

# Gatwick Airport

## Climate Change Report

June 2009



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# 1 About this report

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Within this report we give an overview of the context and impacts associated with climate change and provide more detailed information on aviation's contribution towards climate change. Included within the report is Gatwick Airport's carbon footprint, this was calculated by an independent consultant and encapsulates the emissions associated with Airport related activities during 2008. Within this document we aim to establish our overarching approach towards managing emissions at Gatwick Airport and explain our plans for the development and implementation of a low carbon strategy for Gatwick Airport.

In addition the publication of this report ensures compliance with our S106 legal agreement with West Sussex County Council (WSCC) and Crawley Borough Council (CBC), in which we state that we will ;

- **by the 30th June 2009 prepare and publish a report on the Airport and climate change; and**
- **thereafter continue an ongoing dialogue on climate change initiatives with local authorities and other key stakeholders; and**
- **update this report not less frequently than every three years."**

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## 2 Overview

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### Aviation and climate change

With the emergence of clearer scientific evidence over the past few years consensus has developed on the respective roles of industries and governments in contributing towards efforts to combat climate change. The aviation industry is clear about the role it has to play in this serious global challenge.

Over the past few decades demand for air travel has grown significantly. In global terms, air travel makes up 1.6%<sup>1</sup> of worldwide CO<sub>2</sub> emissions and this could reach 3% by 2050<sup>2</sup>, as the trend for increased air travel continues.

In the UK, CO<sub>2</sub> emissions from UK aviation continue to grow in line with the increasing demand for air travel. Notwithstanding this growth, it is widely acknowledged that aviation plays a vital role in supporting the UK's participation in the global economy, and that it must continue to play its part. However, as an overall contributor to the UK's CO<sub>2</sub> emissions, air travel only represents 6.3%<sup>3</sup> of the UK's total, with energy suppliers and road transport representing a significantly higher contribution.

Considerable momentum has now built behind the aviation industry's efforts to reduce emissions. Such efforts necessarily involve extensive collaboration between airports, airlines, transport services, local communities and governments (national and international). Although significant progress has been made much remains to be done.



<sup>1</sup> World Resources Institute, available at <http://www.wri.org/stories/2006/10/greenhouse-gases-and-where-they-come-from>

<sup>2</sup> Working Group III Report, IPCC, 2007

<sup>3</sup> Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

### Our role as the airport operator

As a leading international airport we recognise the role we have to play in contributing to the wider industry effort. While the bulk of emissions associated with the industry are those emitted during flights, we acknowledge the responsibility we have to reduce the emissions we are directly responsible for on the Gatwick Airport site, and work with airlines and other partners to reduce those we can influence, but not control directly.

The UK Government's White Paper on The Future of Air Transport, published in 2003, set the context for airport development in the UK up to 2030. We support its plans to allow the growth of aviation, within agreed limits and with due respect for the environment and concerns for sustainable growth. We intend to take responsibility for our impacts, at the same time as playing our part in contributing towards the UK's economy.

As we move towards becoming an independent airport, with significant investment plans outlined in our capital investment programme (CIP), we will be focused on building on the work we have started under BAA management. We see this as a great opportunity to think afresh about what climate change and sustainability means for Gatwick Airport, and to build a business that is ready to meet the challenge.

### Our carbon footprint

This year we completed our first comprehensive baseline carbon footprint of the airport, with the help of the independent consultant Entec ([www.entecuk.com](http://www.entecuk.com)), the full details of which are outlined in this report. In addition to a comprehensive set of recommendations for reducing our emissions, we are using this footprint assessment as a foundation for our own low carbon strategy. This strategy will set out in detail, our commitments, our targets, and an action plan to deliver them.

We appreciate the challenge that lies ahead, and look forward to working closely with our key local stakeholders, business and airline partners and employees, without whom progress would not be possible.



# 3 Climate change and the role of aviation

## What is climate change?

Scientists know that the earth's weather patterns have shifted naturally through the ages. However, there has been a significant change in climate over the past three decades, most likely caused by human activity and increased industrialisation. Recent alterations in the earth's temperature and weather patterns are what we call climate change.

Our planet has warmed 0.74°C over the past century. Of this, 0.4°C has occurred since the 1970s<sup>4</sup>. Changing temperatures could have devastating effects across the globe. Hotter temperatures may melt icecaps, resulting in rising sea levels and threatening our existing coastlines. Scientists also predict more heat-waves, droughts and water shortages as a result of climate change. In other parts of the world, changed weather patterns are forecast to bring heavier rainfall and, as a consequence, more severe and frequent flooding.

In short, climate change is a serious global issue and one of the greatest threats facing the world today.

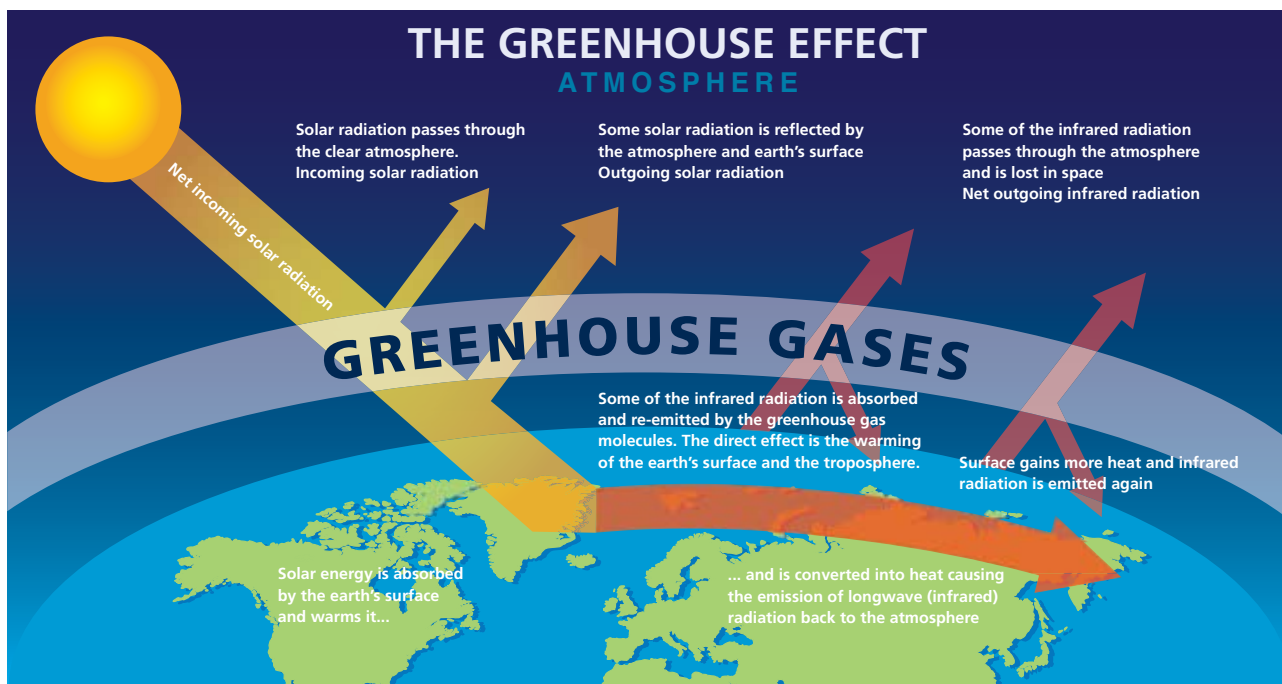
## What is causing climate change?

The current changes in the earth's climate are not caused solely by natural variations. There is now robust evidence and widespread agreement that human activity is contributing significantly to climate change.

### *The effects of human behaviour on climate change*

A layer of greenhouse gases around the earth traps heat from the sun and keeps the earth temperate enough for humans, animals and plant life to live. This is known as the greenhouse effect. However, human activities like deforestation and burning fossil fuels create more greenhouse gases and thicken the layer of gases around the earth. This results in more heat becoming trapped inside the layer and causes the earth's surface to warm at a faster rate.

Figure 1: The greenhouse effect<sup>5</sup>



<sup>4</sup> Defra data available at [www.defra.gov.uk](http://www.defra.gov.uk)

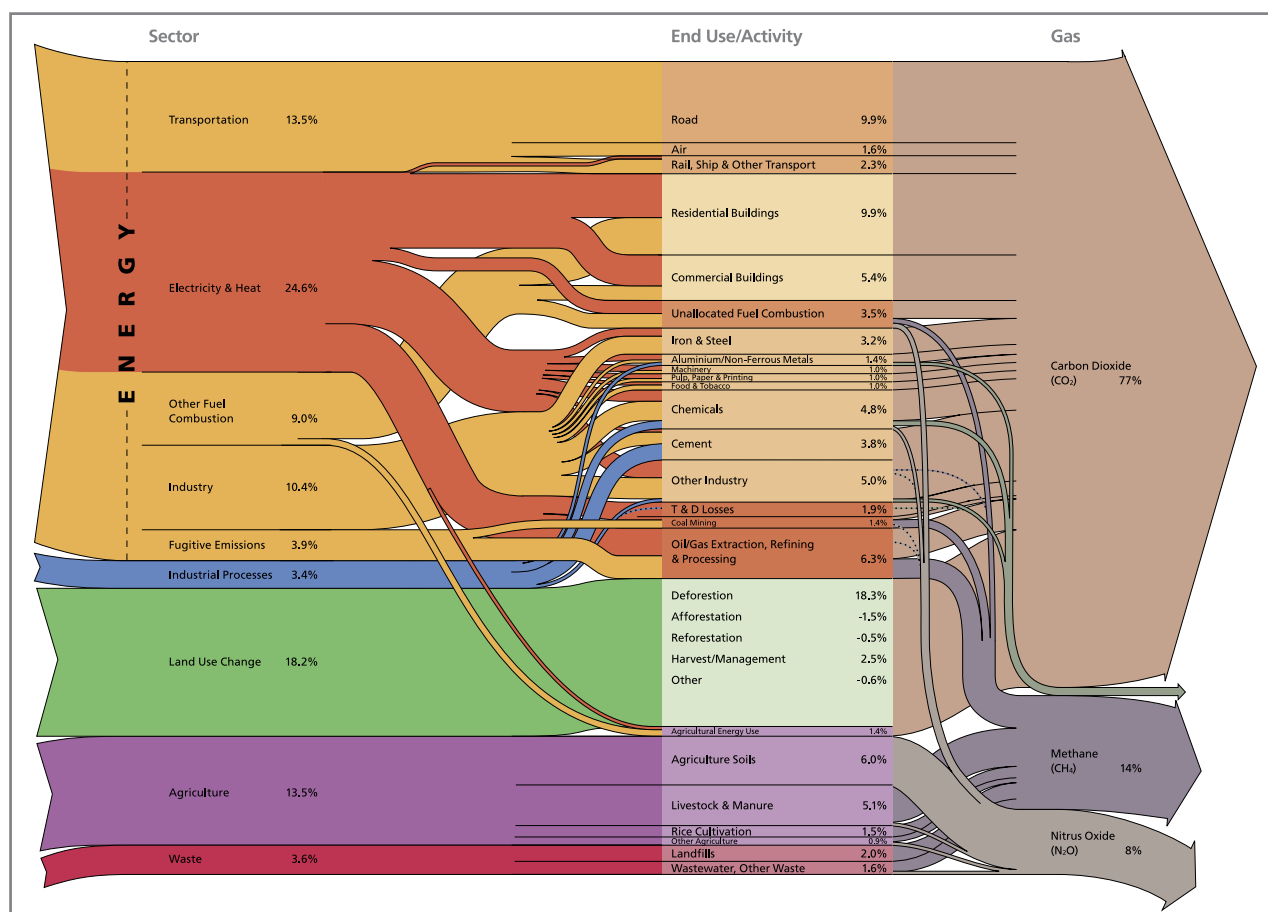
<sup>5</sup> London Gatwick Airport 2009, Philippe Rekacewicz, UNEP/GRID-Arendal

### 3 Climate change and the role of aviation

The six most commonly occurring greenhouse gases are carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide, hydrofluorocarbon, perfluorocarbon and sulphur hexafluoride. However, CO<sub>2</sub> accounts for more than 60% of what the United Nations Framework Convention on Climate Change (UNFCCC) calls the “*enhanced greenhouse effect*”.<sup>6</sup> This is illustrated in Figure 1 below from the World Resources Institute.

In fact, the amount of CO<sub>2</sub> in the atmosphere has increased by 35% since the Industrial Revolution<sup>7</sup>. This is caused in no small part by the burning of oil, gas and coal for power generation and to fuel transport. As Figure 2 shows, this accounts for over 60% of global emissions, of which almost 10% is from residential buildings. Deforestation is another significant contributing factor, contributing to 18.3% of global emissions. Trees absorb CO<sub>2</sub> so deforestation limits the earth’s capacity to remove CO<sub>2</sub> from the atmosphere.

Figure 2: World emissions flow chart<sup>8</sup>



### What are the possible impacts of climate change?

Predictions vary on the scale of impact but hotter temperatures and altered weather patterns may significantly disrupt many aspects of our daily lives. The Stern Report<sup>9</sup> highlights the effect of changing weather patterns on crop yields, food security and water supplies, and increased frequency of extreme weather such as hurricanes, floods and heat waves. At a global level, developing countries are more vulnerable to the worst effects of climate change given their geographies and climates, and relative lack of infrastructure.

<sup>6</sup> UNFCCC data available at <http://unfccc.int/>

<sup>7</sup> [direct.gov.uk](http://direct.gov.uk)

<sup>8</sup> World Resources Institute, Climate Analysis Indicator Tool (CAIT), Navigating the numbers: Greenhouse Gas Data and International Climate Policy, December 2005

<sup>9</sup> The Stern Report was commissioned by the UK Government to examine the economics of climate change. It was carried out by Sir Nicholas Stern and published in October 2006.



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### 3 Climate change and the role of aviation

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The UK Climate Predictions 2009, published by the UK Government, looks specifically at the impact of climate change on the British Isles. It gives demonstrable evidence that the UK climate is already altering. For example, since 1900 sea levels have risen by 1mm a year, sea temperatures have risen by 0.7°C in the past three decades and more rain is falling in heavy winter downpours<sup>10</sup>.

We have already seen the devastating consequences of the changing climate. The report points to the heat wave in 2003 that resulted in 35,000 premature deaths in Northern Europe and the number of insurance claims for storm and flood damage, which has doubled in the six year period from 1998 to 2003.

In terms of future forecasts, these trends are set to continue and worsen. The report predicts a 3.9°C rise in temperatures in the South East by the 2080s, using a mid-way estimate between best and worst case scenario. Given that the global average temperature today has only increased 5°C since the last ice age, this is a significant temperature hike. Across the UK, predictions show much hotter, drier summers, bringing increased frequency of heat waves. Winters will be milder and wetter, with heavier downpours. This means higher risks of summer drought and winter flooding, increased frequency of extreme weather events and higher sea levels, notably a predicted 18cm rise of the River Thames in London by 2040.

### The legislative framework

Climate change is a global problem and co-ordinated action is required at local, national and international level to minimise and adapt to its impacts. The broad legislative framework at international, national and local authority level is as follows:

#### International legislation

Several mechanisms have been established at an international level to create international consensus on climate change and to forge agreement on mitigation strategies.

##### *Intergovernmental panel on climate change*

The Intergovernmental Panel on Climate Change (IPCC) was established in 1998 by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP) to provide a single definitive source of information on climate change. Comprised of governments, scientists and UN representatives, the IPCC is the leading authority on climate change. Its most recent report, the Fourth Assessment, states that "most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [human] greenhouse gas concentrations."<sup>11</sup>

##### *UN framework convention on climate change and the Kyoto Protocol*

The UN Framework Convention on Climate Change is a voluntary international treaty for co-ordinated action on climate change. The Kyoto Protocol, an addition to the UNFCCC, is a legally binding agreement committing 37 industrialised nations to reducing their greenhouse gas emissions.

As part of the Kyoto Protocol, the UK agreed to a target of reducing emissions by 12.5% by 2012 against 1990 levels. The Kyoto Protocol came into force in 2005 and will end in 2012. International negotiations will take place later this year (2009) in Copenhagen to agree a follow-on treaty.

<sup>10</sup> Adapting to Climate Change: UK Climate Projections June 2009, Defra

<sup>11</sup> IPCC Fourth Assessment Report (AR4 Synthesis Report), 2007



### European legislation

#### *European Union Emissions Trading Scheme (EU ETS)*

The EU ETS has been one of the EU's key responses to the Kyoto Protocol. Launched in 2005, the scheme covers the EU's largest emitters through a cap and trade arrangement. Emission levels are set at EU and national level and each country is given allowances to distribute to companies covered by the scheme. Each allowance permits participating companies to emit one tonne of CO<sub>2</sub> per year. Companies can buy and sell allowances to cover their emissions, thereby establishing a price for carbon and creating a market for carbon permits.

A small element of Gatwick Airport's operations is regulated by EU ETS, which has been in force since 2005, and we undergo an annual verification audit on our EU ETS obligated emissions. We have been lobbying for aviation to be included into the EU ETS. From 2012 it will be included in phase three of the scheme and we welcome this development.

#### *EU Energy Performance of Buildings Directive*

The occupation and use of buildings are responsible for almost 50% of the UK's energy consumption and carbon emissions. This directive introduces measures to improve the energy efficiency of buildings, including:

- Energy performance certificates for properties providing A-G efficiency ratings and recommendations for improvement;
- Requiring public buildings to display energy certificates;
- Requiring inspections for air conditioning systems; and
- Giving advice and guidance for boiler users.

The EU directive is implemented in the UK via the Energy Performance of Buildings Regulations 2007. Any new buildings at Gatwick Airport will need to be fully compliant with this regulation.

### National legislation

Over the past decade, the UK government has introduced legislative measures to reduce carbon emissions. The UK-wide goal, as defined in the Climate Change Act 2008, sets a legally binding target for a 34% reduction in greenhouse gases by 2020, and an 80% cut by 2050.

The following government initiatives are particularly relevant to Gatwick Airport:

#### *UK sustainable development strategy*

The UK Climate Change programme is a key strand in the UK Government's sustainable development strategy. It sets out the UK Government's commitments at international and domestic levels to tackle climate change. Domestically it is split into several sectors – energy supply, business, transport, domestic, public sector and local government, agriculture forestry and land management and the encouragement of personal action.



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## 3 Climate change and the role of aviation

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### *Climate Change Act 2008*

The Climate Change Act was passed in November 2008. It has two key aims:

- To improve carbon management and help the transition towards a low carbon economy in the UK
- To demonstrate strong UK leadership internationally.

The Climate Change Act has a number of key provisions that are relevant to the running of an international airport, including:

- Legally binding targets for CO<sub>2</sub> and greenhouse gases;
- The introduction of a carbon budgeting system;
- The creation of a Committee on Climate Change;
- International shipping and aviation; and
- Further measures to reduce emissions.

### *Carbon reduction commitment*

The Carbon Reduction Commitment (CRC) is a mandatory emissions trading scheme being introduced by the Government to cover large business and public sector organisations whose annual half-hourly metered electricity use is above 6,000MWh. The scheme is scheduled to begin in April 2010, with a three-year introductory phase. The first capped phase will begin in April 2013. Our electricity consumption is sufficiently high to obligate us under the CRC.

## Local agreements

There is a role for local government to play in translating these commitments into action at the local level. In December 2008, we signed a new section 106 legal agreement with West Sussex County Council (WSCC) and Crawley Borough Council (CBC), having consulted with seven other adjoining councils and other key stakeholders. The agreement sets legally binding obligations and supporting commitments on the following areas: climate change, air quality, noise, surface access, land use, development and biodiversity, community and the economy, water quality and drainage, waste management and utility management. It also outlines our action plans and process for monitoring and reporting our performance on these important issues.

Following the publication of our airport surface access strategy (ASAS) in 2007, we will also be publishing our action plan on surface access in 2009 which will also be a key part to developing our low carbon strategy.

We will continue to work with our customers, business partners and stakeholders to help us meet our energy efficiency goals.

The full section 106 legal agreement is available on our website (<http://www.gatwickairport.com>)

## Aviation's contribution to climate change

Over the past few decades demand for air travel has grown significantly. In global terms, air travel makes up 1.6% of worldwide CO<sub>2</sub> emissions and this could reach 3% by 2050<sup>12</sup>, as the trend for increased air travel continues.

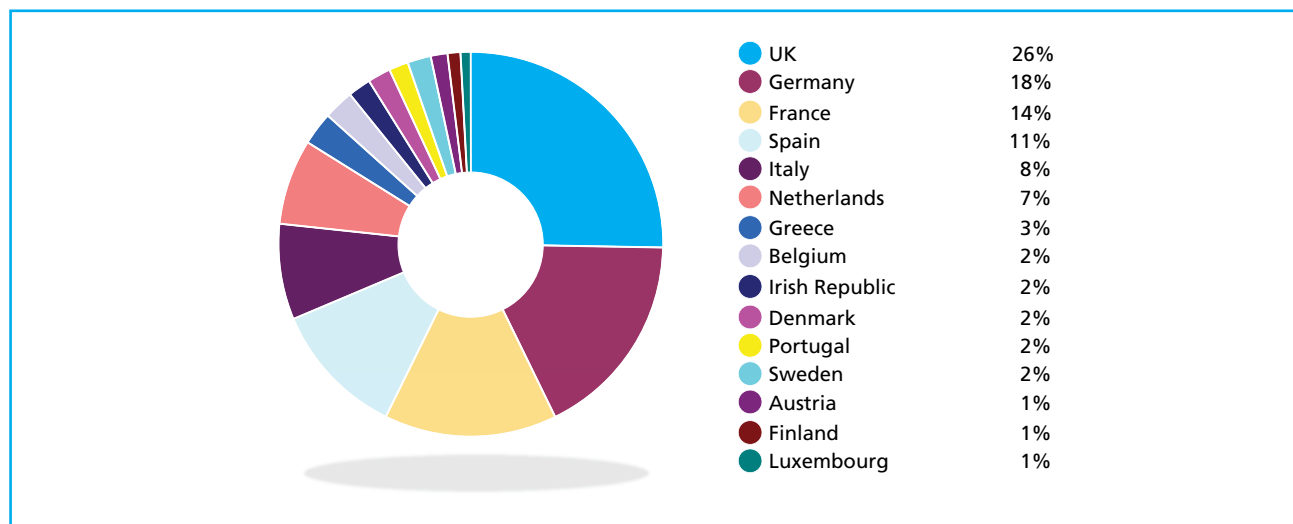
In the UK, CO<sub>2</sub> emissions from UK aviation doubled between 1990 and 2000, whilst the combined activities of the rest of the UK reduced by about 9%<sup>13</sup>. As the table below shows, emissions from UK international and domestic aviation have risen by more than 50% in a decade.

Figure 3: UK domestic and international aviation CO<sub>2</sub> emissions, 1997 and 2007<sup>14</sup>

	Millions tonnes of CO <sub>2</sub>		Aviation's share of total UK CO <sub>2</sub> emissions	
	1997	2007	1997	2007
<b>Domestic</b>	1.5	2.1	0.3%	0.4%
<b>International</b>	22.7	35.0	3.9%	6.0%
<b>Total aviation</b>	24.2	37.1	4.2%	6.3%

The UK has the highest volume of CO<sub>2</sub> emissions in Europe, followed by France and Germany, as shown in Figure 4, below. This is due to the presence of international hub airports in these countries and the large number of international flights from these airports<sup>15</sup>.

Figure 4: EU aviation emissions, 2006<sup>16</sup>



In comparison to other sectors in the UK economy, aviation's emissions are relatively small, as Figure 5 opposite illustrates. Energy supply and road transport together account for over 50% of UK emissions, whereas aviation represents 6.3%. However, DfT forecasts for air passenger demand predict that CO<sub>2</sub> from UK aviation will increase by 56%, from 37.5 million tonnes of carbon dioxide (MtCO<sub>2</sub>) in 2005 to 58.4MtCO<sub>2</sub> in 2030 based on CO<sub>2</sub> emissions from all flights departing UK airports<sup>17</sup>. Clearly, the challenge for our industry is to minimise carbon emissions in the face of growing demand for air travel.

12 Working Group III Report, IPCC, 2007

13 Predict and Decide, Oxford University Report, 2006

14 Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

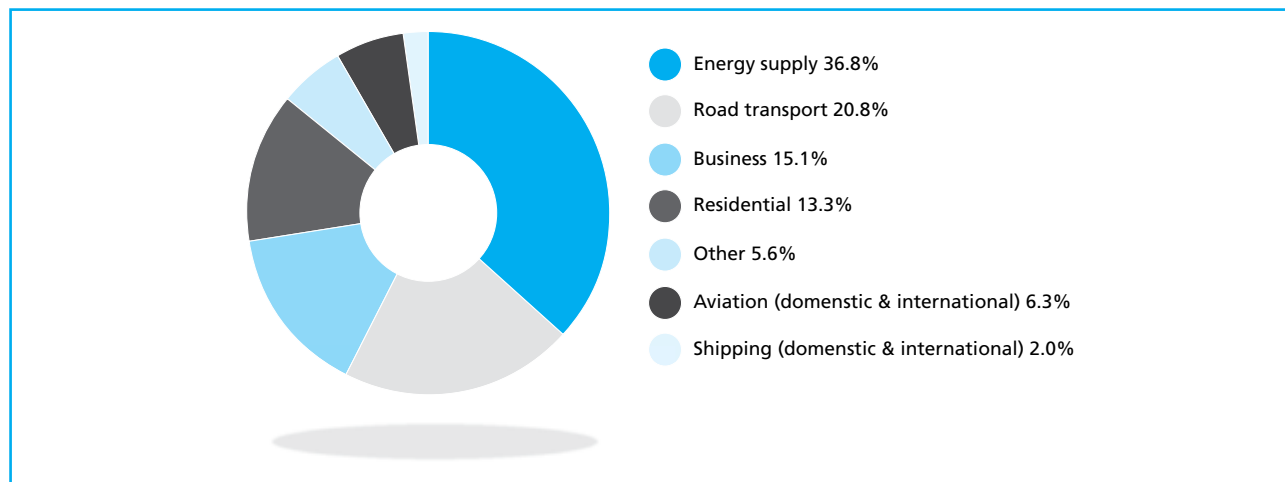
15 Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

16 Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

17 UK Air Passenger Demand and CO<sub>2</sub> Forecasts, DfT, 2009

### 3 Climate change and the role of aviation

Figure 5: Aviations' share of total UK CO<sub>2</sub> emissions 2007<sup>18</sup>



#### Sources of emissions from the aviation industry

Airport Council International (ACI) estimates that airport operations contribute 5 % of the aviation industries emissions. Emissions from airport operations consist of emissions from aircraft in landing and take-off, passengers and staff travelling to and from the airport by various modes of transport, operational vehicle fleets including airfield vehicles, energy used by airport buildings; water usage and waste from the airport which produces greenhouse gases through disposal.

At Gatwick Airport the vast majority of emissions are related to aircraft in flight and on the ground, with a much smaller, but nevertheless a significant contribution is from the energy used by airport buildings and ground operations.

#### Non-CO<sub>2</sub> effects of aviation

Aviation's contribution to climate change is not just the CO<sub>2</sub> emitted by aircraft in flight. Aircraft also emit nitrogen oxides (NO<sub>x</sub>), which can contribute to the formation of the greenhouse gas, ozone. Contrails and cirrus clouds that can be created by water vapour from aircraft may also add to aviation's impact on climate change<sup>19</sup>. The full effects of contrail and cloud formation on the climate are not yet fully understood by the scientific community, although a number of research projects at UK and EU level are currently underway. Nevertheless, IPCC estimates from 1999 suggest that the "radiative forcing" impacts of non-CO<sub>2</sub> aviation emissions are 2 – 4 times greater than that of CO<sub>2</sub> alone<sup>20</sup>.

#### Government and industry responses to emissions from aviation

The Government has recently introduced a new target to bring UK aviation CO<sub>2</sub> emissions below 2005 levels by 2050. DfT has stated that *"meeting this target will involve a combination of technology developments, improved air traffic management, airlines operating efficiently and economic measures, such as emissions trading"*.<sup>21</sup>

In its Air Transport White Paper Progress Report 2006, the DfT sets out the ways in which Government is working with industry to tackle the climate change impacts of aviation. Measures include:

- Adopting a target of improving fuel efficiency by 50% per seat kilometre in new aircraft in 2020 compared to 2000;
- Establishing common methodology for reporting of CO<sub>2</sub> emissions and fleet fuel efficiency; and
- Using fuel efficiency measures in aircraft operations where possible, e.g. single engine taxiing and continuous descent approach (CDA), whereby aircraft come into land under minimum power. This has the potential to reduce fuel consumption by 1%, when combined with low power and low drag technology.

<sup>18</sup> Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

<sup>19</sup> Air Transport White Paper Progress Report, DfT, 2006

<sup>20</sup> Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

<sup>21</sup> Factsheet 5, UK Aviation: Carbon Dioxide Emissions, DfT, 2009

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### 3 Climate change and the role of aviation

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The aviation industry itself has also responded to the challenge of tackling climate change by establishing a number of industry groups, notably:

- **Aviation Global Deal:** the group seeks global solutions for reducing aviation's emissions and highlights the need for industry investment in the sector's key emissions reduction drivers, namely fleet replacement, infrastructure improvement and sustainable biofuels. Members include Air France/KLM, BAA, British Airways, Cathay Pacific Airways, Virgin Atlantic Airways, and The Climate Group; and
- **Sustainable Aviation:** this is a comprehensive strategy for the long term sustainability of the UK aviation industry. This initiative brings together the UK's leading airlines, airports, aerospace manufacturers and air navigation service providers. Signatories to the strategy are committed to delivering significant reductions in carbon dioxide emissions, nitrogen oxide emissions and aircraft noise over the next 15 years. It identifies eight goals to which each endorsing company (including BAA) will contribute according to its respective operation; one of these goals directly underpins Gatwick Airport's utilities management action plan, which is available on our website (<http://www.gatwickairport.com>).

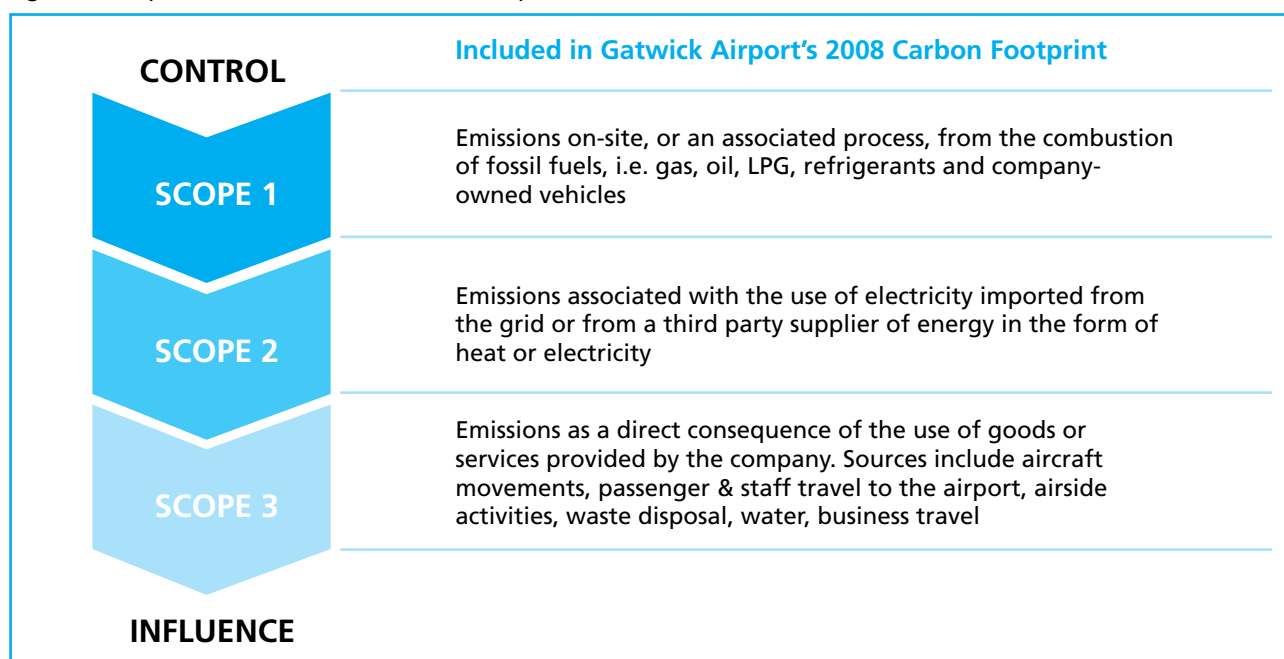


## 4 Our carbon footprint

In 2008, Entec was commissioned by BAA to develop a methodology to calculate the carbon footprint for the South East airports.

In developing the carbon footprint methodology, Entec has drawn on best practice guidelines, notably the Greenhouse Gas Protocol on Corporate Accounting and Reporting (World Resources Institute and World Business Council for Sustainable Development, 2004), and current DEFRA guidelines. This protocol sets out a robust approach to reporting an organisation's carbon footprint, focusing on improving consistency and avoiding duplication in reporting. This includes defining those emissions over which Gatwick Airport has direct control as well as more general guidance on other emissions that can be reported voluntarily. The favoured approach is to report emissions in three levels as illustrated below.

Figure 6: Scope of Gatwick's 2008 carbon footprint<sup>22</sup>



### Our scope 1 and 2 carbon emissions

Entec has calculated our carbon emissions for activities over which Gatwick Airport has direct control. These emission sources include fuels and energy used in operating the airport (paid for by Gatwick Airport) and includes electricity and natural gas; fuel used in the airport's own vehicles and company cars and emissions from refrigeration systems maintained by Gatwick Airport.

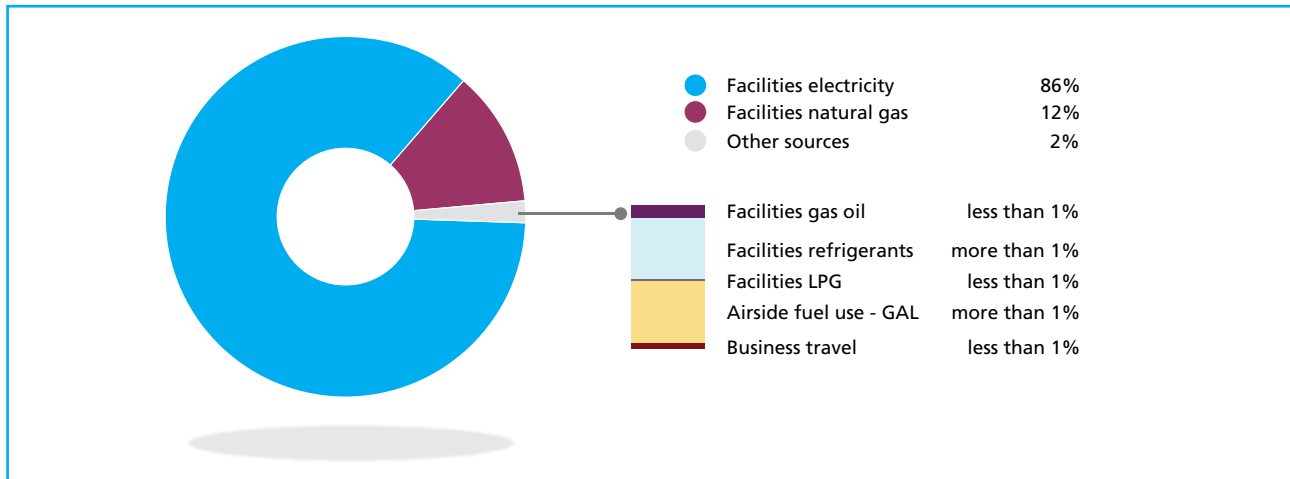
Our metered and billing data have been used to calculate carbon emissions from our electricity and fuel consumption. Emissions from company cars have been calculated based on employee expense claim data.

Our scope 1 and 2 carbon emissions for 2008 are calculated as 102,270 tonnes of CO<sub>2</sub>. A breakdown is shown below and illustrates that emissions from electricity generation take the lion's share, followed by emissions from use of natural gas on site. Taken together these two activities account for 99% of our scope 1 and 2 carbon emissions.

<sup>22</sup> Entec 2009

## 4 Our carbon footprint

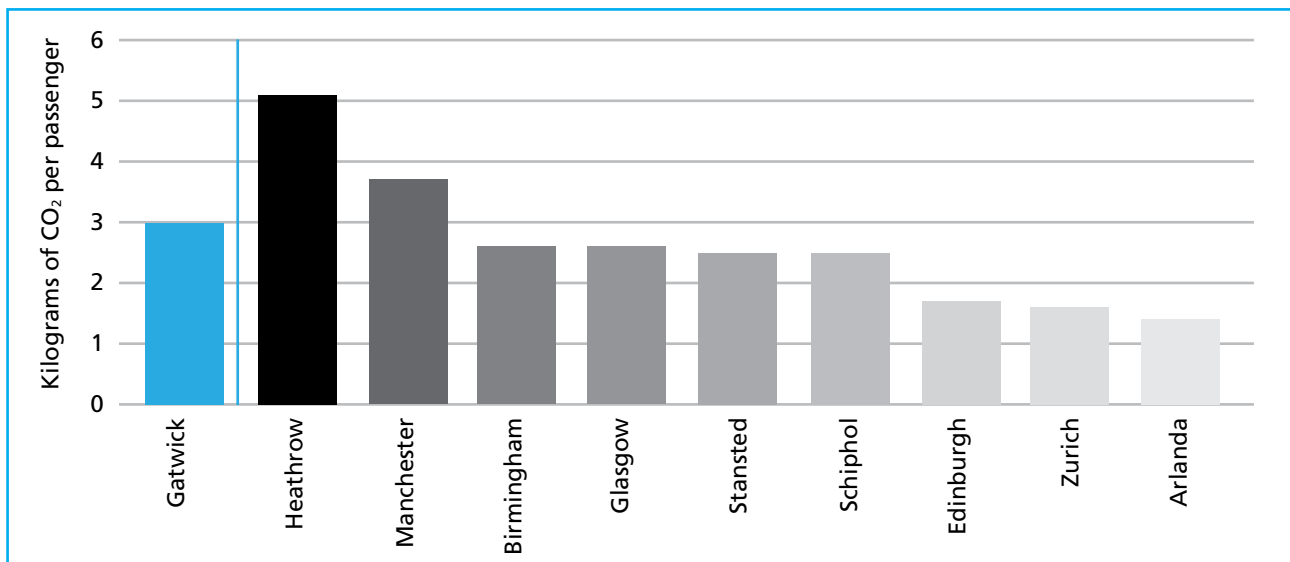
Figure 7: Breakdown of carbon emissions under Gatwick Airport's direct control<sup>23</sup>



### Our scope 1 and 2 carbon emissions compared to other airports

Entec has compared our scope 1 and 2 carbon emissions to the direct carbon emissions for comparable UK and worldwide airports, in terms of carbon emissions per passenger<sup>24</sup>.

Figure 8: Direct carbon emissions per passenger<sup>25</sup>



In terms of kilograms of carbon per passenger, Gatwick Airport is most comparable with Birmingham, Glasgow, Stansted and Schiphol airports, at 2.77 kilograms per passenger.

<sup>23</sup> Entec 2009

<sup>24</sup> 'Total CO<sub>2</sub> emissions from energy consumption' for Birmingham Airport are assumed to be direct emissions only. Direct emissions for Manchester Airport are estimates from Manchester Airport Environment Plan, for energy use and airport vehicles, excluding staff and passenger journeys, aircraft and other.

<sup>25</sup> Entec 2009.



### Other carbon emissions (scope 3)

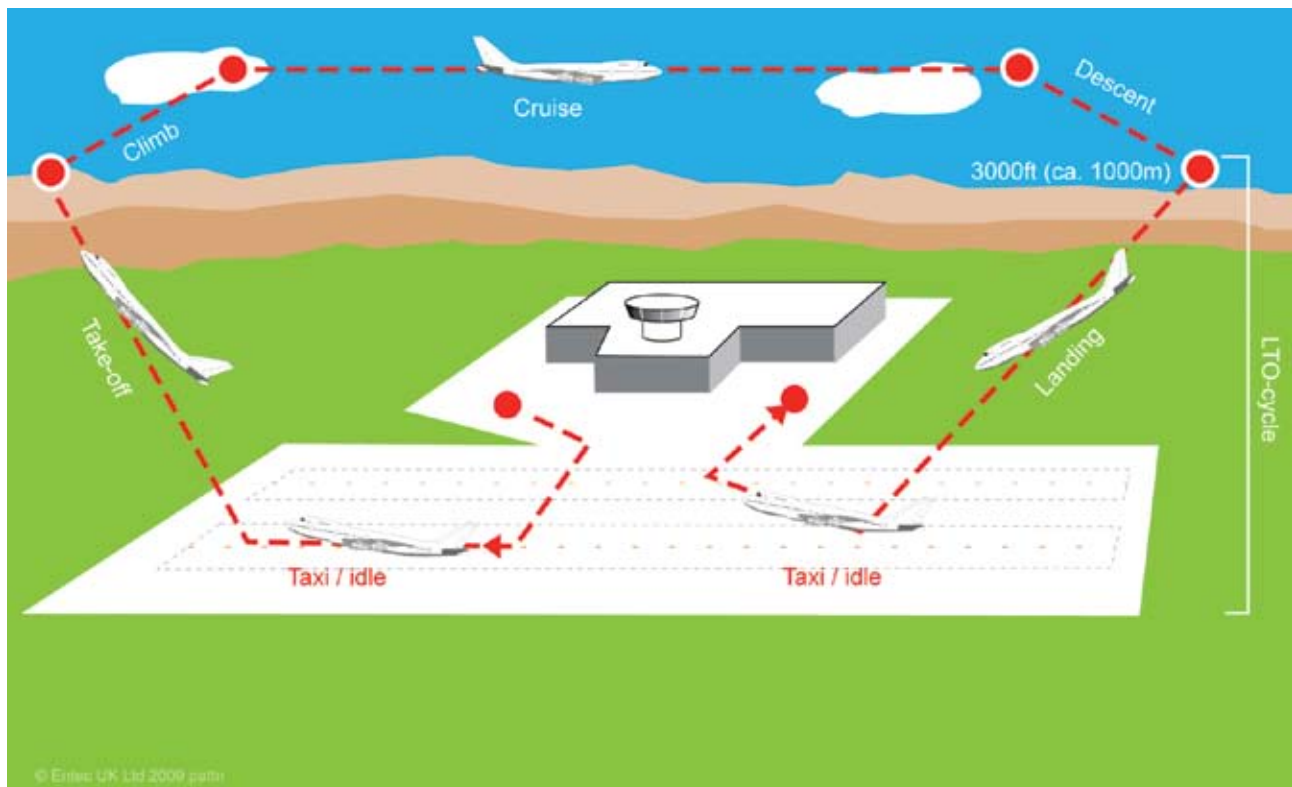
In addition to the activities included in our scope 1 and 2 carbon footprint, the activities of our staff, business partners, customers and passengers also result in carbon emissions and we recognise the need to understand these impacts and play a role in influencing behaviour.

In choosing which emissions to include we have sought to be as comprehensive as possible, including those sources that would be expected to be associated with an airport, and activities in our supply chain where robust data is available. It therefore includes calculations for carbon emissions from:

- Aircraft movements on the ground and close to the airport. To allow consistency with aviation procedures this scope has been set as the International Civil Aviation Organisation (ICAO) defined landing and take off cycle (LTO), as described in Figure 9. This represents the limit where the airport has some influence over these activities;
- All passenger and staff journeys to Gatwick Airport (door to door);
- Water treatment and waste management;
- Vehicles used at the airport by third parties; and
- Business travel by our employees, by road, rail and air.

In relation to the effect of airports on local air quality, emissions from aircraft on the ground and as they approach/depart from an airport are among the more significant sources. A standard approach to this is to consider the ICAO LTO cycle, defined as being operations below 1000m, illustrated in Figure 9.

Figure 9: Aircraft movement classifications, i.e. landing and take-off cycle (LTO)<sup>26</sup>





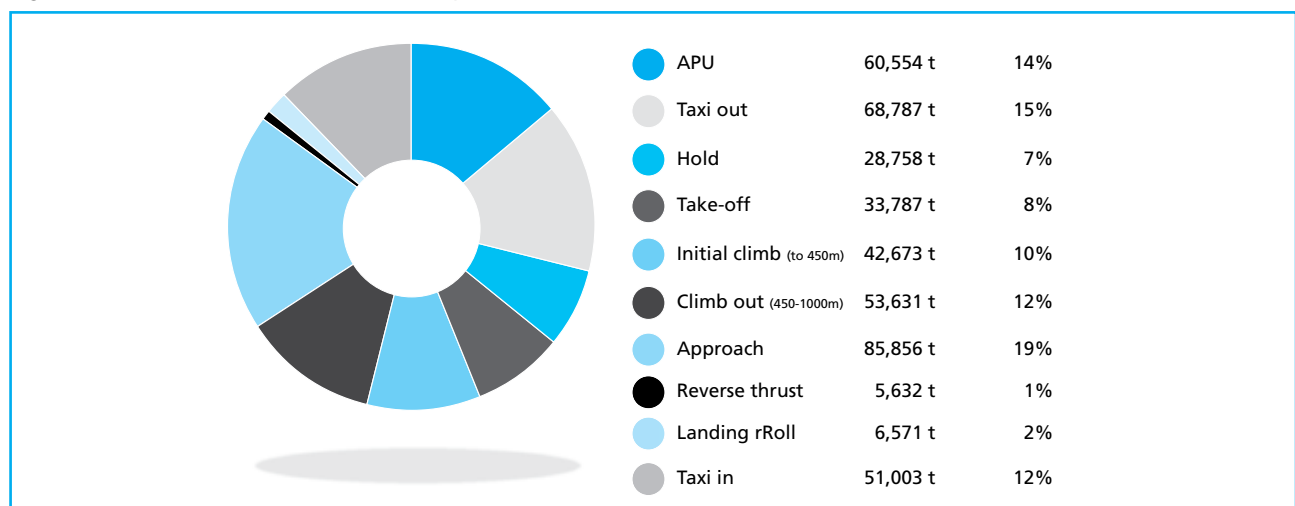
This assessment has considered a number of phases of operations within the LTO cycle; these are based on the typical thrust settings for each mode. This study has considered the following phases:

1. Ground movements: taxiing, time in hold, use of auxiliary power units (APUs);
2. Departing flights: take-off roll; initial climb (to 450 m); and climb to 1000m; and
3. Approaching flights: approach (from 1000 m); landing roll and reverse thrust.

It is during these phases that we can work with our partners to minimise emissions. The aircraft movements, details of aircraft types and engine assignments recorded by Gatwick Airport, together with information on fuel consumption recorded by the International Civil Aviation Organisation (ICAO) and Federal Aviation Administration (FAA), were used to estimate the fuel burn and carbon emissions during each phase of the LTO cycle.

Figure 10 illustrates the emissions from each phase of the LTO at Gatwick Airport in 2008. The largest contributor to emissions in the LTO cycle is from aircraft whilst on the ground, of which aircraft taxiing, both in and out, represents 120,000 tonnes.

Figure 10: Carbon emissions from each phase of the LTO<sup>27</sup>



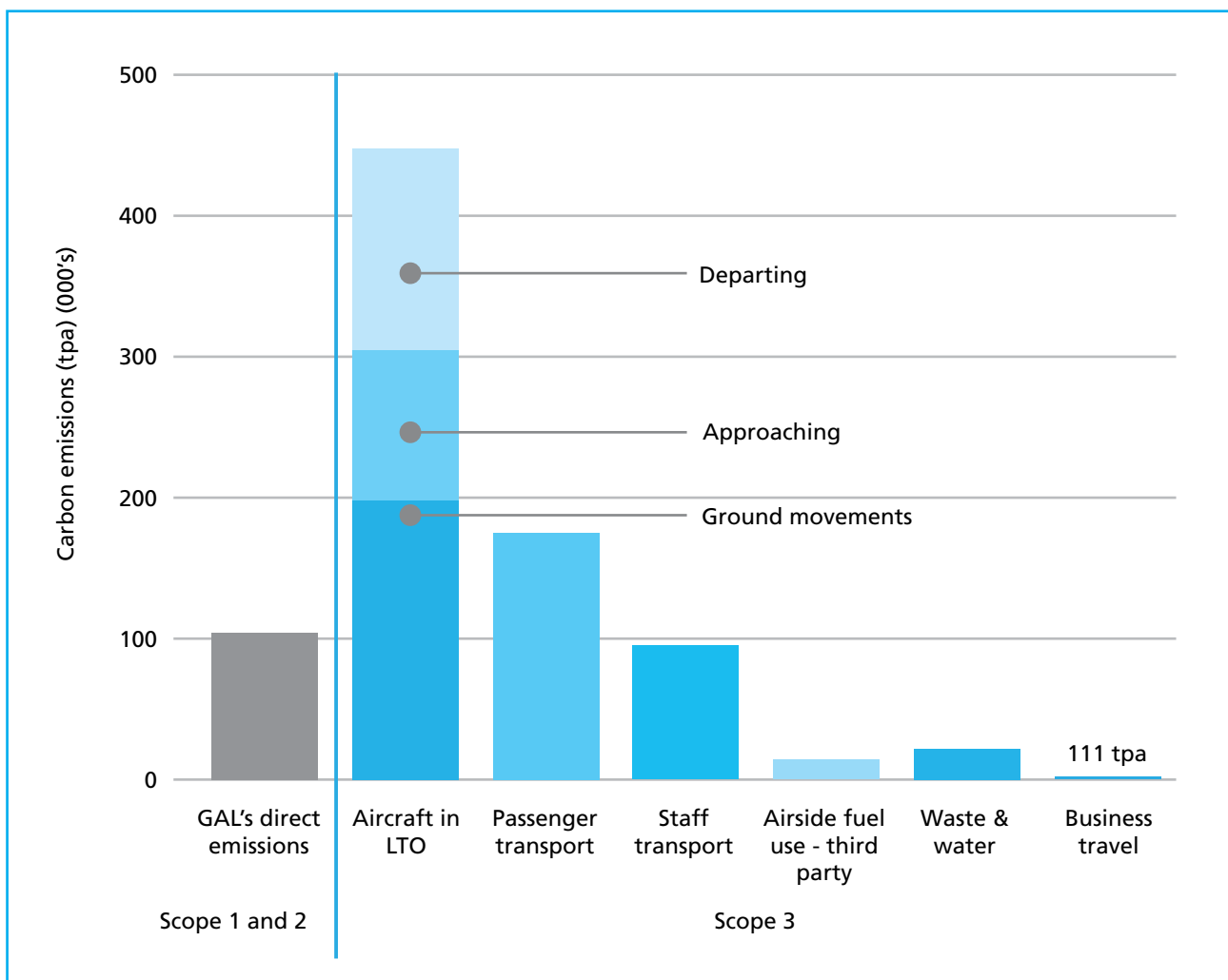
<sup>27</sup> Entec 2009.

## 4 Our carbon footprint

Figure 11 below summarises the carbon emissions from other airport sources (scope 3) and illustrates the significant contribution from aircraft emissions both on the ground and in the departing and arrival phase of flights. To provide context with our direct emissions (scope 1 and 2) these are shown as a separate bar.

Taken together, other airport CO<sub>2</sub> emissions amount to just over 700,000 tonnes in 2008.

Figure 11: Carbon emissions from other airport sources<sup>28</sup>



This carbon footprint has consciously not sought to calculate emissions from aircraft in flight. Firstly, because these are regulated and managed through national policies, in the future by EU ETS, and secondly, because this would replicate work carried out by the DfT who independently produce CO<sub>2</sub> calculations for the UK as a whole as well by individual airport.

To help provide further context it is useful to note that the DfT has calculated that carbon emissions for departing flights from Gatwick Airport to their final destination were 4.4 million tonnes in 2005 (the most recent year for which calculations are published). Emissions from aircraft in the landing and take-off cycle are therefore less than 10% of the emissions from all flights departing from Gatwick Airport and less than 1.2% of the emissions from UK aviation<sup>29</sup>.

<sup>28</sup> Entec 2009

<sup>29</sup> Total CO<sub>2</sub> emissions from UK aviation in 2005 is 37.4Mt (DfT, 2009)

### What we plan to do next

We are pleased to have established what we believe to be a robust methodology for calculating our carbon footprint. The best available data has been used in calculating this year's footprint and assumptions made have been clearly documented. This will act as our baseline and help us measure and report on our performance in future years. Read more about the carbon footprint of all BAA UK airports in the corporate responsibility reports available at [www.baa.com](http://www.baa.com).

BAA intends to publish the full methodology (which will include clarity on the scope adopted and the boundary of the emissions that the airport directly controls, plus the supporting assumptions) in 2009.

The carbon footprint exercise is an important step towards developing our low carbon strategy which will include carbon reduction targets, timeframes and action plans going forward.

The following sections examine the key areas of our carbon footprint, our current activities and our future plans to reduce our emissions at Gatwick Airport. We will provide more information on this issue in next year's sustainability performance report, following the development of our low carbon strategy.



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## 5 Managing our emissions today

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Understanding and proactively managing the airport's impact is a high priority for Gatwick Airport's senior leadership team. Given the growing public concern of climate change, we know that a robust and proactive approach to carbon management is fundamental to our licence to operate. Moreover, it also makes business sense. Improving the efficiency of our operations and reducing our energy bills are important parts of maintaining a competitive cost base.

We are committed to reducing the impacts we have, wherever possible. Firstly, we must tackle the emissions from operations within our control, such as our terminals, office buildings and business travel. Encouraging behavioural change amongst our employees is part of this.

Secondly, we cannot ignore the emissions from aircraft landing and taking off from our airport or the emissions that passengers create when travelling to and from Gatwick Airport. While these emissions are outside of our direct control, they are related to our business. As such, these areas require us to work with both passengers and airlines to achieve change.

### Managing our scope 1 and 2 emissions

Our operations cover our terminals, departure lounges, office buildings and aircraft stands. We have a public utility management objective as part of our S106 legal agreement with West Sussex County Council and Crawley Borough Council. The objective is to "manage our assets and people to drive efficiency in utility use, and thereby reduce the CO<sub>2</sub> emissions attributable to energy consumption at Gatwick Airport".

Our long-term goal is to reduce our CO<sub>2</sub> emissions from energy consumption by 15%, from 1990 levels, by 2010 and 30% by 2020 against business as usual. We will report annually on our progress in our sustainability performance report.

#### *Cutting emissions from buildings*

We regularly measure, monitor and report energy use. Working with our facilities managers, we use this data to identify opportunities to set targets and reduce energy use. This is supported by awareness training across the company and with our business partners.

Staff are encouraged, via poster campaigns and face-to-face events, to think of ways to reduce the consumption of energy in their work areas. We also take part in communication events to learn from other airports and identify best practice.

The Carbon Trust completed a number of audits (latest in 2006) on our behalf which highlighted three key areas for cutting emissions in our buildings: heating ventilation and cooling (HVAC), lighting, and passenger sensitive equipment (PSE).

We control our HVAC equipment using a building management system (BMS). This will be reviewed and upgraded to ensure all equipment can be controlled to match the heating and cooling of areas with their periods of occupancy. In addition, we employ a method of using degree day data – an online database of historical temperatures recorded at weather stations – to reduce the number of days that the airport's boilers are used for heating. Similar methods are employed for our chillers.

Our lighting has been identified as a key area for energy efficiency improvements and includes internal, external and lighting in tenanted areas including retail units.

We plan to install more passenger sensitive equipment such as lifts, escalators and conveyors that will save energy by starting on demand. Our performance on these issues will be reported on in our annual sustainability performance report.

### **Low carbon construction**

We are investing around £1 billion between 2008 and 2013 to revitalise our infrastructure, improve passenger service and increase capacity at the airport.

We are embedding sustainability across our capital investment programme through the use of processes, tools and targets. Sustainable construction is a key aspect of our carbon strategy. The processes include the use of two forms of assessment that are used early in the project life cycle:

- The sustainability screening assessment (SA1) is used to ensure that through the project brief, the team considers the impacts of the project on energy use, water consumption and local wildlife, but also on the local community through noise and nuisance; and
- The sustainability scoping assessment (SA2) asks more detailed questions of the project covering similar areas but ensuring that critical success factors, objectives and targets for the project, for example around energy use or CO<sub>2</sub> production, are clear to enable the correct option to be chosen before the design stage is started.

Our targets include achieving 85% recycling, reuse or composting of construction waste by 2010. At present the majority of mixed construction waste from Gatwick Airport goes to two local materials recycling facilities which are reporting recycling percentages of greater than 70%.

In addition, 100% of concrete from pavement and taxiway works is recycled and reused on airport and 14,000 tonnes of runway planings will be reused this year on airport projects at Gatwick.

Our construction suppliers are targeted to use sustainable materials through the use of our environmentally sensitive materials strategy. This strategy focuses our suppliers and designers to use materials from sustainable sources, i.e. timber from certified schemes, but also to look at reducing the amounts of certain materials such as cement, virgin aggregates and formaldehyde.

The use of our sustainability assessment process (SA1 and SA2), adherence to our environmentally sensitive materials strategy and performance against our waste targets is monitored through a number of assurance reviews as part of our project assurance process at Gatwick.



### Managing our scope 3 emissions

As our carbon footprint analysis has shown, the wider emissions associated with the airport are seven times larger than our own direct carbon footprint. So as well as managing the emissions within our direct control, we also have a role to play in encouraging and supporting our passengers, airlines and business partners to act in a more environmentally-conscious way.

#### *Addressing emissions from flights*

##### **Technological advances**

Aircraft are becoming more fuel-efficient and are currently improving in efficiency by about 1-2% a year. Commercial aircraft fuel, and hence CO<sub>2</sub> efficiency, has improved more than 70% over the past 40 years. Improvements in aerodynamics, engine efficiency and use of lighter weight materials and systems are all making a major contribution.

Improving the efficiency of the international air traffic management system represents one of the greatest near-term opportunities for achieving significant reductions in CO<sub>2</sub> emissions. The benefits include reduced fuel consumption which results in lower emissions and operating costs.

Due to the expected growth in aviation, improvements in aircraft fuel efficiency alone are not enough to curb aviation's carbon dioxide emissions. Renewable biofuels and fuel cells may be a way of reducing greenhouse gases and are key subjects for current industry research.

##### **Aircraft in landing and take-off**

We have been working directly with airlines at Gatwick to influence their behaviour. We have an annual audit timetable which includes conducting spot checks on aircraft to identify unnecessary freight and cabin waste onboard.

We encourage single engine taxiing to reduce emissions and the continuous descent approach is another practical method we support where possible to reduce noise and emissions.

##### **EU ETS**

With regard to the EU ETS, we welcome the inclusion of aviation in the scheme from 2012. We have also been working more broadly alongside industry peers through Aviation Global Deal (AGD) Group, which BAA helped to launch in February 2009, to call for international aviation to play its part in tackling global CO<sub>2</sub> emissions.





### *Cutting emissions on the airfield*

We acknowledge that aircraft on the ground and vehicles on the airfield also contribute to carbon emissions and we have a number of initiatives in place for managing these emissions.

#### ***Airside fuel use***

Aircraft have the ability to run one of their engines while they are parked on the ground to power the plane. This power is used to run the air conditioning system and provide electricity to the aircraft's systems and lighting. Running aircraft engines on the ground is an inefficient way of producing energy and is also detrimental to local air quality. We are putting measures in place, such as fixed electrical ground power (FEGP), to encourage more energy efficient behaviour amongst our airline partners.

#### ***Fixed electrical ground power (FEGP)***

We have a legal obligation to provide FEGPs at all new stands to reduce the need for aircraft to either run their engines or use auxiliary power units (APUs). We monitor aircraft use of FEGPs and regularly report on performance to our stakeholders.

#### ***Pre-conditioned air***

We will commission a study of the feasibility of providing pre-conditioned air (PCA) supplies on aircraft stands to provide air conditioning and electricity from the terminal buildings, allowing aircraft to turn off their engines on the ground. The study will have particular regard to:

- The potential of reducing the impact of airport-related emissions on neighbouring communities;
- The CO<sub>2</sub> emissions attributable to the supply of PCA;
- Any material variation in the benefit of using PCA on different aircraft stands at Gatwick Airport, and their location;
- Evidence of the operational performance of PCA supplies at representative airports elsewhere; and
- Financial considerations.

#### ***Airfield development***

We plan to rebuild Pier 1 in the South Terminal and to refurbish Pier 2. Pier 1 works will replace an inefficient building with one that reduces the number of stands, but improves passenger flow and experience. In this project, targets are being established to reduce the operational CO<sub>2</sub> emissions by 20% compared to 2006 building regulations, and to include low and zero carbon energy contributions to reduce the CO<sub>2</sub> emissions further.

Pier 2 refurbishment will include a sustainability review and targets to reduce energy consumption. A combination of design and energy efficiency improvement is being considered to respond to meet an operational energy target of between 10 and 20% reduction in electricity consumption compared to the original pier.

### *Working with our business partners*

We work with our retailers to encourage efficient use of energy in our terminal buildings. We explain best practice energy use to new retailers and require them to design their units to meet our energy efficient targets. This covers everything including local heating, ventilation, air conditioning, all electrically-powered appliances, equipment and lighting.

We are in the early stages of working with our airport partners on a variety of exciting infrastructure solutions together with operational process initiatives which are a crucial part of the wider industry airspace and capacity workstreams for Gatwick Airport. Over the next 3 years we are actively looking at schemes such as 'on-time performance', to take our already efficient airfield to the next level and thereby further eliminate inefficiencies and waste to allow the optimum balance between performance and environment.

### *Reducing emissions from road traffic and airport vehicles*

As highlighted in our carbon footprint data, (see Figure 11 under Our Carbon Footprint), emissions from road traffic account for a large proportion of our indirect carbon emissions.

Compared with aviation, road transport is a much greater contributor to the UK's carbon dioxide emissions representing 24% of UK carbon dioxide emissions, compared with 6% for aviation. We recognise that the volume of trips generated by an airport the size of Gatwick Airport requires a set of measures to mitigate the environmental impact of airport-related road trips.

In accordance with our S106 legal agreement we have made a commitment to produce a surface access action plan. This focuses on ensuring that our passengers and staff have access to a range of transport options and supports the three main objectives established in our airport surface access strategy (ASAS) 2007:

1. To reduce the rate of growth of trips by private car and taxi by encouraging greater use of public transport;
2. To ease congestion by improving traffic management and implementing strategic road improvements; and
3. To manage on site emissions.

Our strategy encourages employees to use public transport, car sharing, cycling and walking options, and with regard to our passengers we are working to discourage "kiss and fly" and "meet and greet" traffic. (This is the practice of friends or family driving to the airport to drop off or meet passengers, resulting in multiple car journeys, road congestion and carbon emissions).

Going forward we are keen to reduce the carbon emissions associated with access to the airport and will be working to reduce the carbon impact per passenger.

We also have ongoing plans to increase the number of Euro IV<sup>30</sup> and clean-fuelled vehicles in our vehicle fleet. Our air quality action plan addresses how we manage emissions from both airside and landside vehicles.

<http://www.gatwickairport.com>

### *Managing emissions from airside vehicles*

We currently undertake a number of initiatives to mitigate airside vehicle emissions. One such initiative is that only electric vehicles are used in the North Terminal baggage hall. During 2007 we undertook a review of our airside vehicle emissions management process (managing director instruction (MDI)) and considered alternative methods of control. An outcome of this was that a new emissions management system was trialled in 2008. We will be working with business partners and targeting significant numbers of airside vehicles during 2009 to develop the improved control methods.

### *Managing emissions from landside vehicles*

We published our ASAS in October 2007 and it is available to download on our website:

<http://www.gatwickairport.com>

The strategy sets out Gatwick Airport's forward plan for surface access provision and forms the basis on which we will seek to address air quality issues arising from surface access emissions sources, by reducing car dependency and minimising the risk of congestion from airport-related road trips. In doing so, we also aim to have a beneficial impact on air quality within the airport and the surrounding areas.

30 Euro IV is an EU-wide standards that limits car emissions to 0.25g/km of NOx (nitrogen oxides) and 0.02 g/km of PM (particulate matter). It was introduced in 2005.

Key targets, aimed at increasing the number of passengers and staff using public transport, in turn reducing the emissions from airport-related road traffic, are included within the ASAS and are developed in partnership with our Gatwick Area Transport Forum. These targets include:

### **Road trips**

Morning peak hour road trips to and from the airport should not exceed 7,850 trips when achieving 40 million passenger per annum (mppa).

### **Air passengers**

40% of non transfer air passengers to use public transport for journeys to and from Gatwick Airport when at 40mppa.

### **Airport staff**

Our ongoing targets are to achieve:

- 20% of airport staff living in Crawley/Horley to use local bus for travel to work by the end of 2008;
- 45% of airport staff living in Croydon, Bromley and Merton to use public transport for travel to work by 2015; and
- 30% of airport staff living in Brighton and the Sussex coast to use alternatives to private car for travel to work by 2015.

A series of actions aimed at ensuring these targets are met are set out within the ASAS. Relevant actions from the ASAS have also been incorporated into Gatwick Airport's air quality management action plan together with some additional measures to further reduce emissions associated with airport-related road vehicles.

Some key actions include:

- Working with transport providers to promote and improve public transport options;
- Managing emissions from the landside fleet;
- Promoting awareness and usage of public transport modes for travel to and from the airport;
- Continuing to promote and enhance staff travel discounts; and
- Investigating the feasibility of introducing road access charging of the airport as a demand management tool.

We will report performance and progress against these actions in our annual sustainability performance report.

### **Airport-focused transport solutions**

*Infrastructure* – we continue to work with Network Rail to redevelop the rail station at Gatwick and create a high quality transport interchange.

*Ensuring the future of Gatwick Express* – we have been working closely with Southern Railways and the Department for Transport (DfT) to ensure the future of the Gatwick Express.



*Making the most of the regional rail network* – we continue to focus on securing and promoting cross-London links, and optimising the already strong London-Brighton links as part of our response to the South Central Franchise. We have longer term strategic aspirations to improve rail services to both the east and west of Gatwick.

*Meeting passenger needs* – we are developing solutions for rail, coach and other forms of sustainable transport that offer the right service, at the right time and at the right price. For example the recently launched “24/7 Airport by Coach” service from North Kent offers passengers on-board facilities such as Wi-Fi and door to door taxi connections to make it easier for passengers to get to local coach pick up points. We are also looking to provide passengers with pre-arrival information via the onboard TV screens. In accordance with our surface access plans, we will also look to apply these approaches to rail services.

### ***Managing the car***

The major focus of our ASAS is to increase public transport usage; however we wish to ensure that any growth in airport-related car traffic does not significantly increase either congestion or further emissions on the airport road network or those in the immediate vicinity.

*Improving access to the airport* – we are working with the Highways Agency (HA) and other stakeholders on improvements to key local highway access points to facilitate further development such as the North Terminal roundabout.

*Forecourt access* – our approach to forecourt management helps to maintain vehicle flow and reduce congestion but also affords priority to public transport services. This includes assessing longer-term strategies to discourage ‘kiss and fly’ and ‘meet and greet’.

### ***On-airport car parking provision***

Our approach to car parking involves the following:

- Offering passengers a choice of travel options and parking services;
- Ensuring additional airport related car parking is provided on-airport;
- Making the most efficient use of on-airport parking supply for our passengers and staff;
- Optimising car parking locations in relation to South and North Terminal demand;
- Minimising total vehicle kilometres travelled on-airport; and
- Working with our local authorities in the delivery of our car parking strategy.

Please refer to our surface access strategy for more detail on our current parking arrangements ([www.gatwickairport.com](http://www.gatwickairport.com)).

### ***Managing a dynamic travel plan***

Our employee travel plan took a step forward with the launch of Gatwick Commuter in 2006. Essentially the scheme provides a cohesive strategy through which we work with the airport community to develop and deliver action plans geared to their needs. In much the same way as with passenger services there is a strong focus on ensuring we offer airport employees the right services, at the right price, and most importantly, at the right time.

During 2009 we will be launching a new Gatwick Commuter scheme. This will build on the success of the existing scheme and have a strong focus on incentives to reduce single occupancy car use, such as discounts on bus, coach and rail, strong car sharing package and a full suite of marketing materials. We hope to take Gatwick Commuter to the next level through strengthening our working relationships with the airport community, improving monitoring procedures and searching for new and innovative products and ways of communicating to the wider airport community.

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## 6 Managing our emissions tomorrow

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### *Sustainable growth*

The demand for air travel is forecast to grow. People want to go on holiday, stay in touch with families and friends, and continue to travel for business. The aviation industry also plays a vital role in supporting high-value trade in manufacturing and services, which are important in supporting the UK's participation in the global economy.

The UK Government published The Future of Air Transport White Paper in 2003, setting the context for airport development in the UK up to 2030. The White Paper stated that the first priority was to make best use of existing runways. However, it also stated that land should be safeguarded for a second runway at Gatwick Airport after 2019, in case a new runway at Heathrow could not meet the environmental limits.

We support the Government's plans to allow the growth of aviation within environmental limits. We will ensure we take responsibility for our impacts, as well as play our part in contributing towards the protection of the UK's trade competitiveness and tourist industry. Gatwick Airport signed a legal agreement in 1979 preventing the construction of a new runway until 2019.

As we move towards becoming an independent airport, we will be focused on building on the work we have started by establishing new functions and roles that had previously been managed centrally by BAA. We see this as a great opportunity to think afresh about what climate change and sustainability means for Gatwick Airport.

### *Areas identified for improvement*

Following our carbon foot-printing exercise, we are exploring the feasibility of a number of measures to reduce our carbon emissions. These include both shorter-term as well as longer-term strategies:

Immediate opportunities in building management include:

- Improving insulation of our buildings;
- Repairing air handling units (AHU) used for ventilation and conditioning purposes;
- Increased use of variable speed drives (VSD) used to pump air or water or run baggage lines, allowing motor speed to be varied according to load;
- Upgrading building management systems (BMS);
- Replacement of fittings and light sensors to reduce energy use;
- Adjustment of voltage taps at transformer locations to reduce wastage; and
- Better building fabric (e.g. glazing, air tightness, shading) to control the conditioned environment.

Bigger solutions may include investments in combined heat and power (CHP) or through the use of alternative energies such as biomass and wind turbines.

For airfield activities and transport, identified areas for progress include:

- Exploring ways to improve the efficiency of aircraft ground movements e.g. reduced engine taxiing, minimising time the aircraft has to wait in 'hold';
- Improving our regular targeted maintenance programme of operational vehicles and equipment;
- Promoting the use of public transport to the airport to reduce passenger and staff road vehicle emissions; and
- Lobbying for future investment and improvements with appropriate transport organisations.

With regard to construction projects, we have made a commitment for all construction projects to follow comprehensive energy performance planning, and where possible, go beyond best practice. Within our organisation we have a robust sustainable construction assessment process, which includes appropriate governance structures and teams in place to uphold a consistent and sustainable approach as we continue to invest as part of our 5 year capital investment plan to 2013.

On the transit system, our plans for improvements include modernization to enable more efficient energy consumption for the system during low demand periods, without affecting the overall reliability and regularity of the system for passengers.

Our plan is to report on our progress in these and all other areas through our annual sustainability performance report.

### *Developing our low carbon strategy*

We plan to use our carbon footprint data to develop a low carbon strategy for the airport, the details of which will be reported in our 2010 sustainability performance report. Key elements of this are setting long-term targets and developing our low carbon road map to define an action plan for the next three years and beyond.

As a result of the sale of the airport and the separation from BAA, we are currently reviewing all our environmental strategies and targets. As part of this process we are updating our baseline data which will help inform and drive strategy development for an independent Gatwick Airport. In developing this strategy we are working closely with all our key stakeholders, UK and European government (national, regional and local), agencies, airlines, business partners, transport operators, infrastructure providers and key organisations.

Their role in the development and guidance of this strategy is crucial. We will also continue to work with partners to encourage emission reductions. Our intention is to identify the scale of reductions available at the airport and implement plans to reduce our scope 1 and 2 emissions.

The following are some of the actions we have set ourselves for 2009 and beyond. Our low carbon strategy will outline further actions. These will be detailed in our 2010 sustainability performance report.

### *Actions for 2009*

- In terms of our climate change commitments, we have agreed to publish a climate change report in 2009 and update it at least once every three years. We also have a number of utility management commitments that set out how we aim to manage our assets and people to drive efficiency in utility use, and thereby reduce the CO<sub>2</sub> emissions attributable to energy consumption at the airport. In December 2008 we published our utilities management action plan which contains the measures we intend to take to meet our objectives in this area. This is available to download on our website (<http://www.gatwickairport.com>);
- Investigate the feasibility of replacing lights in airport signage with lower energy LED (light emitting diode) lighting; and
- Continue the roll out of upgrading and replacing airport lighting with energy-saving bulbs.

### *Actions for 2009 and beyond*

#### **Scope 1 and 2:**

##### ***Cutting emissions from buildings:***

- Tracking progress against our annual targets for energy consumption on a monthly basis;
- Identifying priority projects to deliver savings in energy consumption;
- Undertaking environmental assessments on our development projects to ensure that renewable energy is considered where appropriate;
- Sharing learning with other airports regarding energy efficiency;
- Reporting annually on progress towards CO<sub>2</sub> emission reductions on our overarching long-term target;
- Identifying priority projects to deliver savings in the following areas of HVAC (heating, ventilating, and air conditioning), lighting, and passenger sensitive equipment (PSE); and
- Examining the opportunity to deliver on-site renewable energy solutions.

#### **Scope 3:**

##### ***Cutting emissions on the airfield***

- Commission a study of the feasibility of providing pre-conditioned air (PCA) supplies on aircraft stands.

##### ***Reducing emissions from road traffic and airport vehicles***

- Working with Network Rail on plans to redevelop Gatwick Airport rail station and create a high-quality transport interchange;
- Working with transport providers to promote and improve public transport options;
- Managing emissions from the landside vehicle fleet;
- Investigating the potential for new early morning coach services and other demand-responsive services along key transport corridors;
- Promoting awareness and usage of public transport modes for travel to and from the airport;
- Undertaking works to improve traffic flow on the airport roads and on main highway links;
- Continuing to promote and enhance staff travel discount; and
- Investigating the feasibility of introducing road access charging of the airport as a demand management tool.

We will review and update this report – in collaboration with our local authorities – by the end of 2011.



For further information on BAA Gatwick, please visit our website  
[www.gatwickairport.com](http://www.gatwickairport.com)

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