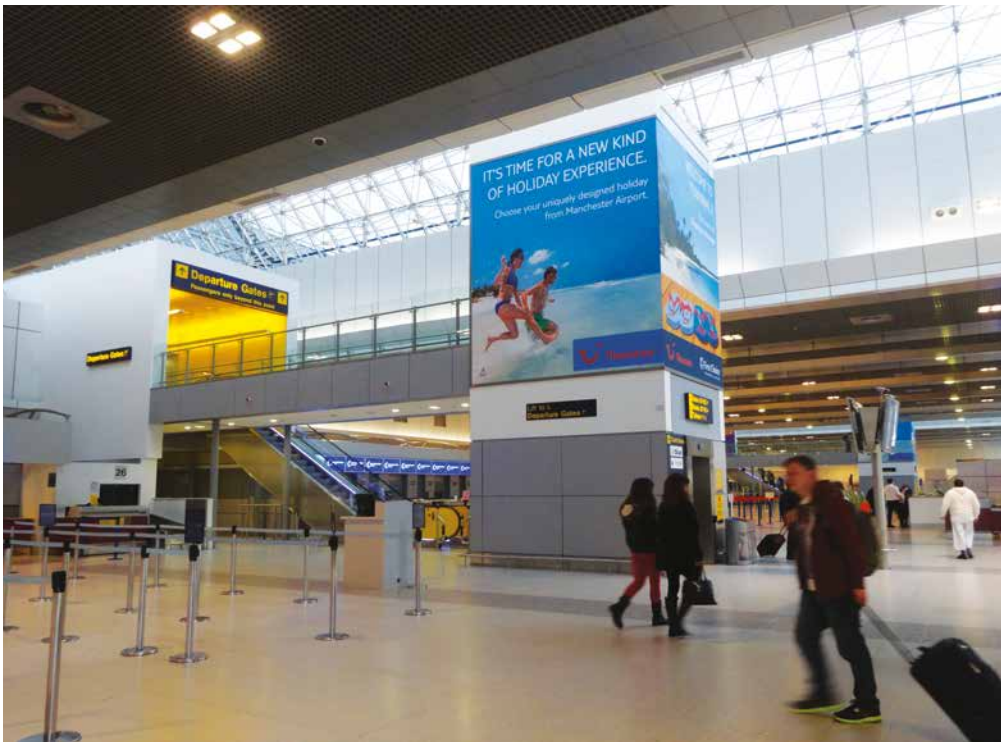
Case study

Manchester: energy efficiency

Manchester airport has saved more than 10 GWh (Gigawatt hours) of gas and electricity use during the last year, by reviewing and changing lighting throughout all three terminal buildings and developing intelligent building systems to control how and when the lighting and other services are used.

The new strategy at the airport is designed to achieve energy savings and incorporate new energy reporting tools through virtual metering. In addition to the review and replacement of luminaires (electrical light fixtures), a new Building Control system was developed, called Flight Link, which is an intelligent system that links real time flight data to the Buildings and Environment Management System that controls all the lighting, heating and cooling in the terminal buildings. As flights arrive at a gate, the building springs into action and the light, heating or cooling systems start so that the passengers can use the building comfortably. When there are no passengers or staff due to use an area of the building, the lights are automatically turned off and are only activated by motion sensors.

Additional energy-saving and monitoring equipment has helped the airport achieve an overall reduction of more than 10GWh of gas and electricity use during the last year, which is the equivalent of providing gas and electricity for 1775 households for a whole year.



© Manchester Airport

Terminal 1

- General lighting: replaced 4,163 luminaires and removed 162 redundant luminaires.
- Emergency lighting: replaced 399 luminaires and added 98 emergency luminaires to improve emergency lighting system.

Annual energy saving of 1.9 GWh of electricity.

Annual reduction of 997 tCO_2 (tonnes of CO_2).

Terminal 2

- Divided into two phases, the first of which is complete and replaced 1,174 luminaires and removed 393 redundant luminaires. The scheme has resulted in an annual reduction of 873 Mwh (megawatt hours) in electricity.
- Phase Two of the scheme proposes the replacement of a total of 1,324 luminaires and the removal of 936 luminaires. The scheme will result in an annual reduction of 1.4 GWh of electricity, which equates to a reduction of 737 tCO_2.

Annual energy savings of 2.2 GWh of electricity across both phases.

Annual reduction of 1,206 tCO_2.

Terminal 3

- General lighting: replaced 2,651 luminaires and removed 452 redundant luminaires.
- Emergency lighting: replaced 411 luminaires and added 164 emergency luminaires to improve emergency lighting system.

Annual energy savings of 1 GWh of electricity.

Annual reduction of 585 tCO_2.

The luminaires selected for the schemes can be individually dimmed and controlled to switch off during daylight hours; this will increase the energy savings to an additional 50%.

Lights not in use as natural light levels are sufficient

Lights in use further away from window

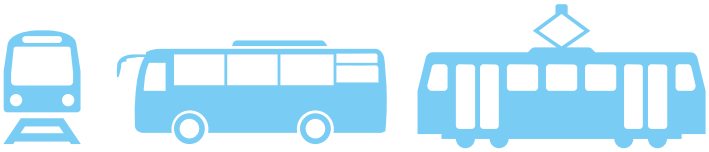
Case study

Surface access: sustainable ground transport to UK airports

Better rail links and better use of roads are also positive for the environment.

Improved public transport links and more efficient use of road and rail networks can enhance access to airports for passengers, airport employees and freight. This would provide more sustainable travel choices, thereby helping to reduce airport related congestion and emissions.

All of the airports in this report are keen to improve the ground transport links, or surface access, to their airport sites in order to encourage more sustainable travel. This includes setting targets for the proportion of passengers who use public transport; investing in improvements to transport links; and measuring their successes.



Edinburgh

Target:

Edinburgh's goal is to increase the number of passengers using sustainable transport (bus and tram) by a further 7%, rising from 28% to 35% by 2017.

Investments and improvements:

Until May 2014 buses provided the only public transport links to Edinburgh airport. The addition of the tram, which began operating in May 2014, will provide passengers with additional choice whilst also adding resilience to the local transport network. In addition to this a new railway station will be built on the Edinburgh to Fife line by 2016, providing heavy rail links for passengers to cities in the north of Scotland, such as Dundee and Aberdeen. The growth of the airport has also supported a new bus route to Glasgow, which has run since July 2013 and patronage on this is growing.

Successes:

Prioritising public transport outside the main Terminal building saw patronage rise from 16% to 22.2% by 2007. Further gains have been made and the public transport mode-share has increased to 28%.

London Luton

Target:

London Luton aims to increase the proportion of passengers who travel by public transport to more than 40% by 2017.

Investments and improvements:

Following successful discussions between London Luton airport and the Department for Transport, the operator of the new 2014 Thameslink, Southern and Great Northern Franchise will be required to run a minimum of two services an hour between London St. Pancras International and Luton Airport Parkway during the busy early morning period. The new twice hourly minimum service represents a significant improvement in terms of rail connectivity with the capital and further enhances the existing link which provides up to eight services each hour to London Luton.

Successes:

The new franchise arrangements will improve London Luton's public transport access, with an estimated 400,000 to 600,000 existing airport passengers expected to use the improved link each year.

Stansted

Target:

As passenger numbers continue to grow at Stansted, the airport aims to maintain the yearly target of 50% of all passengers using public transport. They also aim to grow rail usage from 22% to 25% by 2019, with a renewed focus on reducing journey times from London to the airport by 2021.

Investments and improvements:

One of the main catalysts for growth has been the sustained development of the bus and coach network spearheaded by the airport's multi agency Transport Forum. Over 40 new and improved services have been introduced since 2001 and the network has expanded to all the major towns and cities in the UK, with over 17 coach services an hour operating between Stansted to London. In 2013, over 5 million passengers used the airport bus and coach network.

Successes:

At Stansted 50.9% of passengers used train, coach or bus to get to and from the airport during 2013, showing continued improvement.

Year	Passenger public transport usage (%)
2000	34
2005	39.3
2010	47.9
2013	50.9

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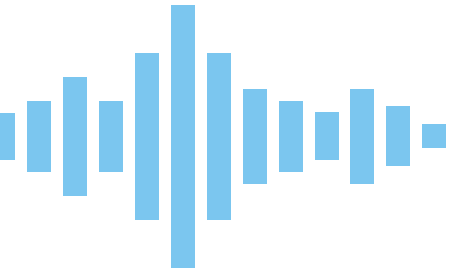
© Stansted Airport

Chapter Two:
Noise

Introduction

In this chapter we define both the policy context for aviation noise, and some of the challenges presented by the need to define and measure annoyance at noise. There is no hard and fast rule for annoyance – it is a personal response to a noise event. What airports can do is: a) work within policy set by Government and try to reduce the number of people inside the 57dB L_{Aeq} 16 hour contour and b) work with local communities that remain inside the contour to try to mitigate annoyance. What airports cannot do is: c) control how land is developed, how new buildings emerge within the contour, and how adequate their standards of noise insulation are.

In this chapter we discuss all three of these important activities, to both explore what airports are doing and how successful they are in managing noise, and to find out what others can do to further manage the noise contours around airports.



Defining aviation noise in policy

Aircraft create noise, particularly noticeable where they fly closest to the ground, such as where they depart from and land at airports. Noise is a complex issue that airports have to manage; for example, different frequencies and volumes cause annoyance to different people. The Government's policy on aviation noise states that "the number of people in the UK significantly affected by aircraft noise" should be limited and, where possible, reduced.[60] This is usually measured through a noise contour, an area of land within which aircraft noise is experienced.

There are different ways of measuring this noise contour: the Government uses the 57dB L_{Aeq} 16 hour contour (see the Information Box on the page opposite) as the average level of daytime aircraft noise to mark the approximate onset of significant community annoyance.[61] Whilst the designated contour is far from a perfect measure, as explained overleaf, its historical application means it is a useful tool for considering the relative impact of noise over time.

60 *Aviation Policy Framework*, Department for Transport, 2013.

61 *Aviation Policy Framework*.

What is the 57dB L_{Aeq} 16 hour contour?

The 'dB L_{Aeq}' metric is used to provide a description of noise exposure experienced over a given period of time.

dB refers to decibel units describing sound level or changes of sound level. dBA is similar, but refers to units of sound level on the A-weighted scale, which is explained below.

L_{Aeq}, 16-hour is the equivalent sound level of aircraft noise in dBA for the 16 hour annual day. For conventional historical contours for a particular year, this is based on the daily average movements that take place between 0700 and 2300 local time during the 92-day period 16 June to 15 September inclusive.

The 'A' in L_{Aeq} and dBA means the sound level has a frequency weighting that is applied to the electrical signal within a noise-measuring instrument to simulate the way the human ear responds to a range of acoustic frequencies. This is because the human ear is less sensitive to low audio frequencies, so A-weighting is applied in an effort to account for the relative loudness perceived by the human ear.

We have used the 57dB contour for all 18 airports. Where the method of measuring this decibel level is not L_{Aeq}, 16 hour we have explained the alternative method in the appendices to this report.

Further information

For a descriptive account of this and other metrics commonly used to measure aircraft noise globally, see:

Metrics for Aircraft Noise
ERCD Report 0904, CAA, January 2009
bit.ly/1C2YQ9W

Noise Discussion Paper
Airports Commission, July 2013
bit.ly/1wDiQjg

Further policy on aircraft noise sets out different levels of noise contours and different responsibilities airports have to communities within these levels. The Aviation Policy Framework (APF) states that airport operators should offer households exposed to noise levels of 69dB or more assistance with the cost of moving, and additionally that acoustic insulation should be offered to noise sensitive buildings exposed to noise levels of 63dB or more (again based on an L_{Aeq}, 16 hour contour).[62]

The APF recommends that airports considering developments which result in an increase in noise review their compensation schemes, and offer financial assistance towards acoustic insulation to homes that experience an increase in noise of 3dB or more where it leaves them exposed to levels of noise of 63dB or more. The APF also states that significant community annoyance is expected within the 57dB L_{Aeq}, 16 hour contour (hereon referred to as the given noise contour).[63]

The APF recognises the 'Balanced Approach' to noise developed by International Civil Aviation Organisation (ICAO), which the AOA supports.[64] This approach is comprised of four elements, namely:

- reduction at source (quieter aircraft);
- land-use planning and management;
- noise abatement operational procedures; and
- operating restrictions.

62 *Aviation Policy Framework.*

63 *Aviation Policy Framework.*

64 For more information see bit.ly/1pHzfhM

The AOA and our Sustainable Aviation (SA) partners support this approach, although we believe that due to the importance of aviation to the economy and society, operating restrictions should be employed only as a last resort after full consideration has been given to the other dimensions of the 'Balanced Approach'. We also believe community engagement is important in managing noise, which is discussed later in this report.

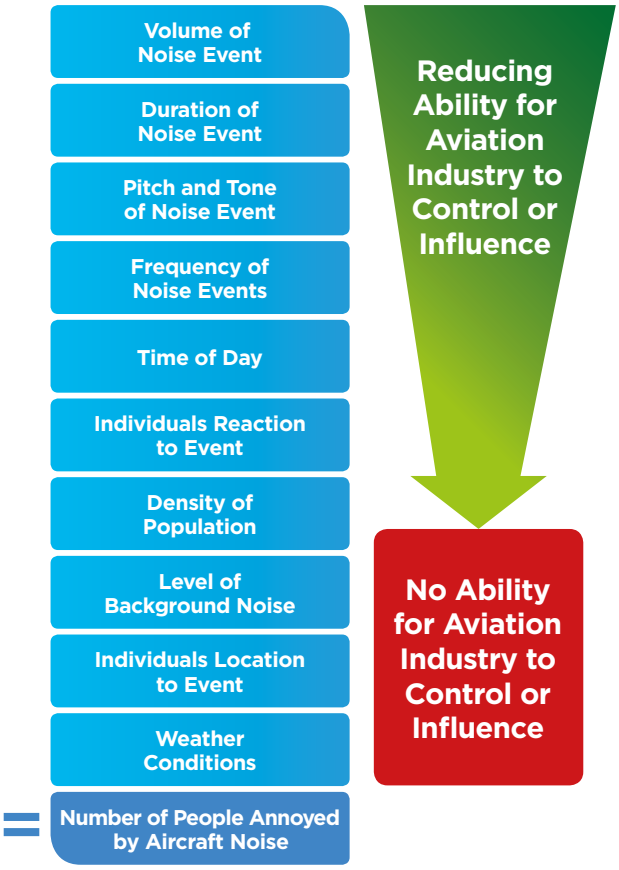
The difficulty of measuring noise

The problems with the Government's chosen method of measuring noise and the onset of annoyance would also apply to any other method. In choosing what to measure, there will always be relevant examples that sit outside the definition. For example, the given noise contour (57dB L_{Aeq} 16 hour) excludes night flights, which some residents feel are more disturbing than flights during the day.

In using the given noise contour to mark the approximate onset of significant community annoyance, APF policy focuses on the number of people exposed to noise, and defines the level of noise that should be used to measure annoyance. But there are some people inside the contour who do not feel annoyed by aircraft noise, and some outside of it who do. Different frequency ranges, intensities and time periods of noise will affect people in different ways. The description of the noise contour on the preceding page suggests sources of further information about other ways of measuring noise.

SA has developed a 'Noise Challenge' diagram (below), which illustrates both the complexity of noise and suggests which aspects the industry can control.[65]

Sustainable Aviation Noise Challenge



65 *Noise Road-Map*, Sustainable Aviation, 2013

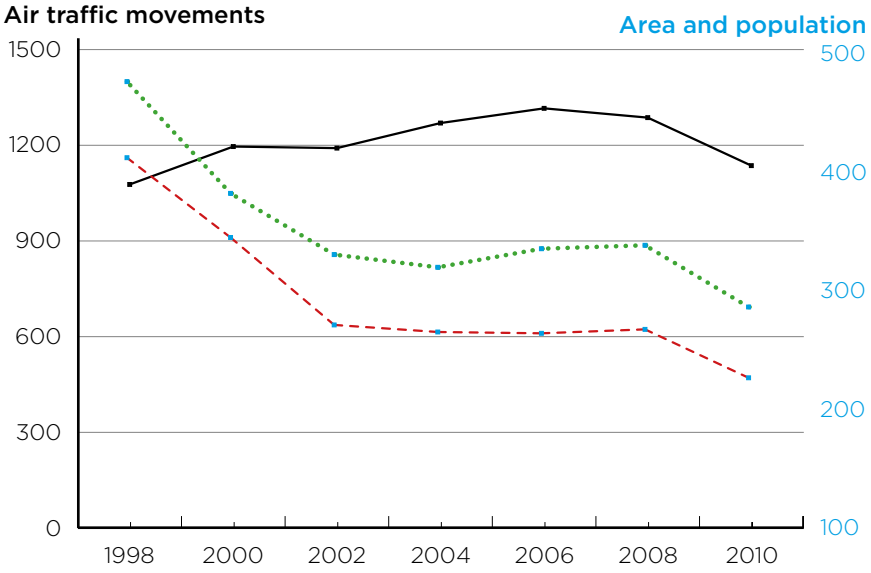
How airports are dealing with noise

a) Reducing the noise contour

The Sustainable Aviation initiative[66] has published a series of Road-Maps including a Noise Road-Map which sets out how, even with Air Traffic Movements almost doubling to 2050, there will be no increase in aircraft noise. This can be achieved through the development and introduction of quieter aircraft alongside the implementation of better operating procedures and improved land-use planning.

Combined Noise Trends for six major UK airports - Heathrow, Gatwick, Manchester, Stansted, Birmingham and Luton (1998–2010)

	1998	2000	2002	2004	2006	2008	2010
ATMS (000's)	1077.2	1196	1191.1	1269.7	1315.8	1286.7	1136.2
Area 57 Leq (km2)	409.6	342.9	269.8	263.9	262.8	266.1	225.6
Pop within 57 Leq contour (000's)	473.2	379.8	328.6	318.0	333.5	336.4	284.8



This graph and data table developed by SA demonstrates that the area around airports in which higher levels of aircraft noise are experienced has reduced by 45% since 1998.[67] This is a result of intelligent airport planning and changes to operational procedures, as well as the work of other businesses in the aviation sector, such as manufacturers and airlines developing and introducing quieter aircraft.

Airports manage noise through a raft of measures, detailed in their Noise Action Plans and, when they are developing their assets, through their Master Plans. Airport Noise Action Plans have been developed by those airports required to do so under the Environmental Noise (England) Regulations 2006.[68] These five year plans draw together the range of activities airports commit to delivering when tackling issues from aircraft noise.

66 Further details of the initiative, and its most recent progress report which was published in December 2013, can be found at www.sustainableaviation.co.uk.

67 The area of the 57 Leq noise contours of 6 major airports shrunk from 409.6 km2 in 1998 to 225.6 km2, according to the Sustainable Aviation *Noise Road-Map* (p62), a decrease of 44.92%.

68 The regulations apply to civil airports which have more than 50,000 movements per year (a movement being a take-off or a landing), excluding those purely for training purposes on light aircraft.

The plans are discussed with a wide range of airport stakeholders and formally agreed by the Government; and they are reviewed and re-developed for a further five years.

Airport Master Plans are developed to show how future airport growth is likely to occur and include details on environmental impacts. The Plans will often include a prediction of future airport noise contours based on predicted changes in the volume and type of aircraft likely to operate and ways to manage that noise.

There will always be areas over which aircraft need to land and take off, and sometimes these areas include housing and community buildings that cannot be easily avoided. Where this is the case, airports are working with communities to understand their responses to aircraft noise.

b) Community engagement

In addition to ICAO's 'Balanced Approach', the SA Noise Road-Map proposes another activity for managing noise: community engagement. The number and types of flights, and the approach of local people towards the airport, all vary at every airport across the country. Community engagement is therefore an important local activity that airports use to understand the specific concerns of the people living and working near their flightpaths or in their noise contours, and how they can help to alleviate those concerns.

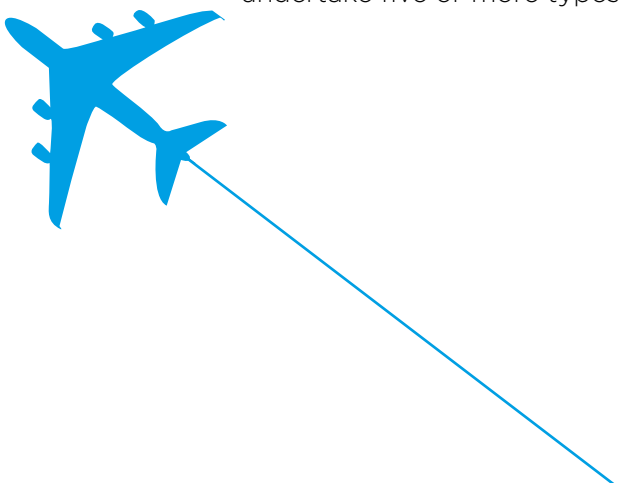
The AOA surveyed the UK's 18 biggest airports to find out what activities they undertake regularly through their Noise Action Plans. We also asked them whether they undertook additional outreach work and whether they evaluated the success of their engagement work. The results varied, often according to the size of the airport, but the national picture is one of a sector committed to local engagement.

Survey Question:

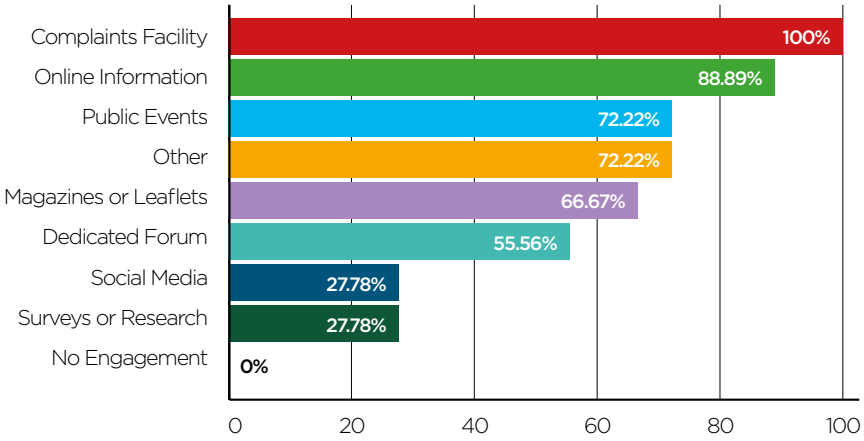
Which of the following types of engagement work is included in your Noise Action Plan?

All of the airports in this report have a facility for handing queries and complaints relating to noise, as the initial starting point for listening to the local community and recording their concerns. Other forms of engagement include: dedicated forums and public meetings; web pages, social media, magazines and leaflets; research and surveys; and other activities that varied at different airports.

Four airports (22%) undertake seven or more different types of community engagement activity, and 14 airports (78%) undertake five or more types of engagement activity.



Community engagement activities ranked by the number of airports undertaking the activity



Several airports published magazines that are sent to local households and include information about noise and the airport's performance. For example, 46,000 households near **East Midlands** airport, 16,000 households near **Glasgow** airport and 24,000 residents near **George Best Belfast City** airport all receive dedicated magazines or newsletters throughout the year.

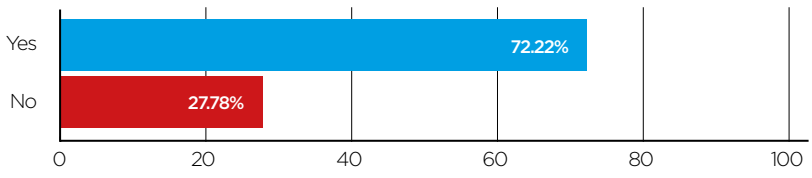
Amongst the other types of activity taken at airports to manage noise, insulation and compensation schemes were common. A number of airports also set up community funds to support local projects and events, many of which include objectives related to noise mitigation. For example, **Stansted** airport fines aircraft for noise infringements or persistent off-track flying. The money raised through these fines is paid directly to the airport's Community Trust. **Stansted** is amongst other airports in maintaining a programme of community noise monitoring, through placing a mobile monitor and having an independent report written on the results.

The case studies in this report give further examples, showing the research and local engagement undertaken by **Newcastle** and **George Best Belfast City** airports.

Survey Question:

Do you evaluate the community engagement work you undertake for noise, and do you use this evaluation to address gaps and/or improve its effectiveness?

Proportion of Airports evaluating their community engagement work



Seventy-two per cent of airports (13) evaluate their community engagement work and use the findings to improve their work. They do this through a variety of methods. **Birmingham** airport, for instance, report that their community engagement is constantly being assessed and updated following community feedback, and is evolving to new needs and methods – a recent example being a dedicated social media channel for the local community. Following community feedback the airport reduced its response time to queries and complaints, and changed the dates of community outreach sessions to include Saturday mornings, so that a greater number of people were able to attend.

London City airport manages and assesses the take up of its 'Sound Insulation Scheme' and publishes the scheme's performance annually. **Manchester** and **East Midlands** airports both hold the Business in the Community Mark, an achievement held by major UK businesses that requires annual formal community surveys to measure the effectiveness of interventions. **Stansted** airport has its noise complaints audited annually by their local authority, which includes advice from their consultative committee.

Survey Question:

When your airport is running a public consultation, do you undertake outreach work to a) let people know about the consultation and/or b) to aim to get a wide range of stakeholders?

Seventeen of the 18 airports undertake outreach work when they are running a consultation; one airport was unable to comment because they had not needed to consult on any changes in recent years. Eighty-nine per cent of airports (16 out of 18) undertake outreach work to let people know about the consultation, and 45% (8 out of 18) use outreach work to aim to get a wide range of stakeholders.

For example, as part of a recent an airspace change consultation, **Birmingham** airport held community roadshows to meet local people and give them the opportunity to both view the consultation information and to ask an airport director, operations and environmental specialists any questions they had. The airport used a mix of communication methods, from iPads to written documents and maps, to cater for all audiences. The feedback from the events was very positive.

Airports are working phenomenally hard to build better relations with their local communities. One development that airports have no control over is new communities forming, or existing communities growing, within the airport's noise contours. Improved planning guidance on aircraft noise and land-use would make an important difference in managing the number of people affected by noise, and is beyond the scope of airports and others in the sector. It is something which requires Government leadership.

c) Controlling land use

The APF provides some noise metrics and measures relating to housing and other buildings, such as the provision of financial assistance for relocation and acoustic insulation, but this policy

concerns airports and how they behave. The APF does not fully identify the role of local authorities in land-use planning, and there is a need for greater consistency in Government policy, namely between the DfT's APF and the Department of Communities & Local Government's National Planning Policy Framework (NPPF) and related national planning guidance.

The NPPF and planning guidance both realise the Government's welcome ambition to simplify the planning system and cut red tape that slows down the planning process and raises the cost of development. However, the streamlining of policy and guidance has resulted in some useful elements of guidance being removed, one of which is Planning Policy Guidance (PPG) 24. PPG24 contained (in Annex 1) useful noise level and noise exposure categories for new dwellings, with the specific aim of ensuring that such noise sensitive development was compatible with existing noisy development (such as airports). It provided a mechanism for controlling land-use around airports, for example, by preventing housing being located in areas subject to high levels of aircraft noise or being built without adequate standards of noise insulation. At present, no such mechanism exists and the resultant policy on noise is unclear.

The NPPF contains a number of references to avoiding and mitigating noise from new development, but provides no direction for managing the land-use implications of noise-sensitive development (such as schools, housing, and hospitals) in proximity to noise generating development (such as airports) where it is likely to be affected by existing or foreseeable levels of noise.

The planning guidance does remind local authorities that the management of aircraft noise is considered in the APF but it does not impress the metrics on Local Plans.[69] Developers and local authorities have free reign to develop new buildings inside airport noise contours if they want to, but this places new responsibilities on the airport and can, in the long term, prevent an airport from growing. Some local authorities work closely with airports and other stakeholders to develop Local Plans that do address the need for housing and the existence of a local airport, but this will vary according to the local authority and other issues which can be outside the local authority's hands, such as the outcome of historical planning appeals that try to manage noise sensitive development. **Following the withdrawal of PPG24 there is a need for quantitative guidance to assist local authorities in balancing competing aspects of applications for noise sensitive developments in noise exposed areas.** Any noise planning guidance, or policy in Local Plans, should be consistent with the APF. This lack of consistency and policy guidance is having a tangible impact on airports.

The number of new residential buildings being developed within the given noise contour (57dB L_{Aeq} 16 hour) continues to grow. Many parts of the UK are experiencing an acute shortage of housing. Around 230,000 new households form every year and there is a backlog of two million households on waiting lists, so that the number of new homes built every year will need to increase at least threefold to between 300,000 and 330,000.[70] There is understandable pressure on local authorities to enable the development of new homes, and of the community infrastructure needed to serve new households. But building

© Gatwick Airport

69 See the planning guidance on noise here: bit.ly/YJ8386

70 *Building the Homes and Communities Britain Needs*, Future Homes Commission, 2012

homes within noise contours that the national Government uses to mark the onset of annoyance at aircraft noise, with no guarantee of adequate standards of noise insulation, is not the best way to meet the UK's housing needs. Moving new households and communities inside noise contours could result in annoyance and conflict with the economic benefits offered by the airport. Some people are happy to live near airports; people react differently to noise; and 57dB levels will not annoy everyone. But living near an airport should be a choice and, if people do choose to live within the given noise contour, they should be made aware of aircraft noise.

We collected the given noise contour (57dB L_{Aeq} 16 hour) of 18 airports and assessed the type and number of new buildings granted planning permission and being built within those areas.[71] **Nationally, 5,761 homes have been granted planning permission, started or completed construction in the noise contours of the UK's 18 biggest airports.** This means new homes are being built in areas where the Government expects people can experience annoyance at aircraft noise. More than half of these new homes are being built in the noise contours of airports near London, and four other airports serving cities across the UK are each finding new developments of over 100 homes in their noise contours. Educational and health buildings are also being extended and even newly built in these areas.

Where are new homes being built?

More than 1,000 homes	Heathrow
	London City
More than 300 homes	Manchester
More than 100 homes	Aberdeen
	Birmingham
	Glasgow
	London Luton
Fewer than 100 homes	Gatwick[72]
	Liverpool John Lennon
Fewer than 10 homes	Bristol
	East Midlands
	Edinburgh
None	Belfast International
	George Best Belfast City
	Leeds Bradford
	Newcastle[73]
	Southampton
	Stansted

71 This research covers the period starting 1 April 2011 to 31 March 2014. The research consultancy Glenigan mapped the noise contours onto their data to tell us the number of development projects and individual residential units that have either received planning permission, started on site or been built within the three year period. Each project and unit was counted once only, at the latest stage it reached within the three year period. For further details see the appendix on noise data.

72 This research covers the period starting 1 April 2011 to 31 March 2014. On 17 February 2011 a development was approved within Gatwick's noise contour that has not yet started on site – this development includes 1,900 homes, a school and community facilities. This has not been included in this report but would elevate the problem of encroachment within noise contours if it had started on site within three years of being approved. Details of the development are here: bit.ly/1oZ1Qjr

73 A development proposal for new homes within Newcastle airport's noise contour is currently going through the planning appeal process, which has not been included in this report.

Where are educational and health buildings being built?		
	School buildings: including extensions to existing schools and pre-school centres, and new school buildings	Five airports: in the London region, the South East, in the North West, and in Scotland
	Other education buildings: new training centres, new university or research buildings, and extensions to colleges	Six airports: in the London region, in the Midlands, the North West, Yorkshire, and in Scotland
	Health buildings: new health centres, converted health facilities and extensions to hospices	Two airports: in the London region and in Scotland

The data shows that nationally, across the UK, significant housing developments of over 100 homes at a time are being planned and built within airport noise contours. But the issue varies within different nations and regions – for example, whilst one Scottish airport has nearly 200 homes being built within its noise contour, another has less than ten. It is also important to note that where an airport has no or few homes being developed, this applies specifically to the three-year period in which our research has taken place. Noise-sensitive development may still be planned within these airports' contours. For example, **Newcastle** airport is awaiting the outcome of a planning appeal for hundreds of homes, and a development of 1,900 homes and other buildings including a school is due to start on site within **Gatwick** airport's contour.[74]

There will be other contingencies too – there is no way of knowing how many of the homes will have adequate noise insulation, and, as we explain above, different people experience annoyance at different types and volumes of aircraft noise. New homes should not necessarily be banned within airport noise contours if there is evidence that people want to live there and are comfortable experiencing aircraft noise.

Conclusion

Encroachment of new housing and other developments on airport noise contours is a national problem that varies in different locations – for this reason the solutions need to be applied locally.

Airports are already engaging directly with local communities through bespoke activities, and with local authorities by providing their noise contours, contributing to policy development and helping to monitor new development within noise contours. But the Government should reverse its policy change and reintroduce national planning guidance about how local authorities should interpret noise contours and align airports with local development needs.

Housing developers and estate agents also need to play their part by ensuring information about aircraft noise is available to people considering buying or renting homes within airport noise contours.

74 Please see footnotes in the table, 'Where are new homes being built?', for further details.

Case studies: Managing noise

Newcastle International Your Airport

Newcastle: community engagement to manage noise

Newcastle airport engages directly with local communities to address their concerns about noise. Through accessible data systems that monitor flights and locally-based forums, the airport is on track to achieve its target of fewer than 60 complaints within a year.

© Newcastle Airport

Noisedesk demonstration of flight paths

Smart engagement

Having undertaken noise monitoring since 1996, in 2012 Newcastle airport invested £250,000 in a brand new system called Noisedesk. Noisedesk takes direct data from radar and stores it in a 3-Dimensional visual format, so that all flights can be viewed and compared to historical data over a ten year period. If a complaint is received, staff at the airport can use Noisedesk to plot the location of a resident and examine the way in which planes take off around that location.

Noisedesk links with six noise monitors, with four positioned at local schools, one south of the airport and a mobile monitor that can go out to different locations, such as a resident's home if it is requested. The system can be accessed via the internet so that airport staff can present the data and discuss noise and aircraft movements locally within the community. Schools have access to some of the data so they can assess and review it themselves.

Face to face forums and community sponsorship

Two nearby villages, Woolsington and Prestwick, have focus groups to discuss any localised issues as a result of the airport. In each forum meeting, attendees talk though airport operations and plans in detail, with the airport registering their feedback and incorporating any required amendments where possible.

In addition to the two forums, public meetings are held periodically to discuss local changes, most recently for the airport's Master Plan for 2030. In public meetings and forums the airport sets out its plans for business growth, but it also listens. As a result of community requests through these forums, the airport pays for flowers in a local village, sponsors local clubs and sports teams and supports an initiative to protect local red squirrels, amongst other offers.

© Newcastle Airport

Newcastle's Airport Consultative Committee

Case study

YOUR LONDON AIRPORT Gatwick

Gatwick: local engagement and noise insulation scheme

In April 2014 Gatwick airport launched a new scheme providing insulation for local communities. The new scheme covers a larger area and increased number of homes, in response to local feedback about noise annoyance.

Community conversations

Gatwick's new community noise insulation scheme is designed to minimise disruption to homes and businesses in the local area. The scheme responds to a broad range of feedback through meetings with the airport's consultative committee, visits to noise affected areas, such as Charlwood, engagement with local environmental groups, and general feedback from noise complainants. The airport has also researched other airport insulation schemes across the world for best practice. The scheme is designed to incorporate a bigger contour and compensate the properties that are most impacted by flight paths. Listening to this feedback, the airport has taken a flexible approach to defining the scheme so that it covers a bigger area, and is drawn flexibly to ensure entire roads and villages are included so everyone in one area can apply to the noise scheme. The new area takes into account both the increased sensitivity people have towards noise levels as well as the frequency of how many times they might be overflown.

The insulation offer

Households can claim up to £3,000 each from the airport to pay for external double-glazing, ventilation, secondary glazing and loft insulation, depending on the findings of a survey. The new approach will benefit a further 985 homes in the community around Gatwick. As a result, over the four year period from 2014 to 2018 the airport is doubling investment to minimise the impact of noise on the local community. The airport has written directly to those who are eligible with more details of the scheme and how to apply.

Case study

George Best BELFAST CITY AIRPORT

George Best Belfast City airport runs a comprehensive stakeholder engagement programme that includes face-to-face conversations with the local community, financial support for local projects and engagement on social media. The airport also undertakes research into local perceptions about noise, to monitor the effectiveness of their Noise Action Plan.

George Best Belfast City: local engagement and research to manage noise

Local conversations

The airport held a series of Community Information Days in August 2010. Information and invites were sent to local residents via the Community Newsletter (distributed to 24,000 residents in East Belfast, South Belfast and North Down), through local media and through the airport's social media channels. At these events representatives from the airport (including specialists in the environment, airfield operations, the airport fire service, air traffic control and planning) were available to chat to local residents regarding airport operations and to answer any queries regarding airport developments. George Best Belfast City airport is also active across the social media platforms Facebook and Twitter, where members of the public can provide comments or post concerns (including those in relation to noise) and the airport will directly respond to them.

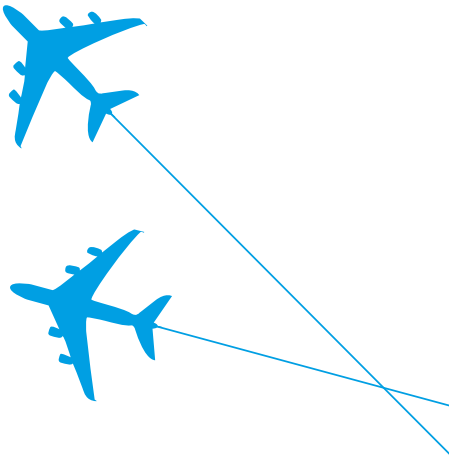
Supporting community initiatives

The airport launched its Community Fund in February 2009 with the aim of supporting the local community while reducing flights in and out of the airport outside scheduled operating hours. The Community Fund is used to support a variety of worthwhile projects in communities in areas that are overflown and the greater Belfast area. Since the inception of the fund, the airport has supported over 80 local community groups to the value of £177,000. In addition to using events such as Information Days to talk to people, the airport also engages directly with local community groups to identify projects that can benefit from the Community Fund. The airport was awarded Business in the Community's Northern Ireland Local Community Impact Award in 2013.

© George Best Belfast City Airport

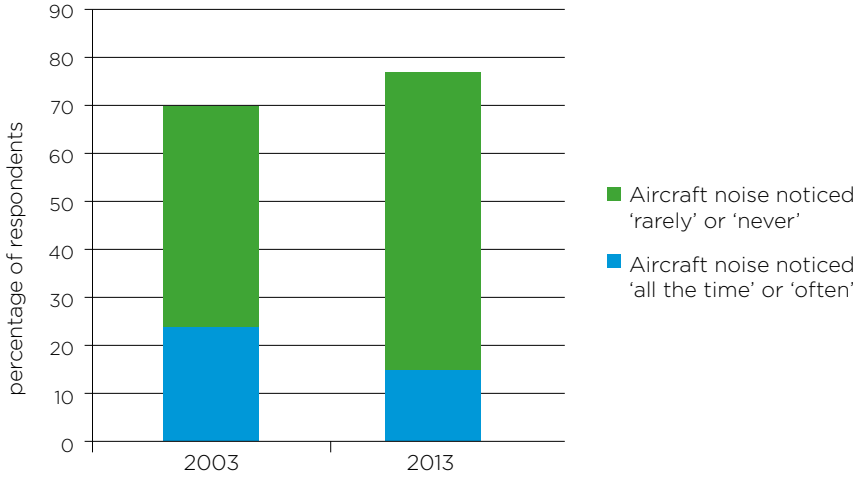
Surveying local attitudes to noise

The airport also monitors its progress in managing noise and working with the local community through surveys and research. In 2013, the airport commissioned a Community Attitudes Survey, to benchmark its performance against a similar survey carried out in 2003. The 2013 survey was issued to 5,000 randomly selected households in areas that are overflown by aircraft to/from the airport, and two nearby towns not overflown by flights to/from the airport, for comparison. The survey was conducted by an independent research consultant and findings were published in the final Noise Action Plan which is available publicly on the airport's website.



One of the objectives of the survey was to understand the degree to which respondents felt that aircraft noise had an adverse effect on their quality of life. Noise from aircraft remained less of a cause of dissatisfaction than many of the other quality of life factors (defined through 17 indicators including areas such as 'feeling of personal security', 'street cleanliness' and 'neighbourhood air quality'), with almost 70% of respondents being 'very satisfied' or 'satisfied' in 2013. Four percent of respondents indicated that they were 'dissatisfied' and a further 4% 'very dissatisfied' with aircraft noise.

The number of respondents noticing aircraft noise was lower in the 2013 survey than in the 2003 survey.



Noise from aircraft was noticed by 15% of respondents to the 2013 survey either 'all the time' or 'often' compared with 24% of respondents to the 2003 survey. Sixty-two percent of participants in the 2013 survey responded that they 'never' or 'rarely' notice noise from aircraft (up from 46% in 2003).

Case study

Airports do not own or operate aircraft, but they can work with their business partners who do. A range of innovative partnerships are being developed by UK airports to help airlines and flight operators fly more quietly.

Quieter flights: airport partnerships to deliver quieter flights

London Luton airport has been working with airlines, NATS (its Air Traffic Control provider) and the Civil Aviation Authority (CAA) to look at ways flight track-keeping can be improved on a key departure route. The work has involved extensive collaboration with airport stakeholders, simulator tests, two live trials with airline partners, and a public consultation. The proposed revision uses Global Positioning Satellite (GPS) based aircraft navigation technology that would enable aircraft to tighten track-keeping and modify the route slightly to avoid, as far as possible, flying directly over communities in the most densely populated areas. This would minimise noise disturbance and reduce the number of people overflown by up to 79% as well as reducing carbon emissions.

Heathrow airport's Fly Quiet league table publicly lists airlines according to their noise performance. The league table lists the top 50 Heathrow airlines every three months (by number of flights per quarter) according to six noise related criteria. The airlines receive a red/amber/green rating for each criterion, as well as an overall score which allows them to understand how they are performing in relation to other airlines. If they are not meeting the minimum performance targets, Heathrow works closely with them to improve their rating.

Glasgow airport

worked with airlines, NATS and other partners in Sustainable Aviation to develop and implement Noise Preferential Routes for arriving and departing aircraft, which seek to minimise flying over centres of population. On the ground, the airport restricts when engine test runs can be carried out with specific locations to minimise noise. The airport has also installed Fixed Electric Ground Power systems at many aircraft parking stands to reduce the use of noisier Auxiliary Power Units.

Birmingham airport

runs Operation Pathfinder, a collaborative group attended by airlines and air traffic control aimed at improving environmental performance. The airport keeps league tables on how well airlines maintain track-keeping and operational performance to reduce the noise of flights over communities.

Report summary and overall conclusions

Airports are becoming more sustainable and they are working with partners and leading the sector to deliver quieter, more efficient flights. But they cannot achieve a more sustainable future and help the UK and its local communities achieve economic stability unless the Government and other organisations support them.

To help airports continue to cut carbon emissions and manage noise whilst delivering the economic and social benefits offered by aviation, the AOA recommends the following actions:

Delivering sustainable growth

1. Airports are already meeting policy objectives to ensure their sustainability; therefore, in light of airports' proven commitment, **all political parties** should support the growth of airports as essential national economic and transport infrastructure. This includes committing to acting on both the 2013 Aviation Policy Framework (APF) and the Airports Commission, when it reports in 2015.

Reducing carbon emissions

2. Airports are reducing their carbon emissions, but their emissions are only a small proportion of those created by the UK's aviation sector. To help the aviation sector achieve greater carbon reductions, the **Department for Transport** (DfT) should help make two important initiatives successful: the development of sustainable aviation fuels and a global Emissions Trading Scheme. The DfT should:

a) Provide an incentive framework to stimulate investment, research and development, and commercialisation for **sustainable aviation fuels**. The fuels should be eligible for incentives in the same way that credits are awarded to qualifying road transport fuels under the Renewable Transport Fuel Obligation.

b) Press for agreement on and support implementation of a **global carbon-trading solution** encompassing all of aviation and ensuring a level playing field for all participants.

3. **Airports** that have not already done so should **commit to a scheme to reduce as well as monitor their carbon emissions**. One option available to them would be the ACI Carbon Accreditation Stage 2: Reduction.

© Newcastle Airport

Reducing noise

4. The location of noise sensitive developments like housing needs to work alongside airports and other existing infrastructure. The **Department for Communities and Local Government** should help airports to further manage noise by reversing the policy change to national planning guidance, so that in **future Local Plans include the noise metrics in the APF**. By reversing this policy change, developers and local authorities would rightly have to meet the same policy expectations as the aviation sector by managing the specific location and noise insulation of new homes.

5. If a new home or other noise sensitive building is to be built within the Government's defined noise contour (the 57dB L_{Aeq} 16 hour contour), then the **housing developer should provide adequate sound insulation and make people aware of aircraft noise before they buy or rent a property**.

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Appendix A:
Carbon emissions methodology

There are different ways of accounting and managing carbon emissions, as we discuss in the report. The figures in our report accumulate the individual carbon footprints shared with us by the airports listed here. The method of producing a carbon footprint varies and therefore the individual figures from each airport are not comparable. However, since they all use the same method for their individual carbon accounting each year, our cumulative annual figures are comparable year on year.

The table below lists the types of data sent to us by each airport

Airport	2013 figures included	Scope system used	Scope 3 included	Verification Method (including name of external organisation used, when relevant)	Calculation Methods	Calculated on an annual basis by calendar year (Jan-Dec) or financial year (Apr-Mar)
Heathrow	N	Y	Y	DNV Two Tomorrows has verified Heathrow's Scope 1, 2 and 3 emissions since 2010. They also participate in the ACI Airport Carbon Accreditation Scheme (and have achieved Level 3).	Three scope system; also calculate emissions by activities. See http://www.heathrowairport.com/static/HeathrowAboutUs/Downloads/PDF/Sustainability/2012_sustainability_summary_report.pdf. For Heathrow's 2012 report they applied the new 2012 Department of Environment, Food & Rural Affairs (DEFRA) emissions factors to previous years' data to allow readers to directly compare the year on year changes. Due to changes in the method used to calculate emissions, 2013 figures are not comparable to 2010 and are not used in this report.	Calendar year
Gatwick	N	Y	Y	SKM Verification.		Calendar year
Manchester	Y	N	N	Footprints are GRI Accredited and Carbon Trust, also ACI Airport Carbon Accreditation.	Manchester Airports Group (MAG) does not report emissions in a scope system but through direct and indirect emissions. The figure in Scope 1 includes some Scope 3 emissions: Scope 3 emissions from the supply of energy and fuel to tenants is included within Scope 1 and 2 figures for Manchester and East Midlands International airports respectively. Renewable electricity supplied to third parties is reported net (zero rated) here for consistency with previous years. MAG's 13/14 annual report will include Scope 3 at standard emission factors as their net emissions are reported for Scope 1 and 2.	2010: Calendar year 2012 and 2013: Financial year
Stansted	N	Y	Y	Followed Green House Gas (GHG) Protocol and split emissions into 3 scopes, in reports break down scopes into activities.	From 2013/14 Stansted has reported as part of MAG. This means their emissions figures have changed, including the range of Scope 3 emissions reported, the deduction of energy/fuel supplied by the airport to tenants (now included as Scope 3), and the reporting of net Scope 2 emissions after the purchase of renewable electricity. Due to the change in method, 2013 figures are not comparable to 2010 and are not used in this report.	Financial year
Edinburgh	N	Y	Y	Carbon Masters.		Calendar year
London Luton	Y	N	N	Carbon Credentials.		2011 and 2012: Calendar year 2013: Financial year
Birmingham	Y	N	N	Calculated internally using DEFRA guidance and conversion factors.	Total emissions are Scopes 1 and 2 together.	Financial year
Glasgow	Y	Y	Y	Use GHG Protocol and UK Government conversion factors to calculate carbon footprint internally.	Glasgow airport calculates Scope 1 and 2 together. It does not calculate Scope3 but breaks it down into activities, figures of which are included in the report.	Calendar year
Bristol	Y	N	N	Calculated internally using DEFRA guidance.	Calculate Scope 1 and 2 together. The airport does not calculate Scope 3 emissions	Calendar year
Newcastle	Y	N	N	2010/2011 carbon foot print was verified through the CRC scheme; calculated internally hereon.		Financial year
East Midlands	Y	N	N	GRI Accredited and Carbon Trust.	See Manchester airport calculation method above for details.	2010: Calendar year 2012 and 2013: Financial year
Liverpool John Lennon	Y	N	N	Carbon Trust, TEAM EAA, WEMS, Scheider, Vantage Airports UK (internal help).	Calculate only total emissions.	Financial year
Belfast International	Y	N	N	PricewaterhouseCoopers and Carbon Reduction Commitment (CRC) figures, audited by Carbon Credentials.	Does not use scopes, but has recorded energy use for all electricity power, gas and oil (heating power, vehicles). Does not exclude electricity sold to tenants but does exclude fuel oil sold to third parties. Figures based on CRC conversion figures.	Calendar year
Aberdeen	Y	Y	Y	Footprint calculated by AEA .		Calendar year
London City	Y	N	N	Achieved ACI Airports Carbon Accreditation Stage 1: Mapping in April 2013; expect to achieve Stage 2: Reduction in May 2014.	Sustainability Strategy and Action Plan can be found here: http://londoncityairport.com/home/page/EnvironmentActionPlans.	Calendar year
Leeds Bradford	Y	N	N	Calculated internally.	Figures are only from the airport's core energy supplies (Scope 1).	Financial year
George Best Belfast City	Y	Y	Y	Calculated internally using DEFRA guidance and conversion factors.	Calculate Scope 1, 2, 3 emissions but only for certain activities (fuel use and electricity purchased).	Calendar year
Southampton	Y	Y	Y	Calculated internally using the GHG Protocol to define the scopes.	Does not calculate full Scope 3 at the moment but are planning to; Scope 3 in this table refers to landing and takeoff cycle only. Total emissions figure calculated by the AOA are based on these components. Scope 1 in 2010 referred to gas use only, in 2012 figure includes other emissions too.	Calendar year

Appendix B:
Noise and planning data methodology

This table shows the data the AOA received from airports on noise.

We asked all airports for the most recent 57dB L_{Aeq} 16 hour contour.[A] Where this was not available, we used the next best source of data, as explained in the table below. These contours were given to research agency Glenigan, and Glenigan mapped the contours onto their own software. Glenigan then ran data analysis on the contours to gather the building development projects, including individual residential units (homes) that: received planning permission; started on site; or completed construction during the three-year period between 1 April 2011 and 31 March 2014.

Each project was counted once only, at the latest stage it reached within the three year period. Glenigan used independently verified reports for each airport's contour, and the development figures in our report are the accumulated results.

The developments found were listed on Glenigan's software, based on their own ongoing research in the building development sector.

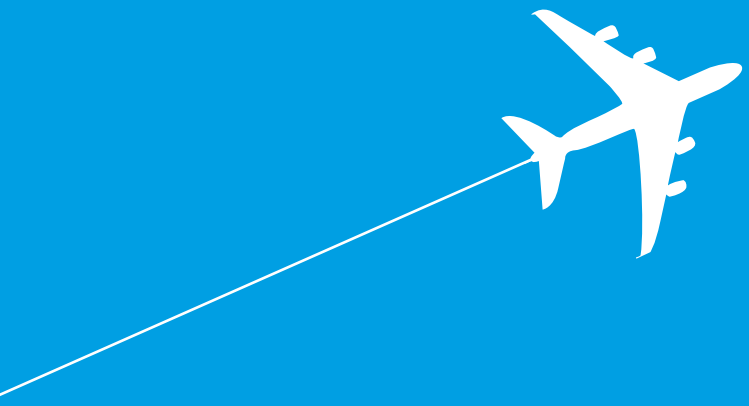
Airport	**57dB L_{Aeq} 16 hour contour**	**Year the contour was measured**	**Format provided**[B]
Heathrow	Y	2012	Data and visual maps
Gatwick	Y	2012	Visual map
Manchester	Y	2012	Data map
Stansted	Y	2012	Visual map
Edinburgh	Y	2011	Addresses and coordinates
London Luton	Y	2013	Data map
Birmingham	Y	2010	Data map
Glasgow	Y	2011	Addresses and coordinates
Bristol	Y	2011	Visual map
Newcastle	Y	2012	Visual map
East Midlands	Y	2012	Data map
Liverpool John Lennon	Y	2011	Visual map
Belfast International	55 Lden instead[C]	2012	Visual map
Aberdeen	Y	2011	Visual map
London City	Y	2012	Visual map
Leeds Bradford	Y	2011	Visual map
George Best Belfast City	Y	2013	Visual map
Southampton	Y	2012	Visual map

For further information or clarification please contact info@aoa.org.uk.

A This is the measure set by Government as the average level of daytime aircraft noise to mark the approximate onset of significant community annoyance. For details see Aviation Policy Framework, 2013.

B The format provided refers to whether the AOA received a list of addresses, a data map such as a shape file, or a visual map (for example, a pdf of an ordnance survey map with the contour drawn onto it). Where we received a visual map, Glenigan researchers plotted the line of the noise contour onto an interactive map so that they could convert it into a format that was compatible with their own software.

C Belfast International does not calculate its 57 L_{Aeq} 16 hour contour so we have instead used the available metric, which is the 55 Lden contour. The day-evening-night (Lden) is a noise rating indicator based upon an annual average 24 hour noise level (L_{Aeq}) with a 5 dB(A) penalty for evening noise (i.e. 19.00 - 23.00) and a 10 dB(A) penalty for night time noise (23.00 - 07.00). However, there were no developments planned or constructed in this contour, so the overall results in this report do reflect development within the 57dB L_{Aeq} 16 hour contour of all airports.



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