

# the sky's the limit

policies for sustainable aviation

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# executive summary

This report examines the future of UK aviation in the context of sustainable development. It is designed to contribute to the debate in advance of the White Paper on air transport that looks ahead to 2030, and is now due by the end of 2003.

We start by assessing the costs and benefits of forecast growth in UK aviation. There are sizeable economic and social benefits associated with air transport. Business travel and airfreight make a contribution to economic prosperity. Aviation makes an important contribution to mobility. More people are flying abroad on holiday than ever before.

There are, however, downsides. For example, the UK has a large and growing trade deficit of over £14 billion in international tourism in 2001, equivalent to nearly one and a half per cent of GDP. Regions outside London and the South East rely on domestic tourism. Greater airport expansion and lower international travel costs will lead to less time and money spent there, more overseas. Areas surrounding airports in the South East are meanwhile faced with the problems of success: skills shortages, congestion and pressures on diminishing countryside. They are likely to get worse if unconstrained growth at these airports is facilitated.

We conclude that the economic and environmental policy framework for aviation is not level with other industries and not consistent with sustainable development. Airlines are exempt from fuel tax and passengers from VAT on tickets. Duty free sales at airports subsidise landing charges. A loose regulatory touch is applied to deal with aviation's environmental impacts in comparison to other industries. In particular, emissions from international flights are excluded from the current international climate change agreement and airports slip through the net of air quality regulation. We recognise the best solutions to these problems are often not immediately available. Many require European or wider international agreement to be effective. As the Government prepares its aviation strategy, our paper does, however, identify some practical ways to apply the original principles of the 1998 integrated transport White Paper.

In relation to air transport, the overarching policy objectives emerging from that document were that the Government should:

- make best possible use of existing airport capacity before contemplating further development;
- manage demand for air transport for the benefit of environmental sustainability by making the industry pay for the costs it imposes on wider society;
- encourage less environmentally damaging alternatives to air transport where it is feasible to do so.

The Government looks like being blown off course from achieving these objectives. Its recent consultation exercise makes a case for meeting as much predicted demand as possible, and only then mitigating up the environmental impacts where it is feasible to do so. In taking this approach the Government is not leading public opinion, but following. Research shows that one of the biggest environmental consequences of aviation – climate change – is only seen as such by about ten per cent of the population. Managing demand for aviation would help control its fast growing contribution. As long as the public remain uninformed of the

logic behind demand management it is likely to meet with a hostile response and fulfil the Government's view that constraining aviation would be politically unfeasible.

#### *Air traffic forecasts*

Air passenger traffic is growing at about five per cent a year in the UK and airfreight at seven per cent. By 2030 the number of people using UK airports is predicted to nearly treble to about 500 million, from 180 million in 2000. The amount of freight carried is forecast to grow even faster, quadrupling from three million to almost fourteen million tonnes over the same time period.

To accommodate this growth would require the equivalent airport capacity of five more Heathrows at its current size by 2030. In our view, this level of growth would be environmentally unsustainable. This is not necessarily because the environmental impacts of aviation are qualitatively different from other industrial activities. The crucial point is that aviation remains outside of a sustainable development policy framework that is beginning to be applied to other sectors in the UK. While this remains the case there is a real danger that the White Paper will agree to over-provide new airport capacity.

### **Making best use of capacity**

At busy times of the day and during the holiday season, more people want to fly out of Heathrow and Gatwick than there are runway slots available. The view expressed by the industry is that expanding capacity will be a solution to the problem. New capacity will increase the amount of traffic the airport can handle and cut down on flight delays. We argue that there need to be changes to the way Heathrow and Gatwick are economically regulated. If new infrastructure is provided in the current regulatory framework this is likely to be little more than a short term fix. New capacity will rapidly fill up again and congestion will return to the system.

There is a parallel to be made here with the debate on roads in the 1980s. In response to steep forecasts of traffic growth, the Tory government unveiled plans for a huge road building programme, subsequently abandoned. In the 1998 White Paper the Labour government argued that such an approach was unsustainable, requiring the management rather than the blind acceptance of demand to travel by car. Given the growing environmental impacts associated with steep forecasts for air travel, the Government should apply the concept of 'congestion charging' to airports.

#### *Airport price regulation*

Following privatisation of these airports in 1986, the monopoly regulator, the Civil Aviation Authority (CAA), caps profits at Heathrow, Gatwick and Stansted. Since the British Airports Authority (BAA) which owns the airports, makes more money from its airport shops than from its runways, profits from shops help pay for lower landing charges. The busier the airport becomes, the more money is spent in airport shops, the lower the landing fees become and the more passengers are attracted. At present the subsidy means that charges are higher at regional airports than Heathrow, in some cases helping to perpetuate regional economic imbalances. At Heathrow alone the economic costs of congestion to the airlines amounted to some £300 million in 2000. The costs for passengers are likely to be much higher. British Airways (BA) wastes 50,000 tonnes of fuel a year at Heathrow and Gatwick due to airport congestion.

The profits from retail shops and runway facilities should be separated as soon as possible and landing charges allowed to rise slowly to rates that cover the full operating and infrastructure costs. This would help reduce airport congestion and environmental pollution.

There is some concern that this would give a green light to BAA to secure economic rents from a captive retail market. To control this monopoly the Government could end duty free shopping at airports, which the taxpayer subsidises to the tune of £400 million a year. If abolishing duty free proves difficult to achieve internationally, a windfall levy could be charged for the equivalent amount. This might be more politically acceptable if the funds were used for investment in integrated transport schemes.

#### *Auctioning runway slots*

The right to use runways at Heathrow and Gatwick is effectively free for the airlines that held them the year before. Managed in accordance with European Union regulation, runway slots are only withdrawn if they are not used for 80 per cent of the time. As a result few become available each year. The evidence suggests that airlines use these rights strategically to keep out potential competitors. The CAA acknowledges too that all the while the right to use these slots is free they will probably always be insufficient to meet consumer demand. Overall, there is no guarantee that airlines are making best use of their slots.

We recommend that all slots be auctioned over a five-year cycle, with at least one fifth coming available on the market annually. Auctioning would ensure that airlines and therefore consumers that valued slots most would get the right to use them. Pressures to squeeze in more flights even where congestion increased would be reduced. It would sharpen an airline's incentive to use their planes fully, investing in larger aircraft where appropriate to capture competitive advantage. In order to gain a slot an airline would have to minimise its costs as far as possible by making ambitious efficiency savings. The effect would be to reduce fuel consumption per passenger with resulting cuts in pollution. A new EU regulation is required to enable slot auctioning and trading.

### **Managing demand in the interests of environmental sustainability**

#### *Climate change*

The contribution of international aviation globally to climate change was estimated to be about 3.5 per cent in 1992. Although a relatively small proportion of the total, it is fast growing. We estimate that in 2000, the climate change impact of international flights from UK airports, including the effects of nitrogen oxides and condensation trails, was equivalent to about 11 per cent of the UK's total domestic CO<sub>2</sub> emissions from all sources. If the UK meets its target to cut total domestic CO<sub>2</sub> emissions by 20 per cent on the 1990 total by 2010, then emissions from international aviation from the UK would grow to the equivalent of about 20 per cent of domestic CO<sub>2</sub> emissions. The government has recently adopted a target to cut the UK's CO<sub>2</sub> emissions by 60 per cent by 2050 from the 1990 total, in line with the recommendation of the Royal Commission on Environmental Pollution, based on atmospheric capacity limits and an equal per capita share of emissions between nations. If emissions from international aviation continue to grow unchecked, then by 2050 the impact of emissions from international flights from UK airports could exceed the UK's entire emissions quota. This is clearly unsustainable.

We therefore recommend that emissions from international aviation be included in national inventories under the climate change convention at the earliest possible date, which is the second commitment period from 2008-12. The most economically efficient and environmentally sure way of controlling aviation emissions would be to include them in an open, international emissions-trading regime, with global emissions capped at a level that reflects environmental capacity. As an interim step, emissions from intra-European flights could be included in the proposed EU emissions trading regime. An alternative way to address the non-CO<sub>2</sub> impacts, would be an emissions charge, as currently favoured by the European Commission.

*Local air quality*

At the UK's largest two airports, Heathrow and Gatwick, the growth in road and air traffic threatens to breach health-based EU limits for nitrogen oxides. Limits are not currently likely to be exceeded for other local pollutants associated with airport development. However, large airports can be compared in the scale of their local air quality impacts, to industrial sources. Unlike these installations, the emissions of which are regulated by the Environment Agency regulation, there is no effective means of dealing with the impacts of aviation emissions and protect public health. In the meantime local authorities are obliged to adopt strategies to tackle significant sources in their area, working with the Environment Agency where appropriate.

We propose that the Environment Agency should oversee the inclusion of large airports into Air Quality Management Zones with enforceable pollution limits.

*Noise*

A meeting of the international civil aviation organisation (ICAO) in September 2001 failed to agree on a common phase out of the noisiest 'Chapter 3' aircraft. Its own noise study has concluded that people affected by annoying levels of aircraft noise will increase in Europe by over forty per cent by 2020 due to rising levels of traffic. The UK is no exception.

ippr recommends that noise capacity limits should be agreed at all airports, overseen by the Environment Agency. The Government should specify minimum standards. Beyond this there is a role for statutory supported local consultative committees composed of interested stakeholders to secure more ambitious noise targets. This would help facilitate local trade-offs between the noise environment and the economic and social opportunities afforded by airport development.

Both noise and air quality standards would guarantee a level of environmental protection for local communities and provide a more predictable environment for airport development. If airports succeed in attracting the quietest, least polluting aircraft they will be given the option of growing within sustainable limits. To achieve these objectives airports could calibrate landing charges, along the lines set out by the European Commission, to reward the least damaging planes while deterring the worst. Especially at larger airports with a high surrounding population the Government should consider more restrictive measures on noisy aircraft afforded by European legislation.

*Land use planning*

We propose that the principles of the New Approach to Appraisal applied to other transport projects since 1998 should also apply to airport developments. This means not simply considering narrow economic costs and benefits, but taking environmental and social impacts fully into account and considering alternatives such as demand management or high-speed rail. It also means a strong presumption against schemes that damage protected wildlife areas and heritage sites of national and international importance. We also propose that the concept of Public Safety Zones around airports should be extended to Public Health and Safety Zones, encompassing noise and air quality limits.

*Social impact assessment*

- The assumption on which the current air traffic forecasts are based is that average fares will fall by about one-third in real terms by 2030. We accept that the price of flying would not fall and may increase if our recommendations are implemented. Overall we are confident that the benefits of the proposals outweigh the costs for the following reasons.
- There is no justification for public subsidy of flying, which is mainly the preserve of the better off, with the exception of access to some remote regions. Over 80 per cent of low

cost and scheduled leisure flights are by about 40 per cent of the population from the three most privileged social classes. As a consequence any environmental charges would be progressive, paid for in the main by those who can most afford it.

- ➔ Since landing charges will increase disproportionately at south east airports the relative price of landing at less congested airports will fall. Government appraisal confirms that this will help distribute the benefits and costs of air transport growth more widely across the UK.
- ➔ In the longer term, if air transport is an essential part of economic activity, companies and individuals may decide to relocate to take advantage of regional links. There will be more destinations and more consumer choice at regional airports, helping rebalance UK economic development towards the regions.
- ➔ Managing demand should help regional tourism. Expenditure by foreign tourists in London accounts for 70 per cent of total revenue. In Cumbria it accounts for about five per cent. Any policy that encourages regional UK tourism is likely to be weakened by the expansion of south east airports. Lower relative prices at secondary hubs like Manchester should likewise encourage more foreign tourists to visit the UK regions.
- ➔ Auctioning scarce slots at UK airports will make long haul services relatively more cost effective and improve the competitive advantages of rail investment as an alternative to short haul and domestic flights.
- ➔ Revenue from environmental charges could be used to pay for mitigating the environmental impacts of aviation, better public transport links to airports, development of high-speed rail or for other public services or tax cuts.
- ➔ Air travel is for primarily for leisure but recent government research shows that even without understanding the full extent of environmental challenges posed by aviation, the majority of the public is prepared to pay more for the environmental costs of air travel.

## Key recommendations

### *Economic efficiency*

- 1 To ensure that the best economic use is made of finite airport capacity, we recommend auctioning of and trading in runway slots, which requires a new European Union regulation.
- 2 A portion of the funds from slot auctions could be set aside to help develop better public transport links to airports and, in the longer term, high speed rail as a viable alternative to short haul flights.
- 3 At the earliest opportunity the Civil Aviation Authority should abolish the 'single till' , which allows profits from retail to subsidise landing charges. Airlines should ultimately be made to pay the full costs of infrastructure and services.
- 4 The Government should encourage EUROCONTROL to consider variable on and off peak airspace charges to tackle congestion in the skies.

*Environmental sustainability*

- 1 Emissions from international flights should in future come within developed countries' emissions reduction targets set under the UN Climate Change Convention. CO<sub>2</sub> emissions from aviation should be included in an open international trading scheme. As an interim step, CO<sub>2</sub> emissions from intra-European flights should be included in the proposed EU emissions trading regime.
- 2 The UK government should support an EU emissions charge to tackle aircraft emissions from aircraft causing climate change. Even if CO<sub>2</sub> emissions from aviation are subsequently included in an international trading scheme, other emissions like nitrogen oxides and condensation trails may be best dealt with by an EU charge.
- 3 The Government should stabilise the impacts of noise and air pollution around UK airports, bringing them within a framework of accountability, regulated by the Environment Agency.
- 4 A system of variable charges should be introduced with funds going to support noise and emission mitigation and compensation schemes in the locality.
- 5 Public Safety Zones should be developed into Public Health and Safety Zones with health impact assessments informing land use planning restrictions in areas surrounding airports.
- 6 Proposals for airport developments should be subject to the New Approach to Appraisal, taking a rounded look at economic, social and environmental impacts and alternatives. There should be a strong presumption against airport developments that damage heritage and wildlife sites of national and international importance.
- 7 The air transport White Paper should adopt a 'plan, monitor and manage' approach to new airport infrastructure, reviewing airport policy periodically to take account of a changing policy environment, especially tighter climate change controls.

# 1 introduction

The debate about airports and aviation in advance of the UK air transport White Paper, now due in the autumn of 2003, is reminiscent of the debate about roads and traffic in the 1980s and 1990s. In 1989, the Conservative government published a White Paper entitled 'Roads for prosperity'. Based on forecasts that road traffic could double or more over the subsequent 25 years, it argued that this growth should be accommodated or else the UK economy would suffer. It heralded what the transport secretary Paul Channon called the biggest road building programme since the Romans, a wish list of more than 500 major schemes, most of which never got built. Environmental protestors effectively ended the programme after the M4 extension through Twyford Down, with the backing of public opinion in middle England, which did not want to see the countryside covered in tarmac. The Conservative government retreated under the guise of the 'great transport debate', abandoned its road building ambitions and in 1996 published a green paper on transport policy 'Transport: the way forward'. This foreshadowed the integrated transport White Paper subsequently published by the Labour government in 1998 'A new deal for transport: better for everyone'. In place of predicting traffic growth and providing enough road space to accommodate it, there would be a balance of public and private transport provision, and demand management, to reconcile economic growth, social progress and environmental protection. In light of subsequent events, one might well ask whatever happened to integrated transport but in spite of the difficulties and the limited number of major road schemes recently announced there has been no return to 'predict and provide'. Without major road building, the 1990s were a period of strong economic growth in the UK. As the Government's Standing Advisory Committee on Trunk Road Assessment (SACTRA) concluded in its authoritative 1999 report, there is no simple link between traffic and economic growth.

This report examines the impact of further growth in air transport, both passenger and freight, on the UK economy, society and the environment, with the aim of assessing the contribution of aviation to sustainable development. We accept the objectives of the Government's sustainable development strategy: economic growth and employment; social progress; protection of the environment and prudent use of natural resources. We conclude that unconstrained growth in air transport is not sustainable; the economic and social benefits are outweighed by the economic, social and environmental costs. Aviation does not come within a framework of sustainable development and gets unjustified special treatment compared with other industrial activities. Therefore the Government should not simply forecast unconstrained growth and ensure that enough airport capacity is built to accommodate it. Instead it should support and implement policies at international, national and domestic level to manage growth and reduce its environmental impacts. The most serious consequence of unconstrained growth in aviation is that it undermines the UK's long-term strategy to reduce emissions causing climate change, as part of a global coalition.

Chapter 2 sets out the principles of sustainable aviation.

Chapter 3 assesses the economic costs and benefits to the UK of further growth in aviation.

Chapter 4 discusses how to create a level economic playing field between aviation and other industries and make more efficient use of airport capacity.

Chapter 5 assesses the environmental and health impacts of further growth in UK aviation and how to address them.

Chapter 6 assesses the social impacts of our proposals to put the development of aviation onto an economically efficient and environmentally sustainable trajectory.

## 2 making sense of sustainable aviation

*The new air transport white paper should establish a framework which will ensure that the long term development of aviation in the UK is sustainable*

The Future of Aviation (DETR 2000a)

### how important is sustainability to the UK government?

*In the UK, sustainable development has become one of the most important overarching issues for government to address.*

DEFRA (21 March 2002)

As a co-signatory to the United Nations declaration in Rio in 1992, the UK government agreed to design and start to implement its own sustainable development strategy – a task completed in May 1999 (DETR 1999a). At the European level, Article 6 of the Amsterdam Treaty requires the UK government to embed environmental protection into the definition and implementation of all policies (EU 1999).

#### *what is sustainable development?*

The UK strategy defines sustainable development as 'ensuring a better quality of life for everyone, now and for generations to come'(DETR 1999a). The idea can be broken down into two concepts: needs and limitations. Economic growth is part of the needs equation, helping to pay for better education, housing, and healthcare, and raising standards of living through providing more goods and services for consumption.

If economic growth is the engine of sustainable development, then the quality of that growth is just as important. The UK strategy makes clear that, in the past, the economy has too often expanded at the expense of environmental and social capital. From now on, economic growth should reinforce these resources. It should happen, too, without 'treating others, including those elsewhere in the world, unfairly' (DETR 1999a). A fairer distribution of assets and adequate access to basic services on a global scale are key implications of this approach.

The idea of limitations acknowledges that, in some policy areas there are environmental limits beyond which it is unsafe to go: the UK strategy gives the example of the amount of greenhouse gases we can safely put into the atmosphere, another would be the preservation of natural diversity. This does not mean that economic development stands still. Instead, society should rely on technology and, in some cases, lifestyle change, using resources more productively to increase prosperity within environmental limits.

The integrated nature of sustainable development requires institutions able to unite the themes of environment, economics and society in one decision-making process. It requires public engagement at all levels. This paper is part of that process helping to open up the debate on developing a sustainable aviation policy for the UK.

### objectives for a sustainable aviation policy

The implications of a sustainable policy framework in which air transport sits are assessed in light of the Government's objectives as set out in the national sustainability strategy and reiterated in 'The Future of Aviation' consultation paper (DETR 2000a). This policy should support:

- Social progress that recognises the needs of everyone;
- The maintenance of high and stable levels of economic growth and employment;
- The effective protection of the environment;
- The prudent use of natural resources.

### guiding principles and approaches

One version of sustainability would concentrate on the second of these objectives, going only as far as to ask if the existing airport and supporting infrastructure is up to the task of meeting future demand to fly – 'operational sustainability'. Any shortfall in capacity should be made up as quickly as possible and environmental impacts dealt with where it is in the interest of the polluter to do so.

At the other end of the sustainability spectrum, some would see air travel as representative of a fundamentally unsustainable pattern of consumption. The upshot of this approach is to seek ways to constrain air traffic as much as possible and in all locations in order to minimise the environmental impacts.

Each approach fails to see aviation in the wider context. 'Operational sustainability' will consider more efficient, less polluting production methods if they offer financial gain to the industry, but there is no control over the overall scale of environmental impact and whether the social costs are acceptable. More efficient production also lowers operating costs, feeding into higher levels of consumer demand and more environmental damage.

If proponents of the second approach agree on the need for more efficient air transport, singling out a particular industry for punitive action is a partial way of tackling environmental degradation and social injustice. Firstly, it could merely shift these problems onto other, less regulated sectors. It could also undermine some of the economic prosperity and social benefits the industry could bring to future generations.

The aim of this report is to assess the costs and benefits of aviation's future growth in economic, social and environmental terms. At the outset we looked for any imbalances between these broad objectives as aviation grows over the next thirty years. Then we go on to examine how aviation currently plays its part in a sustainable development policy framework in comparison to other sectors. Where there are gaps we suggest practical policy instruments to fill them. The UK Sustainable Development Strategy provides policy makers with a set of principles behind our approach (DEFRA 2002a, see box 2.1).

### the growth profile

There is little doubt that people in the UK are enjoying the opportunities afforded by air travel and intend to continue doing so. In a recent UK survey conducted by the Government, more

**Box 2.1: UK Sustainable development strategy, principles and approaches***Taking a long term perspective*

- Thinking beyond the lifetime of a Parliament, or the next decade. Safeguarding the interests of future generations while meeting today's needs

*Taking account of costs and benefits*

- Decisions must also be based on weighing costs and benefits that cannot be easily valued in money terms
- Avoiding disproportionate costs imposed elsewhere
- Public values, the timing of costs, benefits, risks and uncertainties should be considered

*Creating an open and supportive economic system*

- A global economic system, which supports economic growth in all countries
- Creating conditions for trade to flourish and competitiveness to act as a stimulus for growth and greater resource efficiency

*Combating poverty and social exclusion*

- Helping to tackle abject poverty in developing countries.
- Creating the conditions for equality of opportunity through access to high quality public services, education and employment opportunities, decent housing and good local environments

*Respecting environmental limits*

- Serious or irreversible damage to environment and resources threatening global society including climate change
- In the case of climate change there are likely to be limits, which should not be breached
- Defining limits is difficult so consider precautionary action

*The precautionary principle*

- Where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
- Assess the costs and benefits of action and transparency in decision-making

*Using scientific knowledge*

- Anticipate when scientific advice or research is needed
- Identify sources of information of high calibre
- Review the wide range of viewpoints

*Access to justice*

- Access to information, participation in decision-making and access to justice available for all

*Making the polluter pay*

- Provides incentives to reduce harm
- Costs do not fall on society at large
- Not always possible for everyone to bear all such costs, particularly for essential goods and services

source Achieving a better quality of life (DEFRA 2002a)

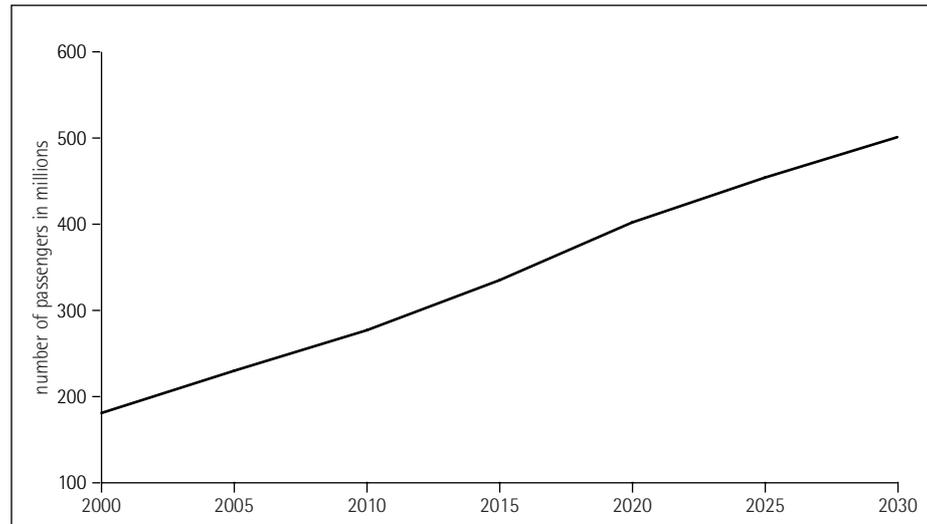
than one in five respondents said that they would like to fly more frequently in the future. On current forecasts, including overseas visitors, as many as 500 million passengers will use UK airports by 2030, nearly three times the present number of 180 million (DfT 2002a). This is a mid point estimate. In the past growth has been consistently nearer the Government's high point forecast. If this is the case, by 2030 there could be closer to 600 million passengers using UK airports.

Between now and 2030 the mid point estimate translates into an average yearly growth rate of between four and five per cent – a trend similar to other OECD countries (Rolls Royce 2001).

This corresponds to an annual increase in passengers of about 10 million, rising to 15 million by 2020, the current throughput of Stansted airport. To put this into context, Heathrow, Europe's busiest airport, handles around 65 million passengers a year. Terminal 5 will cater

for just 30 million more, leaving a home needed for the equivalent of over five more Heathrow airports in the UK by 2030.

figure 2.1 Forecast passenger demand at UK airports 2000-2030



source DfT 2002a

#### *Business and leisure*

Passengers flying for leisure purposes and visiting friends and families made up over three-quarters of total UK international traffic in 1998. This is expected to fall to around 70 per cent of the total by 2020 (DETR 2000b). As limits on leisure time start to bite in developed countries, business travel continues to grow, from about 23 million passengers in 1998 to about 74 million in 2020, about 40 per cent of whom will be UK residents (DETR 2000b).

#### *The regional dimension*

London airports account presently for two thirds of UK passenger traffic. Use of the four largest London airports is growing at a slower rate than their regional counterparts. Regional passenger traffic grew by 78 per cent during the 1990s, while London registered a 66 per cent rise. Where once the charter flight was predominant, regional airports are handling more direct scheduled traffic, bypassing the Heathrow hub. The number of regional destinations served by Heathrow has also fallen from 19 to just nine in the last ten years. As a consequence increasing numbers of London airport users have their final destination somewhere in the south east – 80 per cent in 2000 (DETR 2000a).

#### *Air freight*

The relatively high costs of airfreight mean it has traditionally been composed of high-value, lightweight commodities. Only one per cent of all freight by weight, airfreight's value is 30 per cent of the total. Over half of it is composed of goods exported from or imported to Europe. In the UK 2.3 million tonnes of airfreight were handled in 2001 (DfT 2002a).

Over 80 per cent of this airfreight is categorised as 'general freight' with an average delivery time of six days door to door. The other 19 per cent is 'express freight' with guaranteed overnight delivery a crucial part of the customer service (CATE 2001a).

Increasing volume and the importance of timely delivery is increasing the market for aircraft dedicated solely to carrying this kind of freight. Dedicated freighters account for a third of the UK airfreight market by weight, 40 per cent of which is express. The other two thirds are transported in the bellies of passenger craft with Heathrow playing a dominant role. With the widest variety of international destinations it handles 72 per cent of the UK airfreight total and 8 per cent of the rest is concentrated in Stansted and Gatwick.

Some industry analysts predict demand for express air freight will increase by up to 20 per cent a year, making it the fastest growing part of the air freight market (MDS Transmodal 2000). Overall, the Government expect growth in airfreight tonnage to be 7.5 per cent a year.

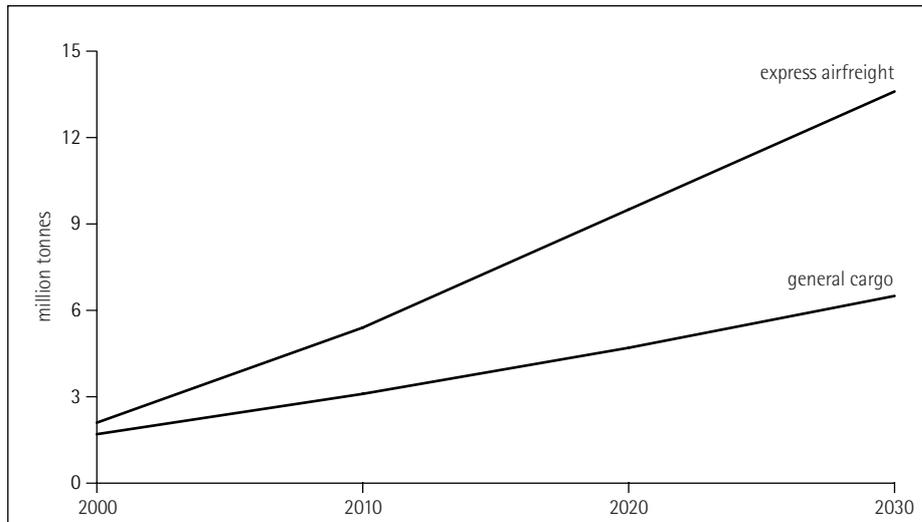


figure 2.2 UK air freight forecasts 1998-2030

source DfT 2002a

### matching sustainable development and air transport growth

So just how would a sustainable aviation policy framework reconcile this growth scenario with the concept of sustainable development outlined earlier in this chapter? Fortunately the 1998 Transport White Paper and the UK Sustainable Development Strategy both shed light on this question (DETR 1998a and 1999a). An appropriate framework could start by assessing the nature and extent of benefit derived from a cheap and capacious air transport network. In particular the degree to which aviation can help facilitate trade and global business activity and meet peoples desire for greater personal mobility.

It is equally important to understand the likely costs of unconstrained airport expansion on present and future generations. Informing the public of the consequences of untrammelled freedom to fly is crucial in preparing the ground for policies that offer environmental protection, possibly by managing consumer demand as a consequence of price, regulation or planning control.

### Headline objectives

In practical terms these policies should aim to:

- ✈ Make best use of existing capacity, putting economic efficiency before vested interests
- ✈ Give equitable access to air transport amongst regions of the UK, even if this means accepting a tighter approach to regulating south east airports to limit environmental degradation and congestion there
- ✈ Bring aviation within a framework setting 'environmental limits', for climate change and also other local and regional impacts
- ✈ In the absence of international or European agreement on environmental issues that could have implications for airport capacity, adopt a 'precautionary approach', agreeing

to 'plan, monitor and manage' infrastructure development in light of evolving climate change policy.

- Make sure the costs of bringing aviation into a sustainable development policy framework do not fall on the public at large.
- Ensure that aviation pays fairly towards public services, education and healthcare on a par with other sectors

### economic benefits and costs of future aviation growth

Understanding the costs and benefits of forecast aviation growth involves a step by step approach. Table 2.1 below breaks down the sector's contribution to sustainability objectives. It is against these criteria that we make a balanced judgement.

table 2.1 Balancing the scales of aviation

Sustainability objective	Benefits	Costs
<i>Economic</i>	access to markets specialisation economies of scale Foreign Direct Investment (FDI)	infrastructure congestion deficits in tourism, air transport and FDI regional imbalances
<i>Social</i>	employment leisure travel cultural exchange consumer choice visiting family and friends	noise accidents health traffic
<i>Environmental</i>		pollution (air, ground and water) climate change use of land and other natural resources waste impact on wildlife

## 3 maintaining economic growth and employment

The Government's central economic objective for sustainable development is to achieve high and stable levels of growth and employment. In this respect, one of the strongest arguments in favour of predicting future air transport demand before providing matching airport capacity has been the perceived economic benefit in doing so.

Economic success comes with a distributional goal for people to share fairly in that prosperity. At a national level the transport White Paper stresses a role for regional airports to maximise their contribution to local and regional economies especially in deprived areas of the UK (DETR 1998a). In doing so regional airports could also relieve pressure on congested airports in the south east and reduce the need for long surface journeys to these airports.

In assessing the merits of the case put forward in the South East Regional Air Transport Study consultation paper (DfT 2003a) this section draws heavily on 'Transport and the Economy', an influential report by the Standing Advisory Committee on Trunk Road Assessment (SACTRA 1999). After three years of research, the Committee came to a number of important conclusions set out in box 3.1.

- Generalisations about the relationship between transport projects and economic growth are invariably simplistic, misleading and likely to exaggerate the overall benefits.
- The effects of transport on economic regeneration are strongly dependent on local circumstances.
- It is possible to 'decouple' growth in traffic from growth in the economy using appropriate policy instruments. In contrast to popular wisdom, cutting traffic growth could bring greater prosperity, while reducing the negative effects of congestion and environmental damage.

box 3.1 Standing Advisory Committee on Trunk Road Assessment (SACTRA) observations

### the case for new capacity

#### *Direct economic benefits*

The Government argue that by far the largest economic loss to the UK from failing to provide more airport capacity would be fewer people flying and a smaller network restricting mobility in an increasingly globalised trading environment (DfT 2003a). In particular a 'do nothing' approach would:

- Impose higher costs on air travellers as fares rise (by about £100 per ticket on average);
- Lead to five per cent of South East passengers using regional airports by 2030;
- Prevent up to 45 million single passenger trips by 2030 compared to a scenario of building three new runways in the South East;
- Increase business overheads through higher transport costs, making inward investment less attractive, reducing inward tourism and damaging UK competitiveness;
- Lead to the dropping of lower yield, especially European and domestic routes from South East airports;
- Divert potential traffic to continental airports more willing to subjugate environmental goals in the race for airport growth.

*Maximum use of existing capacity and the three runway option*

According to the Government's economic appraisal one new runway at Heathrow and two at Stansted are likely to generate an additional £15 billion of direct economic benefit, or one and a half per cent of GDP in current prices to UK Plc by 2030. By far the largest part of this benefit is generated by allowing more people to fly, giving them a greater choice of schedules and destinations. Even then, airport capacity is insufficient to cater for about 30 million potential passenger journeys in the South East by 2030.

If existing airports in the South East were instead used as intensively as possible, 85 per cent of predicted passenger demand to 2030, or 428 million travellers out of 501 million could be catered for. This involves Luton growing to handle over 30 million passengers and Stansted growing to 35 million from its current level of 10 million.

In this scenario regional airports would play a bigger role, drawing back ten million passengers who would otherwise have flown from the South East and attracting 25 million predominantly price sensitive leisure travellers from there. Net benefits would then be halved to £7.5 billion with over 40 million fewer passenger journeys than if two new runways were built at Stansted and one at Heathrow.

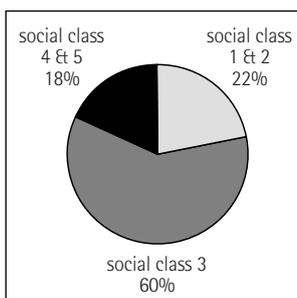
The difference of £7.5 billion stands out in comparison to the relatively small variation in the number of passengers unable to fly or forced to use regional airports compared to the three runway option. This is partly explained by the argument that the economic benefits of airport expansion are greater where the airport is close to key markets. In this respect expanding Heathrow, according to the Government, would be more economically beneficial than equivalent growth at regional airports where underlying demand is smaller (DfT 2003a). Likewise airports like Heathrow with an already dense route network will generate larger development benefits than airports with fewer flight destinations, although Manchester serves as many destinations as Heathrow (MCC 2002, BAA 2002a).

*Employment benefits of aviation growth*

In the South East, the UK aviation industry supports directly and indirectly 160,000 jobs (DfT 2002a). By 2030 the Government estimates that new runway development could support 35,000 more jobs directly. Another 45,000 could be supported indirectly supplying goods and services to the industry. Ten per cent of these are likely to be in retail services at the airport.

Given the fact that the number of passengers using south east airports is set to double by 2030 an increase of 50 per cent in jobs is modest. The already high level of labour productivity characterising the industry which is expected to grow in the future explains this (OEF 1999). Some argue too that more investment in aviation could directly increase labour productivity in the economy. The relatively small size of aviation however 25th out of 123 categories or slightly smaller than the contribution of agriculture to GDP means its impact on raising UK productivity is, however, likely to be tiny in the economy as a whole (ONS 1997).

figure 3.1 Airport employment by social class, 1998



source Gillingwater 2002

Given anticipated productivity increases, using South East airports as intensively as possible is forecast only to stabilise levels of employment there. Under this scenario the Government anticipate more opportunities to generate employment at regional airports (bar Scotland and Northern Ireland whose fortunes are tied closer to access opportunities to Heathrow (DfT 2002 a,b,c)).

The industry is typified by a wide spread of employment by social class with a wide range of opportunities for people of different abilities and skills. A typical airport provides employment for a higher than average number of professional occupations. On the other hand, around half of an airport's workforce is composed of semi-skilled and administrative staff that is typically quite low paid (DfT 2002a).

## aviation and productivity

Improved air transport links can also help raise the productivity of other industries in the UK economy by lowering their transport costs and extending their global reach. In particular,

- Lower air transport costs enable countries to specialise in economic activities they are best suited to, trading products and services more easily on the world market.
- Specialisation means that production becomes more global in scope, using fewer resources to satisfy the same level of market demand.
- Lower product prices stimulate growing consumer markets.
- Larger markets allow companies to take advantage of even greater scale economies in production.
- Innovation is spurred on as its fixed costs can be spread across a more goods brought to market.
- New opportunities emerge to attract foreign direct investment which rewards the best companies, facilitating more technology transfer from one country to another

In this respect the UK's fastest growing industries – computing, pharmaceuticals, insurance and consultancy – are heavily dependent on the services of the aviation sector (OEF 1999). Their production processes are invariably international in scope with a high proportion of global capital investment. Business travel amongst these sectors is particularly important.

The Government acknowledges the importance of these processes but confines itself to quantifying the direct economic impacts of airport developments as the most tangible, certain and measurable (DfT 2003a). The approach to assessing aviation's contribution to productivity growth looks instead at how many more foreign business passengers are able to fly to and from the UK as a rough measure of inward investment facilitated by growth in air transport. This is a step in the right direction given that air-freight and business travel are more likely to be the drivers behind aviation's contribution to UK productivity growth, not leisure passengers, which account for three quarters of international travel and a large trade deficit. It is also welcome given our earlier misgivings concerning an attempt to quantify the productivity impacts of aviation investment (Grayling 2000).

According to the Government's appraisal over 90 per cent of foreign business travellers will still be able to access UK airports if maximum use is made of capacity in the south east (Halcrow Fox 2002). This assumes that a little over four per cent of foreign business travellers deterred from travelling to south east airports use regional ones instead (Halcrow, personal communication).

Even this modest figure requires some explanation. The nine per cent of foreign business people deterred from travelling are unlikely to be those attracting high levels of foreign investment precisely because they are priced out of the market by an average £100 increase in ticket prices by 2030. In comparison to the expected financial return from a useful business trip this amount of money is relatively small. Neither does it compare to the cost of a first class business ticket for international air travel. An extra £100 is rarely over five per cent of the ticket price as the random collection of first class air fares in Table 3.1 shows.

table 3.1 Return first class ticket prices from London Heathrow

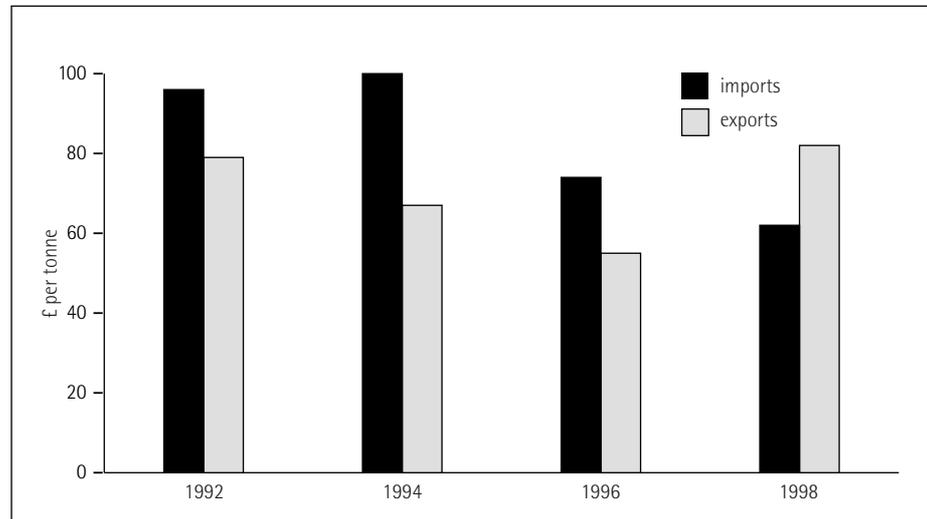
New York (British Airways)	£3570
Hong Kong (Emirates)	£2844
Tokyo (Malaysian Air)	£3892
Chicago (British Airways)	£3868
Johannesburg (Emirates)	£2268

source ebookers website 16.9.02

Different types of freight also have different types of values and price sensitivities. Air-freight was once mainly the preserve of high value, light weight commodities, yet increases in capacity and declining shipment rates have meant the range of goods carried by air has widened. One possible exception is the express sector, the largest export category of which is the electronic and telecoms industry accounting for over 30 per cent of traffic by value (CBI 2002).

For air freight generally, however, the largest import category is now fruit and vegetables accounting for 13 per cent of cargo imports by weight (DETR 2000b).

figure 3.2 Air freight value/weight ratio 1992-98



source DETR 2000b

This helps explain why the value to weight ratio for air freight imports has declined in recent years (figure 3.2). Charging for the environmental costs of air transport will merely ensure that it continues to be used by high value lightweight produce and is not an excuse for bad supply chain management.

Perhaps the most crucial point to be made to the Government is that GDP or jobs would not necessarily be lost if aviation were constrained (OEF 1999). Future consumers who according to the Government are 'lost to the system' or unwilling to fly at the price demanded instead spend their money elsewhere. In doing so they would support a different distribution of jobs and economic output. There is no automatic reason to assume that fewer jobs will exist in the economy if aviation grows slower than forecast. In fact there could be more jobs and more GDP, because:

- ✈ No account is made of tax concessions that would cast doubt on the value added by growth in aviation and might mean that constraining the industry might actually increase national welfare
- ✈ Increasing accessibility between two countries or regions may sometimes benefit one at the expense of the other.

### the case against new runways

#### *Taxes and subsidies*

Since air transport receives a number of tax concessions or subsidies its contribution to value added is likely to be exaggerated. No tax is presently levied on aviation fuel, or VAT charged on air fares by international agreement. By contrast, about three-quarters of the cost of petrol and diesel at the pump in the UK is fuel duty and VAT.

Landing fees are subsidised by profits from airport shops. Duty free shopping is also available for travellers on international flights, increasing sales especially of alcohol and tobacco and feeding into even lower landing fees at busy airports. The right to use scarce runway slots is given freely to whichever airline had them the year before. In 1993 the Chancellor of the Exchequer highlighted these exemptions in a speech to the House of Commons

*air travel is under-taxed compared with other sectors of the economy. It benefits not only from a zero rate of VAT: in addition fuel used in international travel, and all domestic flights is entirely free of tax. (Hansard 30.11.93)*

In 2002 UK airlines paid about £800 million of revenue from air passenger duty, no tax on fuel or VAT on tickets. In answer to a Parliamentary question by Peter Ainsworth in October 2002 the Government confirmed that, applying the same rate as motor fuel, the aviation fuel tax subsidy amounted to £5.7 billion (Hansard 21.10.02). A further £2.4 billion was not collected from VAT on fuel or on passenger tickets, another £400 million from duty on goods sold in airport shops. One estimate suggests that the net effect of these exemptions was equivalent to subsidies worth about £9.2 billion to aviation in the UK in 2002 (Sewill 2003).

**two-way traffic**

*Increasing the accessibility between two countries (and similarly between two cities or regions) may sometimes benefit one of them at the expense of another. (SACTRA 1999)*

Constraining aviation might also raise national welfare because three quarters of UK passenger travel is for foreign leisure flights, and the gap between what our tourists spend abroad and what foreign tourists spend here is growing (see figure 3.3). OEF accept that dissuading some future UK tourists from travelling abroad would, 'arguably support more economic activity in the UK than overseas visitors travelling by air to the UK currently do', quantifying the deficit at over 35 per cent in 1997.

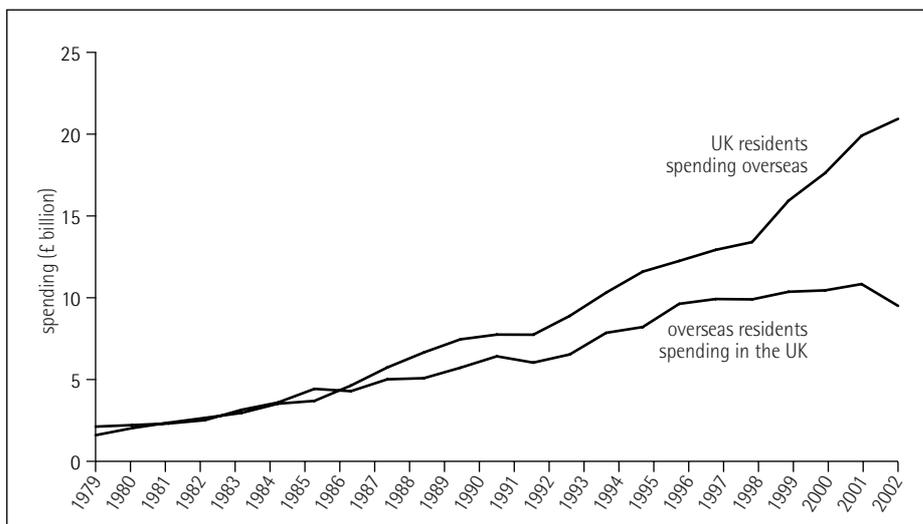
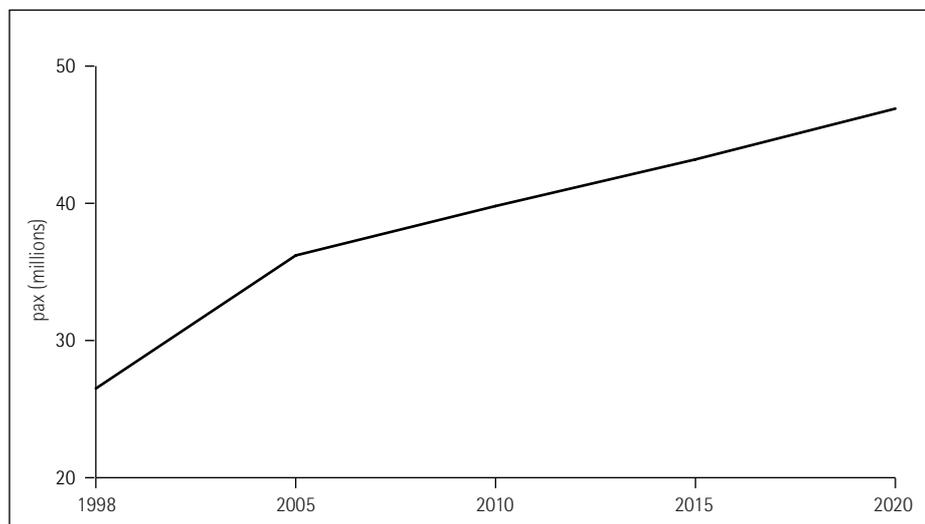


figure 3.3 Spending by air travel tourists (£bn)

source ONS

Contrary to the long term historical trend, the Government argues that this deficit is almost certain to be reversed in future in the south east as 'underlying demand for leisure trips is stronger for foreign residents than for UK travellers' (DfT 2002a). A look at the latest national picture of tourist air travel – the DETR 2000 forecasts – contests this view. The imbalance will grow rather than diminish over the next twenty years. As UK leisure flights abroad increase by almost 65 million, foreign flights increase by only 44 million during the same period.

figure 3.4 Leisure passenger gap (UK and foreign) 1998-2000



source DETR 2000

### Regional economic welfare

We have already highlighted the fact that the distribution of economic benefits is an important consideration of government policy. The Future of Aviation consultation paper reiterates the Government's 'objective of maximising the contribution of regional airports to their local and regional economies' (DETR 2000a). A closer look at the UK tourist industry shows the dangers of generalisations about the economic benefits of air transport growth.

box 3.2 Case study – the UK tourist industry

#### GDP and jobs

The tourist industry contributes around five per cent of GDP while supporting over two million jobs. Overseas visitors arriving by air were responsible for 80 per cent of total overseas tourist spending in 1997. However, only 200,000 jobs, a little over 10 per cent of the total were supported by foreign visitors travelling by air (OEF 1999).

#### Patterns of regional tourism

According to government forecasts 2020 sees 114 million UK leisure passenger flights abroad, almost one return trip for every member of the population and double the present number. Some of this will be extra time to that spent on UK holidays. Limits to leisure time for the working population would also suggest more switching from domestic trips for foreign ones. Data supports this view, showing that UK tourists are, on average, spending more time abroad by visiting more frequently (ONS 2001).

#### Time and visits spent abroad by UK citizens 1996 and 2000

Year	Visits by air	Average nights spent on each visit
1996	27.9 million	11
2000	41.4 million	11

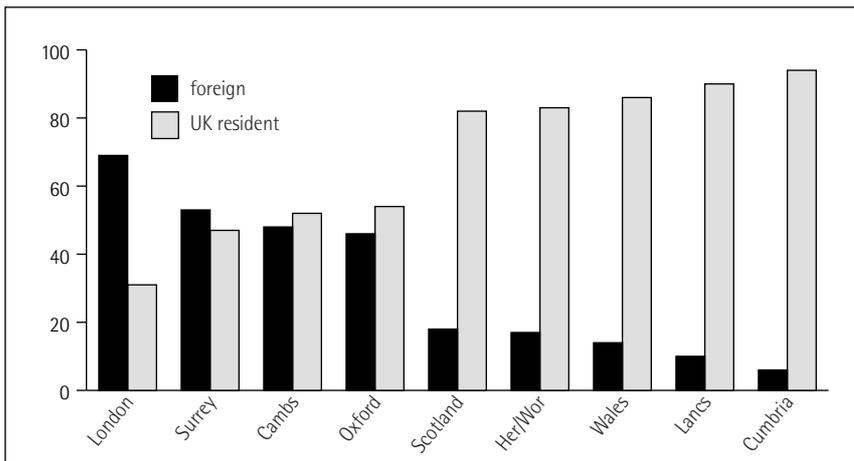
The geographical distribution of foreign tourist visits to the UK is currently skewed to London and the South East. Unless this pattern changes dramatically through the development of secondary regional hubs at Manchester, Glasgow and Bristol for example, replacing UK tourists with foreign visitors is likely to have an uneven impact on the level of spending in each UK region.

source STARUK 2002

#### Winners and losers?

Eighty five per cent of foreign tourists currently use South East airports, helping to explain this picture. Bringing on stream three new runways in the South East is likely to perpetuate the tourist expenditure imbalance at the expense of the regions. Areas like Cumbria and rural parts of Scotland are being urged to diversify away from traditional industries like agriculture into tourism. Yet they stand to lose out if domestic tourism flows are not replaced by foreign tourism.

figure 3.5 Tourist spending by region 2000



source STARUK 2002

The Government's own research into the Scottish tourist economy suggests that foreign tourists will replace domestic tourists over the next thirty years (DfT 2002c). This assumes that Scotland manages to improve direct air services to foreign destinations and a level of maturity slows the growth in Scottish foreign leisure markets. Even then, an additional five million Scottish trips made abroad by 2030, would be replaced by only just over two million foreign visitors.

Meanwhile in places like Oxford or Cambridge the costs of absorbing triple the number of foreign tourists could start outweighing the benefits. Increased congestion in the transport sector, more competition with local residents for access to resources, and the degrading of local beauty spots through overuse are some of the likely impacts.

There are other reasons to believe that the Government's view of economic benefit flowing from aviation expansion may well be exaggerated.

- ✈ Costs imposed on south east passengers forced to use regional airports should be netted against costs imposed on regional passengers who are forced to use south east airports in the absence of a wider range of local air services.
- ✈ Any assessment of the economic benefits of air transport investment should take into account long term as well as the short-term effects of firms and individuals adapting to a slower rate of growth at environmentally sensitive airports. This may involve economic activity moving to the regions to take advantage of comparatively cheaper air links there.
- ✈ Growth in air transport has economic costs primarily caused by congestion
- ✈ Loss of UK competitiveness to other European countries may not be as large as claimed by the Government because they, like the UK, are not immune from the need to balance environmental responsibility and economic benefit.

#### *Economic costs*

##### ✈ *Congestion*

By encouraging industries to migrate to an area, aviation growth can add to congestion at the local level. The inward migration of new residents can increase traffic flows on local roads for both commuting and leisure, exacerbated too by more passenger cars accessing the airport.

Congestion is a particular problem in the South East, although this is also a potential problem in the locality of some major airports in other regions (DfT 2002a). The case for airport expansion is often made because businesses increasingly require good international transport links to operate in a global market place. However, this has to be balanced with accessibility to markets within the UK. In a recent survey of top European executives this was deemed 'absolutely essential' by 57 per cent of those polled (Healy and Baker 2002).

A report prepared for the Small Business Federation found the greatest level of dissatisfaction with transport links was to be found in the south east – congestion was cited as a key factor (FSB 2000). A further three runways at Stansted would see the need for an additional 83,000 houses in the area by 2030 (DfT 2002a). Since settlement this size would require a 200 per cent increase in provision currently identified in the planning system, the Government argues that the labour catchment would need to be extended to as far afield as Chelmsford and Epping.

Even if it would be possible to remote source a large amount of low paid labour, accessing the airport from areas over twenty miles away would put considerable strain on an already overburdened road network. These problems are replicated at Gatwick where airport expansion requires more employees to commute from the south coast (DfT 2002c). Absorbing another 30,000 new dwellings around Heathrow would likewise add significantly to road congestion. According to the Government appraisal there would be such pressure on green belt land that expanding either Heathrow or Gatwick are not realistic options (DfT 2002c).

In some circumstances it may be possible to deal with these problems by simply building more infrastructure. Impacts on non-tradable goods like wildlife, clean air, and landscape, protected by the planning system make this approach difficult to square with the transport White Paper that sought alternatives to major construction projects as a first principle.

➔ *Crowding out*

The south east of England is a region with lower average unemployment levels than the rest of the UK. In the Western Policy area surrounding Heathrow unemployment levels are the lowest in the UK at just over three per cent. There over a third of employers faced difficulty recruiting staff in 1999 (LWLS 2001). For the first time a majority, 59 per cent of top executives from Europe's premier business cities, ranked the ability to find staff easily as the single most important factor in deciding location (Healy and Baker 2002). Set against the difficulty of attracting employees to a busier, more congested and expensive part of the country, quality of life and freedom from pollution also rose up the scale of factors considered of prime importance to employers.

Adding 45,000 jobs to local labour demand at Heathrow would undoubtedly impose costs on surrounding employers, especially those in the public sector. A high growth scenario could cause an economy already near to capacity to overheat resulting in a downturn with serious job losses (DTLR 2001d).

➔ *Displacement costs in the UK regions*

To reduce these economic costs on employers the Government will need to encourage more inward migration, possibly from more deprived parts of the UK. According to the 2001 census, the big cities of the North have suffered the most from depopulation over the last ten years while smaller towns and semi-rural areas of the south east have grown in size.

➔ *Absence of a regional airports strategy?*

Concentrating new runways in the South East will help perpetuate regional imbalances. But there is a choice. The Government makes clear that 'capacity restrictions in the south

east mean more direct air services provided from North of England destinations' (DfT 2002a). A greater choice of routes in the here will, according to the Government, mean greater economic benefits in areas facing relatively higher levels of unemployment, negative housing equity, and more limited economic prospects like Humberside and Liverpool (DfT 2002a).

The Government instead discounts this regional benefit favouring the development of South East airports like Heathrow. This is because they are closer to key markets and a dense route network. Following this logic regional imbalances become self-perpetuating, hamstrung by a national appraisal framework valuing the attraction of greater quantities of economic activity to the south east over development in the regions. A crude measure of prosperity admittedly, GDP per head shows, the gulf between north and south continues to widen, with the North East predicted to have half the level of south east GDP by 2020 (Adams and Robinson 2002). South East airport

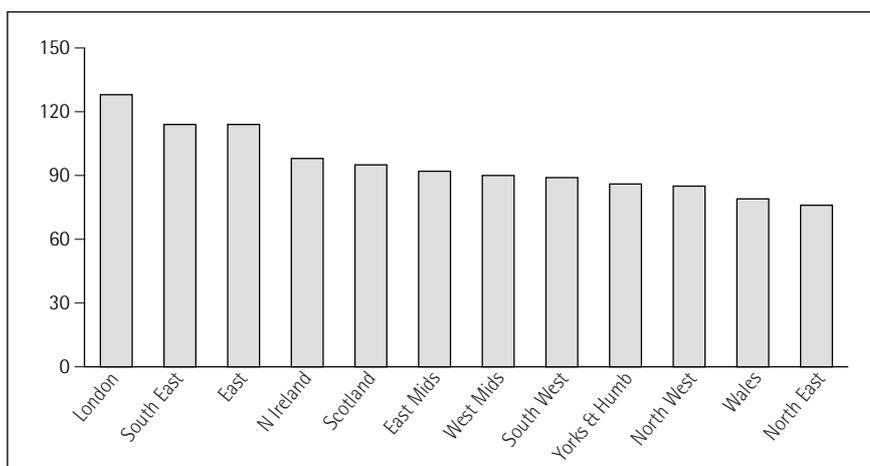


Figure 3.6 GDP per head 1999 (UK=100)

Source: Regional Trends 2001

development will not help a picture of regional inequality markedly different from our continental neighbours France and Germany (Robson 2002).

➔ *Regional passengers using south east airports*

South east passengers unable to access the airport of their choice close to home is cited as the most important economic cost of not providing capacity here. As a consequence, there will be over twenty million trips made to the regions by South East residents. Build three new South East runways, however, and there will be ten million regional passengers who would have flown from local airports now attracted by better facilities in the south east.

By the Government's own calculations a constraint on South East development would mean 55 per cent of UK flights taken in the regions by 2030, home to 65 per cent of the population. Relax that constraint and only 48 per cent of flights will go from the regions. A similar picture emerges from smaller airports in the south itself. Roughly double the number of passengers are catered for by South West airports than if new runways are built at London's largest airports. Encouraging people to fly closer to home is a central objective of the 1998 transport White Paper. The aim was to remove the need for long surface journeys or short haul air trips to already congested South East airports. On these grounds there is merit in considering a limited approach to new capacity in the South East.

→ *Short and long term adaptations to a constraint*

In calculating levels of economic benefit the Government rated most highly the benefits to passengers who, in the absence of additional airport capacity transfer to less preferred airports or do not travel at all (DfT 2003a). The costs of not providing enough airport capacity to satisfy unconstrained demand are added together over a thirty-year time horizon. However as SACTRA point out it is necessary for any appraisal to take a long-term view allowing people to adapt to geographical airport constraints. If air transport becomes more expensive in the south east, over time companies and individuals will move to other parts of the country to take advantage of more attractive regional airports, helping to support a more dense route network there.

→ *European airports*

Rather than highlight this displacement of air transport to the UK regions the Government instead argues that failure to develop airport capacity will lead to more traffic being diverted away from the UK to European airports. In comparison to Heathrow's two runways, argue the Government, Charles de Gaulle has four, Frankfurt three and Amsterdam four. Future expansion plans will allow them to serve even larger markets leaving the UK far behind.

This argument ignores the fact that the UK capital has four large airports that are all billed specifically as 'London' airports, Stansted, Luton, Heathrow and Gatwick. Added together these airports have a total of five runways. Also, the number of runways an airport has is not necessarily a good indication of capacity. Amsterdam is now building its fifth runway but expects capacity to rise only from 45 million to 60 million passengers by 2005, 35 million less than Heathrow with Terminal 5. Frankfurt with three runways can only provide 80 flights per hour, Heathrow nearly 150 with two.

Apart from the 'beggar thy neighbour' approach to airport policy, there is also an implication that continental airports have little difficulty in steamrolling through large infrastructure plans. The recent decision to drop a new airport at Chaulnes outside Paris and one in Sweden contests this view. Charles de Gaulle airport is limited to 55 million passenger movements a year, 40 million less than Heathrow. In contrast to the UK government the director of Aeroports de Paris welcomes the opportunity of substituting domestic flights to rail in order to grow his long haul business (ACI 2001). Nearby Orly is capped at 280,000 movements, 200,000 less than Heathrow. At Frankfurt the planning process to develop a new runway has taken nearly ten years, a longer period of time than that spent securing Terminal 5. Even though the consultation document suggests otherwise, the environmental concerns of our continental neighbours about airport development are no more relaxed than those of citizens in the UK.

## 4 an economic level playing field

An economic level playing field approach is part of a policy framework for the sustainable development of aviation. This means making aviation contribute to general taxation on a par with other industries, avoiding economic distortions as any tax or VAT exemptions in one sector are ultimately paid elsewhere in the economy.

A modern economy requires high quality public services to help sustain economic growth. As part of this commitment the Government has recently announced higher expenditures on education, healthcare, and public transport (HMT 2002). The need for increased levels of taxation to pay for these improvements is likely to be accompanied by greater public interest in ensuring that tax is spent wisely. It also throws into the spotlight the need for all parts of the economy to contribute fairly to funding public services.

Three basic principles establish a socially progressive taxation policy:

- ➔ Those who earn more pay more.
- ➔ On goods and services taxes like VAT are normally applied at a higher rate for luxuries and a lower rate for socially necessary expenditures like food, books and local public transport.
- ➔ For the purposes of economic efficiency all prices, including tax should reflect the full social and environmental costs of providing that service (see chapter 5).

### Taxation of transport in the UK

#### *Planes, trains and automobiles*

All transport modes, in their patterns of employment and production of services, contribute to UK public finances through income tax, national-insurance contributions and corporation tax. Where there are differences is in the levels of fuel tax and VAT applied.

At 49p a litre a relatively high rate of tax is imposed on motor vehicle fuel. In 1999, excise duty on fuel and VAT receipts raised £22.5 billion for the Treasury and £13.5 billion in other taxes on vehicle ownership and use. It is partly justified on the grounds that the road user pays for roads, but this cost about £5 billion in the same year. Of the remaining £31 billion, most goes to help fund public services (HCLRP 2001).

By contrast aviation is exempt from paying any tax on fuel and VAT on ticket sales. Neither is any duty charged on sales at airports of consumer goods to international passengers. In the case of road traffic, the Government has recently become willing to consider too that users should pay for the costs of congestion. As far as aviation is concerned there is no such consideration. The only solution proffered by the UK government in its consultation strategy is to provide more capacity. This self-defeating approach is akin to the Conservatives transport strategy when in 1989 what was hailed as the largest road building programme since the Romans was unveiled. Build more capacity within a lightly taxed framework and reduce prices further, it is hardly a surprise that in a few years time yet more capacity is required.

One reason the aviation industry gives for why it would be unfair to tax aviation is that railway passengers rely on a substantial subsidy covering nearly half the total costs of running the network (ITS, UL, AEAT 2001). The aviation sector pays directly for an increasing amount of its infrastructure costs and receives minimal public subsidy for operating its services. Train fuel is treated in the same way as 'red tractor diesel', paying only 3p a litre in duty. Train tickets are exempt from VAT and planned public spending on railways is more than £30 billion over the next ten years.

The Government justifies the large subsidies to rail on environmental, social and economic grounds (DETR 2000c). It is a key part of government policy to encourage more use of rail to shift people out of their cars. There is no such policy objective for air transport and neither, on environmental grounds, would it be justified. Unlike air transport, two thirds of rail journeys are undertaken for business purposes, compared to a quarter for air travel.

In providing services to peripheral areas of the UK or trips to see relatives in foreign countries air transport qualifies too as a socially inclusive form of transport. As the Government makes clear in its consultation document, arrangements can be made through 'Public Service Obligations' to ensure that the benefits of keeping these areas linked to London are maintained. It is hard to argue that these uses justify tax exemption across the sector as a whole, especially when over three-quarters of journeys are for leisure purposes.

#### *Duty free*

Neither would there appear to be a reason for continuing duty free on sales made to international travellers in airport shops. Duty free was abolished on intra European flights in 2000, justified on the grounds that it was no longer relevant in a single market. However there is also a good reason not to subsidise the consumption of luxury goods, tobacco and alcohol consumption to a better off section of society. While four million people die world-wide every year from tobacco related diseases that figure will rise to 10 million by 2030.

The international movement and sale of tobacco and alcohol world wide without duties has recently been highlighted as providing a role for the large scale illegal trade in these products. Tobacco control is currently the subject of World Health Organisation action to secure an international treaty to ban duty free sales (WHO 2002). The Government should be using these discussions to make the case for an outright ban on all duty free, starting with alcohol, an approach that would be far easier than just singling out tobacco. Alcohol consumed in the airport and on board aircraft was responsible for nearly half the serious air rage incidents on board UK aircraft in 2001/2 and smoking 36 per cent of the total (DfT 2002e).

#### *Identifying a fair rate of tax for aviation*

In assessing a fair rate of tax for aviation it is only fair to deduct air passenger duty, which is uniquely levied on air passengers. However, given the exemption from fuel tax and VAT, not to mention duty free, the table below shows the amount of money currently foregone by the UK Treasury is far greater. According to the European Environment Agency the external costs of passenger air travel are 55 per cent that of equivalent car travel per passenger kilometre (EEA 2001). The external costs of air freight are, however, nearly two and a half times that of road freight per tonne kilometre. By 2030 the Government estimates that seven per cent of air traffic movements in the UK will be freight related. These facts combined would justify a tax rate over two thirds of that applied to motor vehicle fuel. However, this still ignores the importance of raising revenue to support the public purse, something which motor fuel taxation contributes to, yet aviation, beyond air passenger duty, currently does not.

Taxing aviation fuel at the rate of motor vehicle fuel would have brought in £5.7 billion a year to the Exchequer in 2001 ( Hansard 21st October 2001). Applying VAT on air fares would yield about £4 billion. BAA estimated recently that free duty on goods bought in

airport shops is worth £15 per passenger. In total this duty exemption would be equivalent to a subsidy of £400 million. Accounting for £900 million raised by Air Passenger Duty in 2001 the tax shortfall would still amount to £9.2 billion a year in taxes foregone, equivalent to nearly one per cent of GDP. With an almost trebling in the number of passengers by 2030, continuing these exemptions would amount to over £27 billion of subsidy every year in current prices.

<i>Tax paid</i>	<i>£ billion</i>	<i>Tax exemptions</i>	<i>£ billion</i>
Air Passenger Duty	0.9	Excise duty on aviation fuel	5.7
		VAT on aircraft fuel, passenger tickets, etc	4.0
		Excise duty and VAT on consumer goods	0.4
Total paid	0.9	Total exempt	10.1

table 4.1 Air transport tax balance 2001

source Sewill 2003

Capturing £9.2 billion would amount to about £50 added to the price of a single ticket, a total rise of about 50 per cent in prices over the next thirty years. A crucial point is that the Government assumes ticket prices will fall by between 30 per cent and 60 per cent during the same period. Past trends would seem to support their prediction (see figure 6.1). If this is the case the effect of a gradually introduced tax would be to hold prices roughly constant during the next thirty years. We estimate that this could halve the amount of growth in air transport to 2030 compared to an unconstrained scenario. If maximum use were made of all existing airports in the South East no new runways would have to be built in the UK.

*Legal and administrative hurdles*

Both the UK government and the European Commission in theory support the imposition of a fuel tax (DETR 2000a, EC 1999a). Actually applying one is more difficult. At both a European and a national level, internationally agreed air transport treaties currently forbid the taxation of transit fuel (ICAO 1944).

The EU instead looked at taxing European airlines unilaterally. However, the Commission concluded that it would adversely affect the prospects of European airlines against foreign operators (EU 1999b). To apply the tax to all airlines would mean re-working hundreds of bilateral agreements with countries outside the European Union, a process with no guarantee of success. Even then an international tax would create incentives for airlines to fill up with fuel in exempt states to escape the charge.

At a national level there are also practical obstacles to a policy charging VAT on tickets or on air cargo waybills. If exemptions were available abroad the consumer could buy tickets through the Internet to avoid paying the UK tax, something that might however be prevented by carefully checking tickets on departure. It would be easier to achieve with European agreement. In this respect, the European transport White Paper has acknowledged the desirability of applying a harmonised VAT structure to air transport in its forthcoming strategy (EU 2001).

<p><b>Key recommendations</b></p> <ul style="list-style-type: none"> <li>➔ The UK government with other member states and the European Commission should press for a tax on aircraft fuel through the re-working of the Chicago Convention. This should be discussed at the next ICAO Assembly meeting in 2004.</li> <li>➔ VAT should form a component of the new EU emissions charge as considered in the EU Transport White Paper.</li> <li>➔ Starting with the UN Framework Convention on Tobacco control, the UK Government should agree to gradually remove all airport duty free sales at the earliest opportunity.</li> </ul>
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### More efficient use of aviation networks

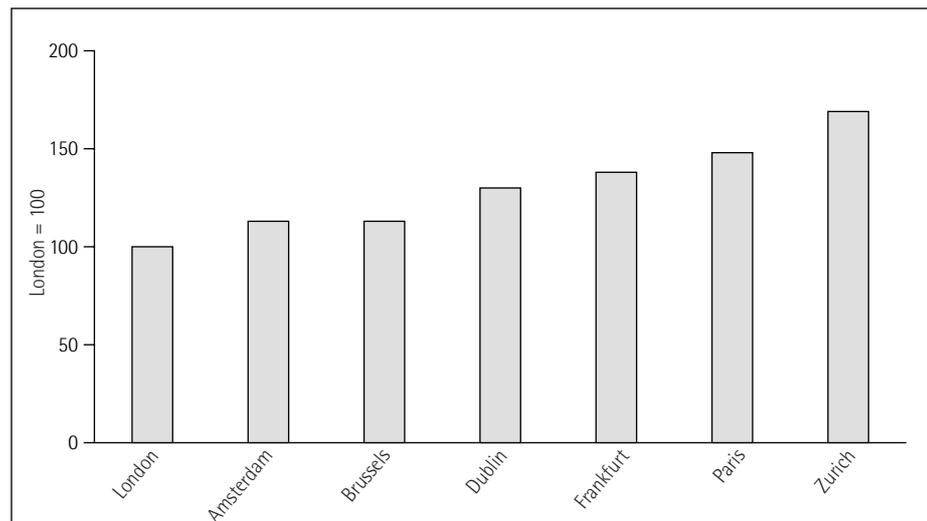
In 1998 the then Secretary of State made clear that the Air Transport White Paper would 'consider, whether by economic or regulatory measures ways of improving the utilisation of existing (aviation) capacity' (DETR 1998a). In practical terms this means making more efficient use of runways and airspace, and raising aircraft load factors, the percentage of seats filled on each aircraft, to minimise pollution.

Any policy measures designed to achieve these goals will help to make the UK aviation industry become more competitive acting as a stimulus to growth and greater resource productivity (DETR 1999). The first test will be to ensure that airlines pay market prices for the right to use runway slots and landing fees.

#### *Airport retail and aviation economic regulation*

The most striking characteristic of airport landing charges is that they remain lower at the UK's most congested airports like Heathrow and Gatwick than they do, for example, at Manchester, which has spare capacity due to the recent construction of its second runway. This is partly explained by the size of operations at Heathrow and Gatwick, allowing for the capture of economies of scale. The fixed costs of everything from terminal facilities to air traffic control can be spread across a larger number of aircraft operators. However, continental hubs like Frankfurt can capture economies of scale. Airlines there face landing charges up to twice as much as Heathrow and Gatwick (Kyrou and Gray 2002).

figure 4.1 Index of intra-European air fares 2000



source London First 2002

More important is the effect of the UK regulatory regime on holding landing charges below their market value. The designation by the Secretary of State for economic regulation of airports with over one million passengers was a key part of the Airports Act of 1986, coinciding with the privatisation of the British Airport Authority. Given the 'natural monopoly' status of the South East airports, the Civil Aviation Authority sets a pricing formula linked to retail price inflation (RPI - X) every five years to limit the profits of Heathrow and Gatwick. This requires the equalisation of all returns on airport assets. Since BAA makes more money from shopping than it does from aviation, the Heathrow landing charge is lower than airports like Prestwick where passenger throughput and retail revenues are modest.

Low landing charges at busy airports send the wrong signal to consumers. They inflate demand, add to congestion, pollution and reduce service quality. The airport becomes less concerned with punctuality as delayed travellers can while away their time in airport shops and cafes from which shareholders make most of their money. Under-pricing aeronautical assets also fails to provide a more accurate investment signal to develop increasingly costly

new capacity. If a higher price were charged for them more money could be secured for justified future investment (CAA 2001a).

➔ *Current initiatives*

In the UK the most recent quinquennial review of airport charging gave grounds for optimism. The CAA proposed the separation of retail returns from aeronautical returns at Heathrow and Gatwick where demand to fly exceeds the supply of capacity (CAA 2002a). The more passengers using the airport, the higher landing charges will go in order to reflect the scarcity of landing facilities. Airlines will have to make better use of airport facilities to maintain their profit margins. The proposals have stopped short of allowing prices to rise to a level where all additional demand was deterred. This, argue the CAA would give BAA an incentive to under provide capacity and take advantage of monopoly rents from rising charges fed by unmet demand.

The Competition Commission (CC) sided with the airlines, ruling out a divorce between the financial returns from retail and aeronautical activities (CC 2002a). The CC claimed that the dual till would merely amount to a rent transfer from airlines and passengers to airports as landing charges rose. In the end intense airline lobbying saw the dual till proposal ditched with airport charges rising by 40 per cent over the next five years at Heathrow only. Even then the aim was only to raise revenue to pay for the construction of Terminal Five. The dual till, will have to wait for at least another five years at the earliest.

**Key recommendations**

- ➔ The airport regulator should separate the returns from retail activities from those of aeronautical activities at the earliest opportunity.
- ➔ Landing charges should be allowed to rise to cover the costs of providing daily aircraft operations at Heathrow and Gatwick.

*Auctioning runway capacity*

A parallel approach to improving capacity utilisation would be to auction runway slots at UK airports where demand exceeds supply. Presently this would apply especially to Heathrow and Gatwick, although auctions could also serve a useful role in allocating scarce capacity at other airports during particularly busy times of the day. A slot can be defined as the right to use a bundle of services at an airport to facilitate aircraft take-off or arrival.

➔ *The regulatory context*

Slot allocation procedures are governed at European level, in accordance with a 1993 European Union regulation (EC 1993). This allows runway slots to be 'grandfathered' or kept by whichever airline had them last season. Harking back to a time when airlines required state handouts and airports fought hard to get new services off the ground, runway slots were granted in perpetuity as part of a 'social contract' for a flag carrier to develop a service for the benefit of the national economy. Under the present regulation they remain the effective property of whichever airline had them the year before, subject to being used over 80 per cent of the time.

➔ *The problem with keeping slots free*

The Government and many experts think the current slot regime is unsatisfactory (Starkie 1999, DETR 2000a, Boyfield *et al* 2003). The 'use it or lose it rule' has, by the Commission's own admission, failed in its primary objective of introducing more competition into the market at congested airports (EC 2000). Without the threat of competition some scheduled airlines have arguably used their control of a slot to maximise revenue rather than to improve the efficiency of their operations. A

comparison of the average proportion of seats filled for each airline – the so-called 'load factors' of different UK airlines – shows that those scheduled carriers sitting on prime time slots at Heathrow have failed to make full use of their aeroplanes. This is despite the fact that demand outstrips supply at this airport. Interestingly the only possible exception is Virgin, an airline in favour of slot auctions at Heathrow.

table 4.2 Airline load factors 2000

<i>Airline</i>	<i>Charter</i>	<i>Scheduled</i>	<i>'Low cost'</i>
British Airways		71.92%	
British Midland		66.47%	
Virgin Atlantic		79.78%	
Go Fly			72.48%
Easyjet			77.92%
Airtours	92.44%		
JMC	91.61%		
Monarch	88.68%		

source CAA 2002b

Not only can slot trading secure economic efficiency objectives, benefiting the consumer and the environment, used to manage demand at crowded airports it could also help the development of secondary hubs outside the South East. This would be an important step towards the 1998 transport White Paper's objective of actually '*relieving* pressure on congested airports in South East England' (DETR 1998).

✈ *Auctioning slots for public benefit*

Given the administrative and legal difficulties of applying an international tax on aviation fuel or VAT on tickets, auctioning slots could also be a means of redressing the fiscal imbalance of the aviation industry. The Government have stressed that UK travellers could be paying on average £100 per ticket more by 2030 if additional airport capacity is not provided in the south east. This broadly equates to the sort of revenue that could be raised by auctioning airport slots. If the Government kept the auction revenue by 2030, £6.7 billion a year could be secured for public investment purposes. This is over and above what slots are worth today. Using CAA figures, Heathrow's are estimated to be worth at least £1 billion alone (CAA 2000).

✈ *Auctioning slots for competitive benefit*

For most airlines, it makes commercial sense to keep a tight hold of slots in order to lock out the competitive pressures that would be brought to bear if another airline got hold of them (DotEcon 2001). Few slots become available for exchange each year and those that do are largely at times that are unattractive for potential competitors (CAA 1998). The CAA found that only a third of new airlines slot requests were granted in 1994 10 per cent of which were available during the busy hours of the day (CAA 1998). All the while that the price of prime time slots remains effectively free to existing holders, the CAA argue that increasing supply will never be enough to satisfy demand. (CAA 1998).

✈ *Arguments made against slot auctions*

Airlines use a variety of arguments to justify the status quo, largely based around the practicality of establishing a market in slots. Historical rights of precedence allow for security of tenure, essential for long-term investment in route development, planes and crew. However, many of these costs are or could be paid for on an annual basis. Planes are usually leased on short-term contracts. Pilots are subject to the same rigorous training and safety standards whether they fly for KLM or BA.

Uncertainty also plagues the present system of slot allocation. Air India is not able to respond to a rapidly growing market from the UK to that country because it has no way of obtaining slots. An auction would allow it to bid for them. Some predictability to build patronage on a route is clearly good for the consumer, but time-unlimited ownership rights remain a missing part of the European Union's Open Skies agenda, entrenching vested national airlines at hub airports (CA 1997).

Larger airlines have openly criticised the effect that slot auctions might have on challenging their market dominance at so-called hub airports like Heathrow, Charles de Gaulle and Frankfurt. At these locations the old national flag carrying monopolies have re-invented a justification for keeping control of slots by emphasising the network benefits. These are secured from using their control of schedules to link 'interlining traffic' with other routes thereby helping to sustain flights to less popular destinations that would otherwise not exist with direct flights alone.

Yet as the European transport White Paper highlights hub airports have contributed to congestion with the use of smaller aircraft and more frequent flights, rather than a limited schedule with larger aircraft (EU 2000a). Some commentators favour more point to point traffic as an equally effective way of developing airport business. Comparisons of the types of services offered by interline dependent and non-dependent services shows why. Whilst one quarter of Heathrow's traffic in 2001 was composed of interliners, at Manchester less than two and a half per cent of passengers were changing planes the airport. Yet both airports serve around 170 destinations worldwide (BAA 2002a,b,c, MA 2002a). Stansted meanwhile has twice as many interliners as Manchester yet serves 70 fewer destinations. As air traffic grows there it is also right to ask the question at what point will there be sufficient point to point demand available to see interliners as taking up seats that could reasonably be used by UK passengers?

Another argument used against primary trading is that the airlines with the deepest pockets would undoubtedly capture all slots. The amount an airline would be willing to pay is, however, ultimately dependent on what a slot is worth. Since most airlines in Europe are now privatised, shareholders are unlikely to agree to the dubious pleasure of securing a time-limited slot if it were going to lose them money in the long term.

Neither can the risks of 'overbidding' to capture market share be compared to the mobile phone licence auction (Kyrou and Gray 2002). Although the terrorist attacks on New York and Washington on September 11th 2001 might suggest otherwise, the Government's own argument is that the long term trend of aviation growth is fairly predictable (DfT 2003a). By way of comparison the uncertain potential of 3rd generation mobiles allowed each company to bid excessively, lowering their future profit margins to dangerously low levels.

#### → Current initiatives

The greatest challenge lies not so much in the practicality of slot trading but in political will, more specifically in securing consensus at European level. The Commission has recognised the limitations of the current slot regulation in either allowing new airlines to enter the market to compete with incumbents or encouraging slot mobility. Last year in a communication to the Council of Ministers the Commission made a number of proposals to modify the regulation.

Unlike the UK government's view, the Commission rejected calls for a more transparent secondary market in slots. A secondary market would enable new slots to be auctioned and incumbents to trade 'grandfathered' rights autonomously (EC 2001b and CAA

2001a). Drawing on lessons from the US experience where a similar approach merely entrenched the operations of existing airlines to the detriment of the consumer, the Commission argued instead for a tightening of regulatory control over the transfer of slots.

It might be easy see the Commission's proposals as a backward step. Alternatively the amendment to 95/93 might be seen as a staging post, putting in place the conditions for a more radical reform. Most importantly the Commission defined once and for all an airport slot. 'Slots do not constitute ownership rights but only entitle air carriers to use airport facilities for landing and take off at a specific date and timings'. In other words slots are public goods, the property rights of which would appear to rest with government. The Commission is now investigating market oriented slot allocation schemes to assess their feasibility. The study is due for completion in the Summer 2003 and is likely to be followed by a new proposal for slot auctions.

#### Key recommendations

- The UK must support the work being done by the European Commission to investigate market mechanisms to allocate runway slots
- The UK should support all slots being auctioned over a five year cycle with proceeds going to national governments. This means a fifth of all airport slots would be put on the market each year.
- A portion of the revenue could be used to pay for a Public Service Obligation for flights to and from London and remote UK regions where rail fails to provide a viable alternative.
- Another portion of the revenue should go to pay for integrated transport schemes for freight and passenger public transport access to airports and investment in rail air substitution schemes.

### More efficient use of airspace capacity

#### *Crowded skies*

Airspace congestion is increasingly feeding into air traffic delays. In 2000 one out of four flights was delayed due to air traffic management problems. The monthly average delay for these flights was anything up to 25 minutes. Between 1998 and 1999 alone, delays put down to air traffic management rose by 30 per cent (House of Lords 2001). The skies over the South East of England where the Government wants to put the bulk of new airport infrastructure are already some of the most congested in the world. Recent reports have highlighted airspace management over Cliffe as a potentially insurmountable problem to development there (Clarke 2002). In Europe as a whole the cost of airspace delays reaches over nearly three and a half billion pounds (House of Lords 2001).

#### *Europe chases a technical fix*

At a national level reducing these delays has involved the bringing on stream of updated technology capable of handling more aircraft at any one time. On a grander scale the European Union recently unveiled a Single Sky initiative to harmonise 26 national air traffic control systems across the continent. More difficult to tackle will be re-organising military airspace zones and tackling another prime cause of congestion routing aircraft through hubs that require smaller planes with more frequent flights at peak periods (EU 2000a). Set these uncertainties aside, however, and it is anticipated that improvements to air traffic management will deliver a 140 per cent increase in capacity across Europe by 2020, enough to allow the UK to meet unconstrained demand if it wishes.

A discussion on the feasibility or otherwise of increasing airspace capacity is outside the scope of this paper. However, it is likely that these high level figures are an optimistic assessment.

In particular, they bear no relation to the increasing pressures to manage take off and landing in the interests of environmental mitigation (Upham, personal communication).

#### *Peak time pricing*

One of the problems of a 'predict and provide' approach to airspace capacity is that charges for ATM are based on cost recovery principles alone. Airlines pay an en route charge based on aircraft weight and distance. Adding more supply is likely to lower these charges, especially as the system becomes more efficient. This will have two effects. The first will be to increase demand faster than current levels. The second will be a failure to tackle congestion at particularly busy times of the day, something highlighted as a particular problem by the European Commission (EU 2000a).

#### **Key recommendation**

EUROCONTROL, the body charged with collecting en route airspace charges, should impose airspace 'congestion charging' in line with the Commission's proposals outlined in its White Paper on Infrastructure Charging (EU 1999c).

### **More efficient use of the transport network: air to rail substitution**

*We can no longer think of maintaining air links to destinations where there is a competitive high-speed rail alternative. (European transport White Paper: 2010 Time to decide)*

#### *European policy framework*

The effect of any of these airport and airspace congestion charges would be to increase the attractiveness of potential substitutes for air transport like the train or the coach. Based on travel time and convenience the European Commission have concluded that high speed rail has distinct advantages over air travel for distances of up to 500 kilometres with the potential to shift flights over 1000 km where exceptionally good high speed links exist. There are strong environmental reasons for encouraging a shift from short haul air travel to high-speed rail. In the EU over 45 per cent of flights are less than 500 km, 68 per cent less than 1000km (T&E 1999). Consequently, it is Commission policy to

*press for more effective air/rail connections in the future...and continue to accelerate efforts to make rail transport more competitive and better integrated, facilitating replacement of shorter flights by rail transport (EU 1999a)*

#### *Lagging behind our European neighbours*

With two agreements laying out a framework of compatibility for Europe's high speed rail system secured this year and significant UK investment in rail line upgrades, locations as far south as Lyon and as far east as Berlin should become accessible by 2030 (EU 2001c,d). These are important developments especially given that over 20 per cent of holiday visits are to France, Belgium or the Netherlands, all highly accessible by rail. A third of UK business trips are to these destinations. Recent through ticketing developments by SNCF make the cost of a journey to the south of France highly competitive with the opportunity to travel direct from central London Waterloo. The opportunity to realise the potential of rail for trips like this remains blunted by a failure to internalise the environmental costs of air and rail transport (SNCF 2002).

#### *A short-sighted Strategic Rail Authority?*

Compared to our European competitors the Strategic Rail Authority is less optimistic on the feasibility of encouraging substitution of domestic flights from air to rail. A new high speed line linking Scotland to London via major airports in the Midlands and North would, argue

the SRA lead to only 15 per cent of domestic passengers transferring to rail. Manchester to London would be the only viable route for a dedicated high-speed line (DfT 2002a).

Crucially the SRA make no judgement about the relative availability of airport capacity for domestic flights in the future. Neither was any attempt made to find out how the numbers might grow if the full environmental costs of short haul flights were paid for in the price of a ticket. In Paris Charles De Gaulle, for example, a passenger limit of 55 million passengers a year has forced the Director of the airport to look at ways of getting the best possible use out of existing capacity. Part of the airport's business plan is to encourage the TGV to take domestic passengers to Marseille. At over 800 km away that is further than the 600km from London to Edinburgh. CDG is not motivated by any environmental reason, just that removing domestic traffic enables the airport to allocate slots for more lucrative long haul operations. Thinking thirty years ahead the Government should have the courage to do likewise, setting aside revenue from slot auctions to support the development of airports as land hubs for high speed rail (RCEP 2002). Combined with a constrained growth policy like the one at CDG this would allow airports to release slots for long-haul traffic. Higher revenues per slot from long haul flights would benefit both airports and airlines.

Inter-continental rail air substitution might be a tougher nut to crack. About half the number of regional passengers flying to Heathrow is bound for destinations further afield using air transport (Kyrou and Gray 2002). As Eurostar services get faster there might be opportunities for Eurostar to serve more proximate continental northern European cities. In 2000 it carried 7.7 million passengers, capturing over 65 per cent of the market to Paris, 45 per cent to Brussels (Eurostar 2002).

Once the Eurostar upgrade is complete the journey time to Paris will be reduced from two and three quarter hours to just over two and a half. The development of a 'super railway hub' in central London, one of the enhancement options welcomed by the SRA, combined with the current European high speed rail programme could provide faster, more frequent and direct access for regional train travellers routing through London. Combined with other fiscal and environmental measures like slot auctions this could change markedly the relative attractiveness of rail as a short haul substitute.

#### **Key recommendations**

- ➔ Manage airport growth in an environmentally sustainable development framework using slot auctions and environmental limits (see next chapter).
- ➔ Set aside a portion of revenue from slot auctions towards an integrated transport fund, paying for investment for rail alternatives to short haul air travel. As rail becomes faster and more efficient, air services should be removed gradually as a result of slot auctions favouring higher yield long haul traffic.

# 5 effective protection of the environment and public health

*Aviation should meet its external costs, including the environmental costs it imposes (DETR transport White Paper 1998)*

This chapter is organised thematically around a number of environmental impacts associated with airport development in the UK. Some, such as water and waste j40

have unavoidably been left out but this does not deny their importance. The effect of aviation on water quality, for example, is highlighted in the latest consultation as being a possible constraint for nearly all runway development options in the South East. Airports recycle only a small proportion of waste yet given the amount they produce there is considerable scope to extend it (SCAN-UK 2002; NR 2000)

In the run up to the White Paper on aviation policy due later this year, we have been able to draw on a wide range of literature in order to formulate our policy conclusions. Sources have been gathered from industry, government and non-governmental organisations (RSBAC 2001; Little 2000; Whitelegg 2000; Gazzard 2000; RCEP 2002). A seminar programme on each environmental theme added further to our understanding.

We have examined each environmental impact in light of an evolving aviation policy context and at different levels of governance, from international right down to the local authority level. Where policy gaps are identified, we suggest how this framework might be aligned with the Government's own vision of a sustainable transport system as set out in the 1998 transport White Paper and more broadly in the UK's Sustainable Development Strategy.

For consistency and as a practical guide, our proposals look across environmental policies applied to other UK industries. The ways in which the Health and Safety Executive and the Environment Agency regulate industrial installations is particularly instructive. Examples of best practice from other parts of the world also shed light on what the UK government could do to bring aviation within a sustainable development framework.

## Policy challenges highlighted

### *Environmental limits and the 'low carbon economy'*

This section questions the view that meeting unconstrained demand for aviation in the current policy context can be carried out in tandem with the Government's own objectives for environmentally sustainable development. Given the widening gap between traffic growth and environmental efficiency improvements, the absence of any strategy to deal with greenhouse gas emissions from international flights is of particular concern. Continued exemption from regulation allows the industry to evade its responsibility towards meeting 'environmental limits', playing its part within domestic emissions controls like other sectors to reduce the impacts of global warming. Access to environmental justice for the world's poorest affected by climate change forms little part in current policy discussions. Aviation's role within the Government's objective of a 'low carbon economy' over the next thirty years likewise forms no part of their current policy objectives.

*Protecting local communities*

At a local level the 'precautionary principle' is put to one side when protecting local residents from excessive levels of air pollution, especially around the UK's largest hub airports. Whilst they are doing much to limit the level of pollution from individual aircraft or ground-handling equipment there are no public policy instruments applied if they fail to meet ambient standards overall, set out in the National Air Quality Strategy (DETR 2000d). The most ambitious targets to get a higher proportion of people using public transport on airport journeys will still see absolute increases in numbers driving and more overall pollution.

On noise, the UK government is signed up to the World Health Organisation's recommendations on levels of noise exposure as a long-term objective (WHO 1999). It is party to the European Commission's evolving noise strategy aiming to stabilise or preferably *reduce* the numbers of people exposed to unacceptable levels of aircraft noise. The Commission highlighted the need for the industry to 'phase out the noisiest aircraft in the world fleet if [ICAO noise standards] were to have a tangible impact' (EU 2000a). No agreement was forthcoming. Current aircraft noise restrictions are insufficient to achieve this policy goal.

*Determining environmental costs*

One of the most important conclusions of the transport White Paper was that aviation should meet its full external costs. Following interim work by the DETR on valuing the environmental costs of aviation that added them up to less than £1 billion, voices within the industry argue that these are already accounted for by the payment of Air Passenger Duty (APD) (DETR 2000e, BATA 2001). APD currently yields about £800 million per year. A more recent estimate puts the climate change cost of UK aviation at £1.4 billion, rising to £4.8 billion by 2030 (HMT/DfT 2003).

As we highlighted in the economic section of our report, APD was never designed as a tax to pay for the environmental costs of aviation. It was and still is a modest attempt to level the tax take between aviation and other sectors of the economy (Hansard: 11/3/97, columns 227-8). Secondly, the Government's calculations as set out in 'valuing the external costs of aviation' were, by their own admission, very rough estimates. More detailed work by the European Environment Agency (EEA) calculates the total environmental costs of UK aviation to be in the region of £6 billion a year (EEA 2001).

What this goes to show is the high level of uncertainty associated with valuing external costs, a point reinforced by the choice of the United Nations to adopt a quantity based restriction on greenhouse gas emissions rather than the imposition of a tax on carbon dioxide. Whilst the Government's attempt to model the effects of a CO<sub>2</sub> tax are an encouraging step forward, a tax can only ever be a partial approach to the problem of aviation's contribution to climate change. Both the Sustainable Development Commission and the Royal Commission on Environmental Pollution made this point forcefully in their responses to the Future of Aviation consultation paper (SDC 2000, RCEP 2000). Lack of discussion over other policy options in their latest consultation documents is a glaring omission.

**Climate change and aviation: the scale of the problem**

*any significant medium-term growth in aviation's contribution to global warming is incompatible with the need to make demanding reductions in total greenhouse gas emissions, globally and particularly by the developed nations. (Royal Commission on Environmental Pollution 2000a)*

*What are we aiming for?*

Following advice from the United Nations Intergovernmental Panel on Climate Change (IPCC), the Royal Commission who advise the Government on climate change have urged a 60 per

cent reduction in the UK's CO<sub>2</sub> emissions on today's levels by 2050 (RCEP 2000b). International failure to tackle climate change could lead to average temperatures rising by two to six degrees centigrade by the end of the century. That would mean more flooding in some areas of the UK, and the droughts and famine in already poor parts of the world, becoming more frequent and extreme in nature (TC 2002). Even though the scale of these impacts is uncertain the UK government has applied the 'precautionary approach' to the treatment of global warming, joining the other responsible industrial nations in setting binding limits for the emission of greenhouse gases through the Kyoto Protocol (DETR 2000f).

#### *The contribution of international aviation to climate change*

In 1992 aviation was responsible for an estimated 3.5 per cent of climate change from all types of human activity, about as much as the total amount of greenhouse gases emitted by the UK (ICAO 1999). Aircraft contribute by emitting a cocktail of pollutants, including carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and water vapour. Released at high altitude, water vapour however could have an even greater impact than CO<sub>2</sub> through the formation of condensation trails, 'contrails' and cirrus clouds. The effects of NO<sub>x</sub> are complex: nitrogen dioxide can lead to increased ozone concentrations that warm the atmosphere but decreased methane concentrations, which has a cooling effect. Most importantly, these impacts do not necessarily offset each other as they occur regionally. There is still much scientific uncertainty regarding the impact of NO<sub>x</sub> emissions. Taken together emissions from aviation are estimated to have an impact between twice and four times that of CO<sub>2</sub> (IPCC 1999; RCEP 2002).

#### *Public ignorance, atmospheric squalor*

Social surveys consistently show that while people are at least aware of the environmental benefits of using public transport rather than taking the car, only about one in eight people recognises that aviation contributes to climate change (DfT 2002e). In the same survey a clear majority of respondents claimed that they would not fly if it harmed the environment.

#### *Limited technological improvements*

At the same time there is almost universal agreement amongst experts that application of state of the art engine technology will not stop the compound growth of greenhouse gas emissions from international flights (Little 2000, RSBAC 2001). Fuel efficiency improvements range from under one per cent per year to two per cent (ENDS, 05.11/99, Little 2000). Air traffic control offers fuel savings of between eight and eighteen per cent from current levels to 2030 (EU 2002)). Even then improvements might be 'at the price of greater impact on climate change' because increasing the efficiency of engine combustion must be weighed against higher NO<sub>x</sub> emissions (RSBAC 2000). A step change from kerosene fuelled craft is as far away as 2050 and would 'require the stimulus of appropriate regulatory incentives due largely to the large risks involved in production when compared to the small economic benefits'.

#### *Doing nothing is not an option*

By 2050 the sector's contribution to global warming could grow to as much as fifteen per cent of the world total (IPCC 1999). The accompanying caveat is that this ignores the Kyoto Protocol's effects in reducing greenhouse gas emissions elsewhere. Since this is already having an effect, and international flights remain exempt from individual countries' future obligations it could be greater still. In the UK, international flights constitute about 95 per cent of the global warming contribution from aviation (DfT 2003a).

At the same time, the UK has a commitment to reduce greenhouse gases by 12½ per cent below their 1990 level by 2008-12. The exclusion of international flights from the UK Kyoto target means that by 2012 between 30 and 50 per cent of greenhouse gas emissions reductions elsewhere could be cancelled out by the growth in aviation (DETR 2000f). Other

industries will, in effect be footing the bill for aviation's continued exemption from the Kyoto Protocol (RCEP 2000a, ICAO 2001)

Emissions from domestic aviation accounted for less than half a per cent of the UK total of 158 million tonnes of carbon in 1998. However, they are projected to be more than twice as large by 2030 (DETR 2000f). The Royal Commission on Environmental Pollution (RCEP) has recently highlighted the possibility that the UK may not meet its voluntary 20 per cent cut on 1990 CO<sub>2</sub> emissions by 2010. In this context it is becoming increasingly urgent that policies are put in place to reduce domestic aviation emissions (ENDS, May 2002).

*UK aviation and climate change strategy*

The Government's air transport consultation document raises the possibility of tackling aviation's growing impact on climate change through a tax on carbon dioxide, nitrogen oxides and water vapour emissions from aircraft. Using estimates derived from the Department for Environment Food and Rural Affairs (DEFRA) these work out at £210 per tonne of carbon equivalent, rising at £3 a year to reflect increasing costs over time (DfT 2003a).

A tax at this level would add roughly 10 per cent to the average air ticket price, presently about £8 on a short haul and £30 on an average long haul flight. Evidence gathered by the Department for Transport (DfT) suggests that a one per cent increase in fares will reduce passenger demand by the same amount. The carbon tax could thus shave about 50 million passengers off the half a billion passengers forecast to be using UK airports by 2030.

Past trends however, suggest that the aviation industry will reduce fares by about one and a half per cent a year over the next thirty years due to efficiency improvements and enhanced competition (DfT 2002a). Under this scenario a tax of 10 per cent would still mean prices fall by around a third in real terms between now and 2030. Even then, argue DfT, the tax would stimulate aviation technology improvements, lowering operating costs further and bringing passenger demand back up close to the original half billion figure. Conveniently there is no need to constrain demand for aviation to 2030 on the need to avert its contribution to climate change.

One crucial element is however missing from DfT's tax modelling which renders the approach at best partial at worst inadequate. As the Government's sustainable development strategy makes clear

*Serious or irreversible damage to some aspects of the environment and resources would pose a severe threat to global society. Examples are climate change... In this case there is likely to be a limit, which should not be breached. (UK Sustainable Development Strategy, DETR 1999)*

These limits, agreed and ratified globally presently mean the UK must reduce greenhouse gas emissions by 12.5 per cent below 1990 levels by 2012. The Prime Minister has also endorsed the Government's voluntary domestic commitment to a 20 per cent reduction in UK carbon dioxide emissions on 1990 levels by 2010. 'The reason,' claimed Tony Blair at an address to the CBI in 2000, 'for taking the lead in cutting national emissions, as we have in the UK, is to give us standing and authority in international negotiations.' (CBI, Green Alliance 2000). That this is only the start of a much bolder process the PM made clear in his speech to the World Summit on Sustainable Development in Johannesburg last year.

*Kyoto only slows the present rate of (climate change) damage. To reverse it we need to reduce dramatically the level of pollution and let us at least start to set out in that direction. (WSSD 2002)*

The UK Climate Change Strategy sets out how we intend to do so, setting out the challenge to developed countries in particular. In order to avoid severe climate destabilisation, the United Nations Framework Convention on Climate Change (UNFCCC) estimates that carbon dioxide emissions can grow globally by nearly 60 per cent between 2000 and 2050. On equity grounds the developing world must be allowed to increase its emissions to 2050 whilst the rich world cuts theirs. In this policy context, by 2050 the Royal Commission on Environmental Pollution recommends that the UK CO<sub>2</sub> reduction burden should be 60 per cent below 1990 emission levels. This will undoubtedly auger a shift to a 'low carbon economy', something that the Government has broadly welcomed as both possible and desirable (CBI, GA 2000, DETR 2000b). Achieving the RCEP target of a 60 per cent reduction in UK CO<sub>2</sub> emissions by 2050 is the central objective of the Government's energy White Paper (DTI 2003), strongly endorsed by Tony Blair in a speech for the Sustainable Development Commission on the day of its publication.

If the Government is serious about meeting this challenge a fair question to ask is how can a 'low carbon economy' be squared with a more than doubling in aviation's contribution to CO<sub>2</sub> emissions between now and 2030? In particular, how would this level of growth relate to meeting our long-term obligations for significant CO<sub>2</sub> reductions?

The fact that international flights are presently outside national targets for controlling greenhouse gas emissions has been used by some to argue that they imply no cost burden on industries already faced with cutting emissions within the Kyoto Protocol. The longer international flight emissions remain outside this UN framework however the bigger they grow. The greater the cost burden will then be when UK international flights do become accountable.

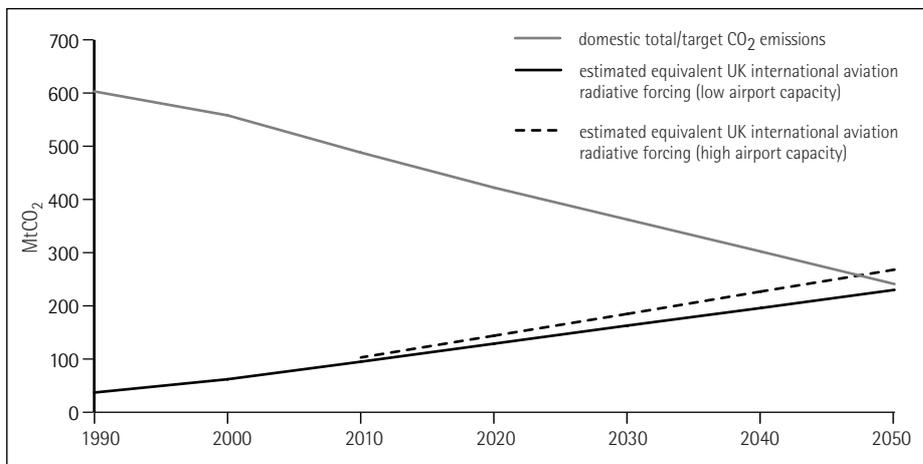


Figure 5.1 Growing climate change impact of international aviation from the UK

Figure 5.1 illustrates the growing climate change impact of international aviation from UK airports; emissions from ground sources and domestic flights are excluded, since in theory they already count in the UK's inventory under the Kyoto protocol. The descending line shows total domestic CO<sub>2</sub> emissions from all sources in 1990 and 2000 and domestic targets for 2010 (20 per cent reduction on the 1990 level) and 2050 (60 per cent reduction on the 1990 level). The targets for 2020, 2030 and 2040 are interpolated (respectively a 30, 40 and 50 per cent reduction on the 1990 total). The data for aviation conservatively use a factor of 2.5 to convert CO<sub>2</sub> emissions into estimated 'radiative forcing', a proxy for the total climate change impact including the effects of nitrogen oxides and condensation trails. On this basis, the estimated climate change impact of international flights from UK airports was equivalent to about 6 per cent of total domestic CO<sub>2</sub> emissions from all sources in 1990 rising to about 11 per cent in 2000. The data for aviation in 2030 are based on official forecasts (HMT/DfT, 2003). The low capacity scenario assumes no new runways and a total of 415 million

passengers in 2030; the high capacity scenario assumes new runways at Heathrow, Gatwick, Stansted, Birmingham, Manchester and Edinburgh and a total UK passenger throughput of 480 million. Figures for 2010 and 2020 are interpolated; those for 2040 and 2050 are extrapolated.

If the UK is on course for a 60 per cent reduction in total CO<sub>2</sub> emissions by 2050 and emissions from international aviation grow unchecked, then by 2030 the climate change impact of international flights from the UK could be equivalent to about half the total. By 2050 the climate change impact of international aviation could exceed the UK's entire sustainable emissions budget. The graph illustrates the scale of the problem, even if half the emissions from international flights are attributed to other countries. Unless there is an unanticipated quantum leap in technology and operations, it seems unlikely that the climate change challenge can be met without reducing the growth in air transport.

## Climate change and aviation: the policy response

### *International aviation*

#### ✈ *Voluntary agreements*

Voluntary agreements between industry and government have always looked at the possibility of improving the efficiency of aircraft operations rather than addressing the overall scale of the industry's contribution to global warming. As a result none so far have countenanced reductions that match the projected growth in traffic over the next thirty years. Measured against this backdrop and the need for limits to global emissions as set out in the UK Sustainable Development Strategy, voluntary initiatives have a role to play, but will not be a solution to aviation's growing contribution to climate change on their own (ICAO 2001).

#### ✈ *Global open emissions trading*

ICAO's Committee on Environmental Protection (CAEP), the UN body charged with developing recommendations on potential instruments to combat aviation related climate change, recently came to a conclusion over which policy instrument would be most cost-effective to deal with the problem. As the ippr had recommended earlier, it favours an open trading regime (Hewett and Foley 2000). Under the scheme, each industry, including aviation, will be allocated a quota of greenhouse gas emissions permits to trade on the open market depending on their performance against meeting an overall cap (ICAO 2001d).

The UK has an international obligation to cut its contribution to global warming by 12.5 per cent on 1990 levels by 2008–2012. The present government also has a domestic commitment to reduce CO<sub>2</sub> emissions by 20 per cent by 2010. These commitments are only the start of a much more stringent process. Even with a policy framework to tackle climate change the Royal Commission questions some of the Government's optimism regarding reductions in fossil fuel use from motorised transport. Without further measures, the Royal Commission on Environmental Pollution expects emissions to start rising again to only 2 per cent below their 1990 level by 2020. As a consequence it is vital that greenhouse gases from international flights come within the UN climate change convention as soon as possible (RCEP 2000 and 2002).

#### ✈ *A European emissions charge on the horizon*

The protracted process towards this goal does not rest easily with the European Commission. In 2000 the EC made clear that it would act to reverse the gap between environmental improvements in the industry and the growth in passenger traffic, a trend which the EC claimed was 'unsustainable' (EU 2000a). Since concrete action to tackle

climate change was not forthcoming at the last ICAO Council meeting in September 2001 it is embarking on this process unilaterally.

The Commission has now moved beyond discussing the principles of an emissions charge to looking at implementation issues (CE Delft 2002). The recommendation is for an en route charge of £6 and £30 per tonne of CO<sub>2</sub>, and a charge for NO<sub>x</sub> emitted. It would be applied to all carriers on intra European flights only, minimising the number of bilateral agreements requiring re-negotiation. An en-route charge levied on emissions in European airspace would not create incentives for tanking up with fuel outside the EU to avoid payment. The charge could have the effect of reducing aviation's CO<sub>2</sub> contribution to global warming by between two and 13 per cent with roughly half the cut caused by accelerated aircraft fleet renewal (CE Delft 2002). An alternative approach would be to include emissions from intra-European flights in the proposed EU emissions trading regime.

➔ *Will the UK government fall into line?*

In the most recent consultation process the Government have anticipated that a CO<sub>2</sub> tax that could be applied to the international flights, albeit at a level far below the amount currently paid by car drivers. Their scenario set the tax at 100 per cent of the present cost of kerosene. Even then it would still only have a minimal effect on people's demand to fly. Fares would rise by only 10 per cent causing a drop in traffic of a similar magnitude. Due to ongoing efficiency improvements translating into lower fares, the Department for Transport concluded that the tax would have little or no effect on demand in the longer term. Action to curb airport expansion, it argued, would therefore be unnecessary (DfT 2002a).

➔ *Airport development and climate change – proceed with caution*

Any charge or tax attempting to reduce the climate change costs of aviation is a welcome step. However, it is unlikely to be effective because of the political difficulty of setting it high enough at least in the short term. The long-term damage effects of climate change on social and economic development are also difficult to quantify, as the wide-ranging CE Delft estimates show. Furthermore, these impacts will be felt on poorer societies who do not benefit from the availability of mass air travel. This is partly why the ippr has previously called for international flights to come within the domestic emissions commitments of developed countries as soon as possible (Hewett and Foley 2000). In applying absolute limits to greenhouse gas concentrations the United Nations has signalled the importance of pre-empting climate change rather than dealing with its downstream effects with damage compensation.

The United Nations Framework Convention on Climate Change (UNFCCC) gave the problem to the International Civil Aviation Organisation (ICAO) to solve. However, the problem of how to allocate responsibility for the emissions from international flights appears to be being used by this quasi-industry body as an excuse for inaction.

The Government's White Paper, setting out a plan for the development of airport capacity will come sooner than the introduction of initiatives like the emissions charge or the inclusion of international flights in the climate change convention. In the meantime, 'There is a danger that short-term pressures to accommodate growth in air transport could lead to decisions on infrastructure which will undermine future efforts to limit the sector's contribution to global warming' (RCEP 2001). In the absence of a policy framework to deal with these externalities the Government should 'plan, monitor and manage' reviewing airport planning permission in light of evolving climate change policy.

➔ *Sustaining mobility for the future – hypothecate environmental funds to R&D to cut aviation-induced climate change*

At the same time the number of people hoping to fly in the future is likely to grow. There is a strong case for more expenditure on research into step change initiatives that could cut drastically aviation's contribution to global warming. ippr strongly urges the UK government to apply pressure on the Commission and the airline industry to find ways to reduce the impact of aviation through technology research. This sort of step change, that envisaged in the Blended Wing Body aircraft for long haul flights for example, is likely to require more investment than the sort of revenue envisaged through the current levels of environmental charges (RCEP 2002). The polluter pays principle makes clear that the aviation industry should pay for these initiatives. Using funds from the EU emissions charge for R&D to cut the climate change impacts of aviation should be a priority and is not necessarily ruled out by ICAO rules on charges and taxes.

➔ *Encourage high speed rail*

The growing threat of climate change from aviation compares markedly with the Government's modest vision for the role that high speed rail could play in substituting for short haul flights both in the UK and to access holiday and business locations on the continent. There are not only practical and commercial reasons to support this process, discussed in section one, but environmental and social ones too.

A UK survey by the Commission for Integrated Transport (CfIT) of the relative environmental effects of short haul aircraft and rail acknowledged that CO<sub>2</sub> emissions per passenger by an average aircraft were four times that of an equivalent train (CfIT 2001). On other aspects of environmental damage the impacts were more difficult to compare, particularly for noise and land take.

In terms of local air pollution the picture was less black and white. Rail produced more sulphur dioxide, due to coal fired electricity generation, but less carbon monoxide, nitrogen oxides, and volatile organic compounds per passenger kilometre. Two key points arising from the analysis were the opportunity to reduce rail emissions in the future by bringing in renewables to provide electricity for trains. Another advantage of rail was the fact that it was situated in city centres where access journeys were more likely to be taken by public transport.

The European Environment Agency has found that the overall external costs of aviation per passenger kilometre are double those of rail due to the effect of other atmospheric pollutants as well as CO<sub>2</sub> on climate change (EEA 2001). The average external costs for air freight per tonne kilometre in the EU were more than ten times that of rail. In this context it is surprising that the Department for Transport find the environmental benefits of switching to rail at best marginal (DfT 2002a).

*Domestic flights and climate change*

➔ *The pitfalls of voluntary emissions trading*

One way to start applying a sustainable development policy framework to aviation in the UK is by making domestic flights accountable for their greenhouse gas emissions. Domestic flights are already included in the UK's Kyoto target for 2008-2012. The policy response so far has been the voluntary inclusion of British Airways domestic emissions in the UK Emissions Trading Framework, which got going in April 2002 (ENDS, March 2002).

Judged against the objective of getting UK businesses used to emissions trading and kick-starting a market in the UK, the scheme looks impressive. Companies that signed up bid against each other to reduce emissions below an agreed baseline level, in return for a

government incentive totalling £215 million over five years. The Government claims that the emissions saving amounts to five per cent over and above planned reductions by 2010.

BA bid to reduce 125,000 tonnes of CO<sub>2</sub>, a cut of one per cent of its forecast total. Most came from domestic flights, calculated as the company's average emissions between 1998 and 2000. At the same time BA's strategy has been to retrench to more profitable routes, cutting domestic services. In the case of BA's agreement it is unlikely that any additional emissions have been secured. Already these flights are being replaced by growth elsewhere in the 'low cost' sector and routes to international destinations – excluded from emissions trading due to ICAO rules.

BA gains revenue whatever happens. At the top end estimate of £5 per tonne of CO<sub>2</sub> BA would need to buy credits worth about £1.9 million – a lot less than the £6.67 million the company gets for participating in the scheme.

A UK emissions trading scheme is not doomed to fail. The clear message is that it must be made mandatory. Leaving it voluntary will create problems of what economists call 'adverse selection'. Those companies anticipating a cut in output in the future will be the most willing to join the scheme.

#### Key recommendations

- At international level – support the inclusion of all emissions from international flights to and from developed countries, to come under national greenhouse gas targets by the time of the second UN climate change convention commitment period (2008–2012). For further details see Hewett and Foley (2000). An interim measure could be including emissions from intra-European flights in the proposed EU emissions trading scheme.
- The UK government should support European Commission proposals for an intra European en route emissions charge, levied on CO<sub>2</sub> and NO<sub>x</sub>. When emissions from international flights form part of national reductions targets within the UN climate change convention, CO<sub>2</sub> should be tackled by a scheme of open emissions trading under a global cap (Hewett and Foley 2000). The EU charge would still be required to pay for NO<sub>x</sub> and the formation of condensation trails and cirrus clouds.
- The Government should encourage the Commission to use revenue from the EU emissions charge to support R&D projects to reduce aircraft's contribution to climate change in conjunction with aircraft and engine manufacturers.

### The problem of aircraft noise

Almost a quarter of English householders think noise is a problem in their area (DETR 1999). Noise adds to stress levels and to other health-related ailments: hearing loss, hypertension, heart disease, and reduced educational performance (WHO 1999). The World Health Organisation found that noisy environments inhibited pupils' reading abilities and slowed their cognitive development. The Dutch Health Council concluded that there was a strong relationship between these impacts and 'noise associated with an airport operations system' (Gezondheidsraad 1999). Night time noise meanwhile can adversely effect health in a variety of ways depending on the recipient (DfT 2002f).

#### How do we measure aircraft noise?

*Noise levels are measured using a Decibel 'A' Scale (dB(A)). The scale runs from the faintest sound the human ear can detect, which is labelled 0 dB, to over 180 dB, the noise at a rocket pad during launch. Decibels are measured logarithmically. Each increase of 5 decibels doubles the loudness. For example, exposure to a 90 decibel noise for eight minutes is the same as being exposed to a 95 decibel noise for four minutes. (Howard Leight Hearing Protection 2002)*

For aircraft noise, Leq measures dB(A) averaged over a 16 hour daily period. Lmax, on the other hand, measures the peaks of individual noise events, more useful for gauging the impact on noise when background levels are low.

#### *Long term objectives*

The World Health Organisation (WHO) recommends the following maximum levels of ambient noise:

*table 5.1* World Health Organisation recommended maximum noise levels

<i>Context</i>	<i>Ambient noise limit (dB(A) )</i>
Bedroom	30 Leq
Balconies, terraces, gardens	55 Leq
Outdoors at night	45 Leq
Schools and classrooms	35 Leq
Outdoor playgrounds	55 Leq
Single noise event in house	45 Lmax

source WHO 1999

#### *Past trends*

There is no doubt that aircraft noise has reduced over the last thirty years. Aircraft coming off the production line are now a full 20 decibels quieter than their 1970s forbears (Rolls Royce 2002). Improvements in reducing take-off noise have not, however, been matched by similar reductions in landing noise (DTLR 2001).

Over the long term official figures have shown marked declines in the numbers of people affected by high levels of aircraft noise at BAA's London airports. (DTLR 2001b). Around Heathrow and Gatwick, for example 220,000 people are now affected by noise above 57 dBA – a level causing the 'onset of low levels of high annoyance' – down from 311,000 five years ago. This has largely been due to the phase out of the noisiest aircraft, more than 25 years old, a process completed in April 2002. BAA also point out that numbers of noise complaints have been falling at all their airports except Stansted in recent years (BAA 2002b).

#### *More still to do*

Since the Government measure the population affected by levels greater than 57 dB(A) this does not capture people who, according to the WHO should not be exposed to ambient outside noise above 55 dB(A). The difference between 55 and 57 dbA is a 20 per cent increase in noise. Government figures show almost double the number of people affected by noise greater than 54 dBA at Heathrow (DfT 2002a). A good proportion of these will be exposed to noise above the WHO standard.

New research should establish an index that reflects not just the sound intensity of individual noise events but the frequency with which they occur (Vandermeer 2001). The UK also remains one of the only European countries not to weight noise according to sensitive times of day or night or locations such as areas of natural beauty. New EU noise legislation will require the UK government to provide a factor recognising that night noise is on the whole more harmful than day noise, due to the health effects it has on sleep (EU 2000; DEFRA 2001a).

#### *Future trends*

Work conducted by the ICAO at a European level sees a 42 per cent increase in the population affected by 'annoying' levels of aircraft noise between 2002 and 2020, a rise from 2.23 million to 3.17 million (ICAO 2001b). This takes into account the very best in operational practice anticipated at our busiest airports. It is a picture echoed by the Government who conclude that stabilising noise levels at Heathrow to the level achieved with the phase out of the noisiest aircraft in April of this year will be extremely challenging indeed (DfT 2002a).

## The regulatory framework controlling aircraft noise

### *International standards*

Through its Council, the International Civil Aviation Organisation (ICAO) is a UN body charged with setting international standards for aircraft noise. This involves certifying the noise levels of new craft and agreeing a phase out programme of older planes. Aircraft designed before 1977, called Chapter 2, have been retired from service in the UK with noise levels reaching historically low levels this year.

### *Latest developments at ICAO*

Since aircraft are a very expensive form of capital equipment destined for use across national boundaries and with a lifetime of over 25 years, a 'first best' policy would set standards at an international level through ICAO.

ICAO advocates a 'balanced approach' to noise mitigation, including land use planning and management, noise abatement operating procedures and noise charges. Operating restrictions are advocated only as a last resort. Guidance is provided to aviation authorities on how these measures can be applied, although uptake is discretionary (ICAO 2001c).

The expectations of airport operators and environmental NGOs to attract the best available noise technology to European airports were, however, dashed at the last meeting of the ICAO Council in September 2001 (ICAO 2001c Appendix D). They had anticipated a challenging list of next generation aircraft and the start of a new phase out programme. Instead the new noise standard has not kept pace with cutting edge technology. Almost all new aircraft (96 per cent) already meet the new standard. No international agreement was reached on a timetable for phase out or on using the standard as a basis for restricting the movements of noisy aircraft. The date when Chapter 4 comes into effect is 2006 by which time fast growing aircraft numbers will be causing deterioration in the noise environment around UK airports (ICAO 2001b).

### *UK designated airports*

In the UK, the busiest three airports of Heathrow, Gatwick and Stansted lean heavily on ICAO's 'best practice' guidance. All three are 'designated' meaning that airport related noise is subject to some statutory regulation by the Secretary of State under the Civil Aviation Act 1982. There are noise preferential routes to limit the numbers of people exposed to aircraft noise, day and night time noise quotas, and controlled take-off and landing procedures to minimise people affected further away from the airport (BAA 2002b). At night time this quota system is supplemented by limits on the number of flights, permitted aircraft types and noise emission controls (DETR, 1999b). The government is consulting on extending the present night noise controls at Heathrow, Gatwick and Stansted until 2005 (DfT 2003b).

Individual aircraft noise quotas were tightened for departing aircraft only by 2dBA for daytime noise and 3dBA for night time noise in 2001. It is too early to review how successful these measures have been, although the Government are keen to express the limited impacts this will have on airline operations. In practice this means that aircraft marginally compliant with existing standards cannot take off at night. Newer jumbo 747-200s ploughing Far East routes have instead been given more time to depart and land in order not to disrupt international flights.

BAA levies a charge for noise breaches, rewarding quieter planes by rebating a portion of the landing charge. The levels charged for noise infringements, however, seem too small to have any significant effect on changing the selection of aircraft – £500 for levels up to an additional 3dBA and £1000 for more than that (BAA 2002b). This corresponds to between £1 and £3 per passenger. Its input of fixed electrical power units and engine testing bans at anti-

social hours help to reduce some noise. At Heathrow benefits from noise fines are handed over to local projects and a rolling noise insulation programme (BAA 2002b). At £10 million a year this is equivalent to a little more than 6 pence per passenger using the airport. In the Government's recent consultation document for Heathrow it was suggested that between 36 and 40 pence would be an appropriate sum, although it was not made clear if the charge would rise for night flights (DfT 2003a).

#### *Non-designated airports*

Elsewhere the Secretary of State has chosen not to extend his designation powers so noise is regulated through ad hoc planning agreements and other voluntary agreements between local authorities and airports. Airport consultation committees in particular have been criticised strongly for inadequately representing community interests (AEF 2001).

The Government is consulting on proposals to strengthen the regulation of airport-generated noise (DETR 2000g). Proposed measures include a new enabling power for airports to establish noise control arrangements and enforcing them to set up a noise amelioration scheme. A final decision on these issues will be set out in the White Paper, although they must take into account the European Union's growing interest in this area (see Box 5.1).

box 5.1 Night noise and air freight

The problem of night noise around UK airports is set to grow under nearly all airport development options (DfT 2003). This is partly as a result of even greater forecast demand for air-freight than for passenger travel and the difficulty of obtaining daytime runway slots. The past ten years have seen prodigious growth too of express freight flown out by dedicated express operators like DHL, Fedex and UPS. These companies require 24-hour aircraft operations to enable next day delivery especially to transatlantic markets. Seen as an essential component in a globalised economy, the express industry is said to contribute £1.2 billion to other sectors. Over the next twenty years this could increase to £5 billion a year (CBI 2002). Each flight, according to the CBI provides knock-on economic benefits in the order of £60,000 compared to £20,000 from scheduled passenger flights.

#### *The problem*

The Government anticipates the number of night freight movements increasing from 26,000 to 80,000 between 1998 and 2030 in an unconstrained scenario. According to official forecasts, an increasing proportion of this total will be composed of express freight (DfT 2003a). Even if South East airports do not play their part in this expansion, there could be something in the region of only 14 per cent fewer freight movements overall compared to the unconstrained scenario by 2030 and higher numbers of night flights migrating to regional airports like East Midlands.

At the same time people's expectations for a better quality of life continue to rise. Current policy to reduce night noise is considered insufficient by the European Court of Human Rights. A judgement made in October 2001 claimed that the UK government had been negligent in weighing the economic benefits of night flights against local residents' requirements for a peaceful night's sleep. The result of the Government's appeal will be known this Autumn, but in the meantime it is evident that a different approach to night noise control is required. Of much greater concern is that, according to the European Environment Agency the external costs of airfreight are over twenty times greater than rail and more than double that of road haulage.

#### *Making best use of existing capacity*

Our proposals for slot auctions and for landing charges to rise to recover costs will provide airlines with a greater incentive to maximise bellyhold freight on passenger aircraft (see page 34). Ending the subsidy from passenger retail expenditure should allow airfreight to compete on a more level playing field with leisure traffic.

#### *Strategic siting*

At a strategic level, however, the Government needs to choose an airport to cater for the needs of high value lightweight freight. Night operation will still be required so they should be sited away from centres of population. Our policy to develop Public Health and Safety Zones around airports should help to remove and control residential development under noisy flight paths.

*Strategic use*

Because of its high overall impacts on global warming, including airfreight in an open emissions trading regime could pass on significant costs to the consumer. This would favour rail, maritime and road haulage as more economic alternatives, keeping 'just in time services' the preserve of high value, lightweight, time sensitive goods. In this respect 'general airfreight', with a mean delivery time of over six days, still constitutes nearly 90 per cent of the total market by weight. For these goods, higher airfreight charges would mean less environmentally damaging modes of transport could become a competitive alternative on price and delivery time. Internalising the climate change costs of all air freight should sharpen management focus on optimising supply flows rather than relying on last minute shipments as a haphazard alternative. In the longer term levelling the environmental playing field might also improve the economic viability of hydrogen airships as an alternative to short haul airfreight (CATE 2001). To ensure a level playing field with aviation's historic infrastructure subsidies, this may involve government support in the early stages of market development.

*How to pay – protection, mitigation and compensation*

The CBI has pointed to a knock on benefit per express operator flight of £60,000. It should therefore be possible to return some of that profit to pay for the very quietest aircraft technology. Ambitious targets should be set to phase in new aircraft fleets that align themselves in performance with the best European standards for aircraft in excess of the Chapter 3 standard (EU 2002b). The type of voluntary package at East Midlands airport provides an example of how this might be done (EMA 2002). There the threat of designation and likely regulation led the airlines to put together a noise reduction programme to phase out noisy Chapter 3 aircraft. Since many environmental organisations unsuccessfully urged ICAO to phase out these aircraft this is definitely a progressive move.

With the minimum level of population affected by aircraft noise and the high economic benefits of night flights argued by the CBI, it should be possible for that scheme to apply a system of differential charging to pay for noise mitigation. As a measure of last resort, compensation should be provided up to the loss of property value caused by aircraft noise, enabling residents to move if they wish.

*European policy options*

Political wrangling to balance US and developing country interests against the EU's bolder approach to noise mitigation are diluting the strength of ICAO proposals. In the meantime the European Commission have already defined a sustainable noise policy framework as one that does not add to the numbers of people affected by intolerable levels of aircraft noise (EU 1999).

✈ *Noise sensitive airports directive*

The EU has opened the way for operating restrictions on aircraft that improve upon the noisiest aircraft allowed at UK airports by less than two decibels (EU 2002b). The standard is optional. With the lack of a strategic framework from Brussels, it is unlikely that any airport will want to get a reputation for being 'noise sensitive' in case the traffic shifts elsewhere.

✈ *Noise charges directive*

A directive that will come into force in April 2003 has established a common framework for noise classification for the purposes of calculating noise charges (EU 2002e). It applies to both departing and arriving aircraft. Noise charges are set according to noise energy rather than decibels alone. On these grounds a doubling in the number of aircraft would result in a doubling in the amount of costs paid on a graduated scale, not the chance that an aircraft will infringe a discrete noise quota and pay a fine, or just scrape through and go without paying anything. The charges will be applied on a revenue neutral basis meaning that they will be returned to the airlines, although owners of quieter aircraft will gain and noisier aircraft lose out.

➔ *European ambient noise directive*

More importantly for the conclusions of the White Paper, the European Parliament and Council have recently agreed a Directive on acceptable levels of ambient noise in the Community as a whole targeting all transport sources. The strategy will map levels of noise at civil airports with over 50,000 movements per year by 2007 (ENDS, no 327). A key objective will then be to prevent or reduce environmental noise particularly where the exposure is 'great' (DEFRA 2001). Unlike UK noise measurements, the European approach weights night-time noise events more severely in a way that reflects deeper public concern for sleep disturbance. The UK government is preparing a national initiative to comply. The consultation paper has highlighted transport impacts including airports as key areas to tackle.

**Key recommendations**

- ➔ In preparation for the EU environmental noise directive, develop noise capacity limits around airports as a condition for planning consent.
- ➔ Since individual aircraft are also a problem the Government should have a strategic approach to implementing EU directives on noise charging and operating restrictions outlined above.
- ➔ Within a noise capacity envelope, set by the Secretary of State, set up airport consultative committees composed of different stakeholders to negotiate more or less challenging noise standards, balancing economic and environmental objectives at a local level.
- ➔ The Environment Agency should oversee new rules for these committees and local consultation procedures.
- ➔ Noise charges, added to the landing fee, and varied according to the time of day or night or over-flight location, must be an important means of reducing aircraft noise to meet locally agreed standards. Funds should be used for mitigation schemes such as noise insulation and compensation where residents wish to re-locate.

table 5.2

Safety ranking	Mode of travel
1	train journey
2	sea cruises
3	bus/coach travel
4	air travel
5	bicycle
6	motor cars
7	motor cycle

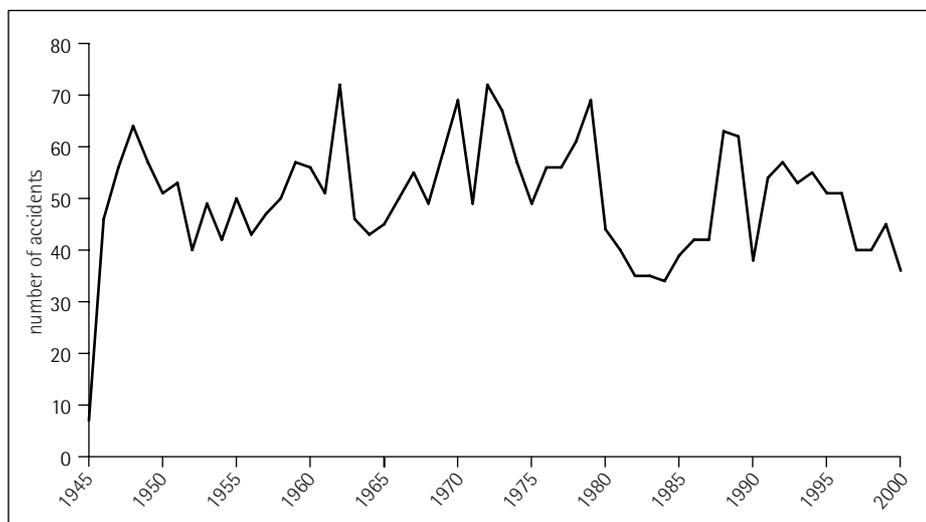
source KH Lim (2002)

**Public safety**

*Safety compared*

Flying appears a safe form of travel in comparison to other types of transport. Measured in terms of passenger kilometres travelled the US National Safety Council in 1996 found that flying was 22 times safer than car travel (Boeing 2001). In 1971 an accident occurred on average every 140 million passenger miles flown. By 2001 this had improved tenfold to one per 1.4 billion passenger miles. Casualty rates per journey have likewise improved. In the late 1960s the death risk per journey was about 1 in 2 million, by 2000 it had improved four times over (MIT 2001). On a per journey basis, however, air travel compares favourably with cars, but less so with other types of public transport.

figure 5.2 Air transport accidents 1945-2000



source Aircraft Safety Review 2001

The rising amount of passenger journeys and miles flown worldwide has meant the number of accidents has remained fairly stable for about twenty years. There are an average of two or three incidents involving ground fatalities annually, a figure not dissimilar to that of large chemical plants (ETSC 2000). The numbers of yearly ground fatalities rarely exceeds ten, although nearly three quarters of aircraft accidents happen in the landing or take off stages of flight, usually close to very large populations.

#### *Future safety*

It is almost impossible to predict with any accuracy the ability of future airspace technology to deliver more capacity in the skies and guarantee equivalent levels of safety. However, increased airport congestion and the pressure to 'keep things moving' can only add to accident risk. Congestion in particular is made worse by hubbing, as opposed to point-to-point flying. Hubbing relies on more frequent flights with smaller aircraft landing and taking off in waves. This provides a critical mass of connecting and direct passengers to support routes and timetables that would not be available with point-to-point passengers alone.

The relationship between risk and aircraft movements has been quantified by one of the United States' foremost experts on airport safety, Arnold Barnett of the Massachusetts Institute of Technology. Once the amount of aircraft movements at any airport go beyond about 250,000, Barnett found statistical evidence supporting accident risk increasing at double the rate of the amount of additional traffic. With 500,000 movements Barnett concluded that the risk of a fatal runway collision would increase fourfold.

Despite concerns over the ability of the current system to handle traffic in parts of the UK, the Government is confident that planned improvements in the system are up to the task of doing so (DfT 2002b). National Air Traffic Services will need to deal with three times as many movements by 2030, from handling two million planes a year to six million by that date.

#### *Public safety policy*

After the El Al plane crash over Amsterdam in 1992, the Government through the DETR updated Public Safety Zone policy around all large airports (DfT 2002g). Each zone is constructed on the basis of the danger to third parties from aircraft taking off or landing. This starts with a 1:10,000 risk zone in most cases found within the airport perimeter where risk to human life is considered too high to allow settlement, and a 1:100,000 inner zone where development is prohibited. Safety assessments are made with reference to traffic volume, aircraft safety records, past crash location data and the proportion of people likely to be affected. No account is taken of existing population within the zones. All are forecast over a 15-year horizon. Planning guidance to local authorities is based on the objective that there should not be a significant increase in the number of people living, working or congregating in each zone.

For the effectiveness of Public Safety Zones, the Government invites judgement on its attempt to reconcile two opposing themes:

*To minimise the number of people on the ground at risk of death or injury in the event of an air crash on take off or landing while not imposing unduly onerous controls on the use of land use around airports, which will have an economic cost associated with it. (DETR 1997)*

There is a fundamental reason why PSZs fail in this objective. It is up to the local authority to decide if PSZ cost benefit analysis is applied to existing developments coming within each risk contour. With competitive pressures to agree to airport development local authorities will often be reluctant to make the airport pay to re-locate buildings within the 1:100,000 zone. Around Farnborough airport, for example, a technical college comes within this area with 2,500 people there for most of the day. Currently airport expansion and development

restrictions around the airport means properties like Farnborough College are in a double bind. Few want to buy their property and if they do it will be at a price well below market levels outside the PSZ. In the meantime those attending the college face levels of risk that PSZ policy would deem unacceptable for new developments.

For new developments PSZ policy determines first the levels above which no further risk of an accident would be socially acceptable before working back from that to look at risk reduction measures that could be taken if the benefits exceeded the costs. The cost benefit approach values each life saved in comparison to expenditure on risk reduction strategies around airports the same as that from road transport. This implies that the public would respond in the same way to an air crash over Heathrow in which third parties were killed as it would to a pile up on the A1 with an equivalent number of casualties. In the Terminal 5 planning inquiry, the inspector specifically refers to the risk of aircraft crashes as societal risk. If this were the case, the value of avoiding each fatality could be up to four times as great as doing so on the roads (Vandermeer 2001). Public Safety Zone policy in Holland recognises this difference. It is more stringent, allowing the maximum individual risk allowed to rise to 1:15,000.

The PSZ looks at crash risk in isolation from the other economic and environmental benefits of reducing noise, air pollution, road traffic growth and urbanisation in the safety zone. If the Government had added these environmental costs together and included them in the costs of risk exposure, it is likely also to find merit in extending the PSZ beyond current borders. In earlier studies the DTLR gave consideration for specialist policies in a 1:1,000,000 risk contour zone. We would like to see this proposal resurrected and for 1:1,000,000 zones to form a new Public Health and Safety Zone incorporating the benefits of reducing pollution or compensating residents as part of the land use planning process.

The Government accepts that there is a high degree of uncertainty surrounding accident risk measurements in the three contours yet this does not prevent a search for an optimal balance between risk and mitigation costs. This contrasts with the Health and Safety Executive's (HSE) approach to dealing with industrial hazards, which recognises that a search for cost/benefit optimality is not particularly helpful or practical in different local contexts. At the HSE 'the comparison of risk against efforts to reduce it in the judgement of 'reasonable practicability' is one of gross disproportion and not equivalence'.

In other words the Health and Safety Executive makes controlling risks around major industrial hazards the obligation of the plant owner, regardless of cost. From this 'polluter pays principle' risk reductions are made where it is 'reasonably practical' to do so. It is incumbent on the source of risk to publicly justify cases where it is not. This would allow for a number of common sense risk reduction solutions that might be ignored by the Government's rigid PSZ criteria, but could be defined as practical in some areas. In Vienna for instance the airport submerged a nearby motorway in a cut and cover tunnel to protect both drivers and air passengers by removing obstacles.

#### Key recommendations

- Both passengers and the public should have the right of access to information about the environmental and safety implications of air transport growth.
- The Government should offer UK citizens a level of protection equivalent to that secured by Health and Safety Executive policy to industrial hazards.
- The UK government should take the opportunity of the EC's Single European Sky initiative to press for a common approach to ground as well as air safety across Europe in line with Dutch PSZ protection.
- Public Safety Zones should be revamped as Public Health and Safety Zones. The health impacts of noise and air quality should be help to decide how much land use development to allow and how much money could be spent on local area mitigation and compensation projects.

### Local air quality

*The Government's air quality policy aims to ensure that polluting emissions do not cause harm to human health or the environment (DETR 1999a)*

#### *Airports, air pollution and health in context*

In terms of their overall contribution to local air pollution, airports can be compared to large industrial sources like power plants or refineries. In the UK, Heathrow airport is the second largest emitter of Volatile Organic Compounds after the BASF chemicals plant in Teeside (W&W 2000). The difference between the BASF plant and Heathrow airport is that the Environment Agency sets enforceable pollution abatement targets for industrial sources of pollution like BASF. Heathrow, on the other hand, reduces local pollution only if it chooses to do so.

Air pollution can have both short and long term effects on public health. Long-term exposure can 'lead to substantial loss of healthy life expectancy' (Gerondziaad 1999). In the UK up to 24,000 people die prematurely from it every year (DETR 2000). Medical evidence shows a link with bronchitis and other chronic breathing conditions. Short-term exposure can raise the death rate, putting at risk the young, the old, the sick and infirm.

#### *When airport size becomes a problem*

As airports grow they are likely not just to become a bigger contributor to local air pollution but for some pollutants they could help tip the balance between an area meeting local air quality objectives or failing to do so. This is especially the case for airports in excess of about 30 million passenger movements a year like Heathrow and Gatwick.

In 1993 Heathrow was responsible for almost 60 per cent of NO<sub>2</sub> emissions and 38 per cent of PM10s within an area 8km by 6km surrounding the airport (see table 5.3). This conforms to the pattern logged at other European airports. Frankfurt handling 50 million passengers a year was found to contribute over 70 per cent to local NO<sub>x</sub> concentrations while at smaller Zurich the airport accounted for less than thirty per cent of the total (W&W 2000).

Chemical	1993	% total	2016 with T5	% total
NO <sub>2</sub>	7500	58	12531	83
PM10	144	38	154	61
SO <sub>2</sub>	522	66	587	73
VOC	1935	51	1361	60

table 5.3 Heathrow airport's contribution to local air pollution (tonnes)

source BAA 1993

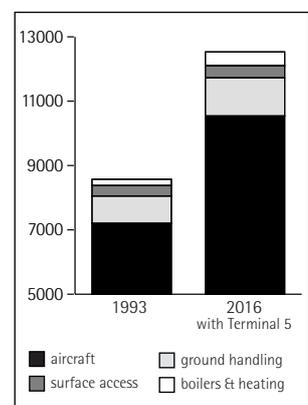
#### *Limits of the voluntary approach*

BAA are keenly aware of the airport's growing contribution to local air pollution and set voluntary targets for NO<sub>x</sub> and PM10. Better management of planes on the ground and public transport initiatives are just two ways BAA is attempting to reduce local air pollution.

Figure 5.3 shows that their efforts may be in vain. The total amount of NO<sub>x</sub> is forecast to increase while the proportion coming from aircraft remains roughly the same, at about 85 per cent of the airport total. Voluntary initiatives targeted at ground handling and surface access measures will not be sufficient.

The absolute amount of particulate matter (PM10), small dirt particles that lodge themselves in the respiratory system, is predicted to fall even with Terminal 5. However, as knowledge of their impact on health has increased, standards have tightened over the years (DEFRA 2002a). The amount of SO<sub>2</sub> will also rise in total, with the airport contribution causing more grounds for concern.

figure 5.3 Heathrow airport-related nitrogen oxide emissions 1993 and 2016



source BAA 1998

For smaller airports in the UK, breaches of air quality regulations are presently less of a problem (DETR 2000g). Birmingham and Manchester are anticipated to become so only at the end of the White Paper's projection: 2030. There is little cause for complacency, however. The Government commissioned study assumed no changes in air quality standards, the airport infrastructure, surrounding road network or residential areas in response to increased activity levels at the airport.

*The UK policy framework for regulating ambient air pollution*

✈ *Setting objectives*

Air pollution is one of the fifteen headline indicators in its sustainable development strategy supported by a set of binding Air Quality Regulations to limit concentrations of fifteen potentially dangerous pollutants to a 'safe minimum standard' by 2005 (DETR 2000d). The challenging targets for airports in particular appear to be NO<sub>2</sub> and PM10.

Under the National Air Quality Strategy and Integrated Pollution Prevention and Control local authorities have a statutory obligation to meet these objectives by monitoring air pollution and setting up a Local Air Quality Management Zone where one or more of the pollutant limits are likely to be breached. Within each zone they are bound by law to develop a local strategy to find out what is responsible for the problem, bring the source back under control, while 'striking a balance between controls on domestic, industrial and transport emissions' (DETR 2000d). Co-ordination with the Environment Agency is required in cases where the pollution emanates from industrial sources. Neither the Environment Agency nor local authorities have any jurisdiction over air pollution at airports.

As we showed in the previous section, aircraft in particular are sizeable contributors to overall air pollution, especially in the case of NO<sub>x</sub> where more than half of the total emissions in a 50km area around Heathrow emanate from aircraft. In this respect tighter Euro standards on vehicle engines to reduce motor vehicle pollution are likely to be insufficient to help meet local air quality standards.

This view also lets airports free-ride on the technological efforts being expended by the car industry (EU 1998). The precautionary approach would take account of air pollution standards being a likely 'moving target' with national standards likely to get more, not less demanding in the future. Apply the precautionary approach and the continued exemption of airports from local air quality obligations becomes less tenable still, especially where airports are located near to large centres of population.

✈ *The way forward*

In the UK there are no legal or administrative obstacles against statutory controls to limit local pollutants. In Zurich the airport is bound by law to play its part in meeting the Federal Clean Air Ordinance (Fleuti 2001). The Swiss CAA oversees a rigorous system of measurement in order to assess the airport contribution. Following this, a pollution target is set for the airport. Zurich airport varies landing charges in order to attract low NO<sub>x</sub> emitting aeroplanes. The problem here is that landing charges presently only constitute two per cent of airline operating costs so the financial incentive to reduce emissions is not great. Our proposals to end the retail subsidy at airports and duty free could raise charges and enhance the effect but they are likely alone to be insufficient unless the charging range is sufficiently wide.

Boston Logan airport in the US meets clean air targets through a tradable NO<sub>x</sub> emissions permits regime. Each major source in the region is issued a level of permits, the total adding up to the limit imposed by the Clean Air Act. If the airport wants to grow, it does so by buying permits from other polluters (Massport 2001).

The Mayor's Air Quality Strategy claims that this type of system could not work in the area around Heathrow because air quality is a problem in the whole area (GLA 2002). Reductions would be needed in all areas suggests the strategy so trading permits would not be appropriate. A cap similar to that proposed to deal with global CO<sub>2</sub> emissions could be imposed in the whole area that would over time tighten to meet National Air Quality Standards. Different players in the market would be issued permits equivalent to the level of the cap, trading them as appropriate.

**Key recommendations**

- ➔ Airports should be brought within Local Air Quality Management regimes. Statutory powers should be awarded to the Environment Agency to enforce compliance in instances where limits are on course to be breached.
- ➔ Once set within the an air quality control framework, planning permission should be partly dependent on meeting national targets for all pollutants especially NO<sub>2</sub> and hydrocarbons. An aircraft emissions charge could be set at a level to help meet local air quality standards with funds going to reward passengers and staff who use public transport.
- ➔ With airports coming under a local air quality 'bubble', they could be issued with permits enabling trading with other sources. Public transport providers who were successful in encouraging customers to arrive this way could sell permits to the airport.

**Surface access**

*Defining the problem*

The predicted growth of air transport will have a profound effect on the surrounding road network. For those situated close to congested traffic corridors, and that includes all major UK airports, the marginal effect of more passenger and employee travel can impose a considerable cost on fellow road users or those suffering the environmental effects of traffic growth (DfT 2002a,b,c and 2003a).

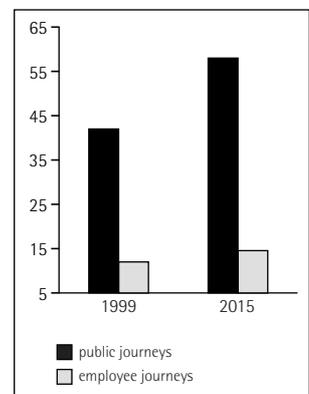
In comparison to other European airports, the UK's largest airports have a reasonable record in public transport use. Little over a third of passengers arriving at Heathrow and Gatwick currently use the bus or train (BAA 2002). Both airports have set voluntary targets of 40 per cent by 2007 and 50 per cent in the longer term as a way of facilitating further expansion. Smaller airports less endowed with good rail links, however, struggle to get even 20 per cent of their passengers arriving by public transport (Gazzard 2000).

Most importantly the predicted growth in both employment and passenger numbers means that the number of people travelling by car or taxi is set to increase considerably even if airports meet their voluntary targets. Assuming Heathrow manages to get half of its non-transfer passengers to use public transport by 2015 and that it continues to persuade one per cent of its workforce each year to make the switch unconstrained airport expansion will put an even greater strain on the already overburdened local trunk road network.

*Time to respond to a quadrupling in air freight by 2030*

Another issue revolves around the fact that no UK airports currently have rail freight terminals. Given long lead times of rail projects, infrastructure developments will need to be mapped out rapidly if aviation grows in line with unconstrained demand forecasts (DfT 2003). At Stansted, Gatwick and Heathrow almost two million tonnes of airfreight are currently transported by road. This figure is likely to increase fourfold to almost eight million tonnes by 2030 if no rail freight terminals are constructed. Up to 65 per cent is likely to be transported by the UK's largest articulated lorries across distances averaging 100 kilometres. A total of 137,000 HGV journeys of this average trip length could be added to the road network every year. (DTLR 2001c).

figure 5.4 Heathrow surface access journeys by car and taxi 1999 and 2015



source Mayor's Air Quality Strategy, 2002; BAA Issue Briefs 2002

*Surface access: the vision*

One key objective of the 1998 transport White Paper envisaged a sustainable transport system as one that supported economic and social objectives whilst limiting the impact on people's health (DETR 1998).

Two ways in which this could be achieved were by encouraging public transport use and reining back the growth in private vehicle traffic. The Road Traffic Reduction Act of 1997 provided guidance to local authorities on how they could prepare a strategy to cut traffic levels in their area. The strategy was optional but prioritised in areas unlikely to meet National Air Quality Standards. Local authorities were urged to link traffic reduction strategies with ambient air quality objectives. In the case of Heathrow, Gatwick and other large airports situated close to population centres these areas would seem ripe for inclusion in an overall traffic reduction policy.

box 5.2 Best practice at Heathrow

Air Transport Forums, statutory bodies charged with devising and overseeing surface access strategies, have made much progress at Heathrow. BAA both subsidise buses in the vicinity of the airport, and pursue green commuter plans to reduce employee car access. More recently the company funded the Heathrow Express, a fast train service from Paddington into the heart of the airport. The Heathrow Joint Distribution Centre has reportedly reduced the number of freight vehicles entering the airport by nearly 70 per cent.

Heathrow airport, however will continue to put greater strain on the road network as it potentially expands from 60 million passengers in 2000 to 116 million by 2015, with a third runway. Even with a 50 per cent target for public transport access, the airport could have 18 million more people arriving by car by 2015. Assuming that the GLA is successful at reducing traffic in outer London by its target of 10 per cent by 2008, Heathrow's traffic growth will make the job of local authorities much harder to achieve (SCC 2002). Without a mechanism to bring airports within the framework of road traffic reduction strategies this will render local authority action impotent.

One way of linking benefit with public policy objectives would be to link surface access targets to actual environmental outcomes. Including the airport within an air quality 'bubble' could provide a greater incentive to do this, tying environmental improvement into the airport's business plan. Rolling out the next stage of congestion charging around Heathrow could be a way of tackling traffic and raising funds for public transport access. To be equitable, burdens imposed on the airport to reduce private car access would have to be comparable to local authority objectives to reduce traffic across the boroughs as a whole.

**Key recommendations**

- ➔ The Government should tie traffic reduction and air pollution reductions. Bringing airports within the national air quality strategy would be one way of doing this. The airport would reduce road traffic or encourage clean freight and passenger vehicles as a pre-condition for more traffic growth on the airfield.
- ➔ Where private traffic is forecast to grow to unacceptable levels, targeting airport hinterlands for road congestion charging or motorway tolling would be one way of encouraging more public transport use.
- ➔ This would be complementary to raising parking or passenger drop-off charges, measures already being considered by the UK's largest airports. 'Carrot' measures could include a more aggressive public transport marketing strategy with discounts for people accessing airports by public transport.
- ➔ Given the high forecast growth of airfreight, the Government should strategically site a freight hub. This would provide sufficient economies of scale for the development of rail freight access to the airport.

## Planning for environmental sustainability

### *Land use planning and airport developments*

There are a number of important loopholes allowing aviation development to circumvent the usual controls of the planning system (AEF 2001).

- ✈ *Transition from military to civilian aviation* – No planning permission is required to change the nature of airport operations in this manner. When London Manston airport ceased to function as a military airport there was no public discussion about the environmental implications of new use or consultation with the local authority in whose area it fell.
- ✈ *Established use rights* – Airports are allowed to intensify their operations and, as long as they require no new infrastructure, no additional planning consent is required.
- ✈ *Permitted development rights* – If an airport agrees to subject itself to economic regulation by the CAA, no matter how large or small the scale of its operations, then it can obtain a number of important planning exemptions. Terminal floor space can be increased by up to 15 per cent. This would allow Heathrow to grow by nearly five million passengers a year by expanding T5. The alteration of runways and the construction of new taxiways is also permitted. A series of developments of this nature occurred at Biggin Hill and Bristol soon after their new regulated status.

Outside of these exemptions the approach to all other types of airport development is 'plan led'. If an airport owner wishes to undertake a major infrastructure investment they must apply for planning permission in exactly the same way as someone wishing to make a house extension. After sending off a development proposal to the relevant local authority, it is common practice for the application to be refused and then 'called in' by the Secretary of State to make the final decision. The Secretary of State appoints a planning inspector to conduct a comprehensive inquiry, inviting submissions for evidence from any party objecting or supporting the development.

In July 2002 the Deputy Prime Minister announced plans to streamline the planning process. Public inquiries would remain the mainstay of the system for dealing with major infrastructure projects rather than, as had been mooted earlier, making Parliament the arbiter of planning consent. The Deputy Prime Minister instead hoped to limit inquiry time by appointing a larger number of inspectors to assess different aspects of the development proposal (ODPM 2002a).

### *The new approach to appraisal*

Part of the success of the transport White Paper in setting a robust planning framework would depend on whether it can carry as much public opinion with it as possible. For this to happen the appraisal process supporting it should be seen as impartial and as comprehensive as possible.

The instrument to underwrite this objective is the new approach to appraisal 'NATA' (DETR 1998b). In the past, appraisal had confined itself to a narrow assessment of their economic benefits, expressed mainly in terms of journey times saved for commercial or business traffic. Each project would now be judged against its contribution to five overarching objectives.

- ✈ Integration with other transport modes
- ✈ Safety
- ✈ Economy
- ✈ Impact on the environment
- ✈ Accessibility

NATA thus marked a departure from the past by considering the wider economic environmental and social costs as well as benefits of any new scheme. There were important spatial effects associated with transport infrastructure developments. In the past economic activity had been displaced from an area and this was counted as an economic benefit in the area it had been drawn to. Each development proposal therefore needed to be judged in context, avoiding simplistic generalisations about the relationship between transport investment and economic benefits.

In its most recent consultation paper, however, the negative economic and social impacts of meeting unconstrained demand for air transport were ignored or passed over without critical examination (DfT 2003a). There are a number of reasons why this is an important oversight (see chapter 3).

#### *Planning to make better use of capacity*

NATA recognised that major transport schemes could have negative impacts on the environment that could outweigh the positive economic benefits. These impacts were difficult to quantify yet sufficiently important to caution against extensive infrastructure development as the first option. It was 'important that alternatives to new construction (were) considered at the earliest stage of planning' (DETR 1998a). These boiled down to:

- making better use of existing capacity
- the active use of demand management
- encouraging the use of other more environmentally sustainable forms of transport.

Our proposals in section two suggested ways in which the UK government could make better use of existing capacity. This revolved around a combination of aviation congestion charging and an ambitious, long-term investment programme to shift short haul flights on to rail.

In an approach clearly at odds with that adopted for road policy, the tone of the latest consultation is to actively enable more people to fly in the future regardless of the environmental consequences. Policy options to reduce the need to travel by air are seen negatively as 'preventing large numbers of people from flying at all'.

#### *Sensitive sites*

On developments affecting environmentally sensitive areas the integrated Transport White Paper is also very clear. NATA should have as a guiding principle 'a strong presumption against new expanded transport infrastructure which would significantly affect such sites or important species, habitats or landscapes'. Chief amongst the Government's concerns is whether the site is of international, national or local importance, or whether the species threatened are protected. Table 5.4 highlights the potential impact of new airport developments.

#### ➤ *Historic buildings protection*

More than eight out of ten people think that the historic environment makes an important contribution to their quality of life (MORI 2000). In 1999 over 50 per cent of the public had visited an ancient monument. For the purposes of planning policy, there is a presumption against the destruction of ancient buildings. Any developer must present a case that shows no alternative apart from demolition. Moving buildings is not normally considered unless all other options have been exhausted.

<i>Airport</i>	<i>Impact</i>
<i>South East</i> Cliffe	Serious effect on Thames Estuary Site of Special Scientific Interest (SSSI)/Special Protection Area (SPA)/Ramsar site. Likely to have a very serious adverse effect on biodiversity.
Gatwick	Could result in damage to Gloves Wood SSSI and other ancient semi-natural woodland. Likely to have a serious adverse effect on biodiversity.
Stansted	Adverse impacts on Elsenham Woods and Hatfield Forest SSSI plus impacts on ancient woodland sites. Likely to have a very serious adverse effect on biodiversity.
<i>South West</i> Bournemouth	Close proximity to a number of SSSIs and species issues means that an expansion of the airport could lead to a serious adverse effect on biodiversity
<i>Midlands</i> Birmingham	Would lead to a loss of Bickenhill Meadows SSSI and affect Castle Hill Farm proposed site of importance for nature conservation (SINC) and The Jungle SINC. Likely to have a very serious adverse effect on biodiversity.
Coventry/Rugby	Partial loss of River Avon SINC, loss of ancient semi-natural woodland, loss and disturbance to grassland, hedgerow and pond habitats. Likely to have a very serious adverse effect on biodiversity.
<i>North</i> Liverpool John Lennon	Mersey Estuary SSSI/SPA/Ramsar could suffer from land take and bird disturbance. Likely to have a very serious adverse effect on biodiversity
Manchester	Cotterill Clough SSSI could be affected by new terminal. Possible third runway could affect twelve Sites of Biological Importance and Rostherne Mere National Nature Reserve (NNR)/SSSI/Ramsar site. Likely to have a very serious adverse effect on biodiversity.

Table 5.4 Impact of airport developments on environmentally sensitive sites in England

source English Nature

The only legal form of protection for ancient sites is when they are put on a list of Scheduled Ancient Monuments (SAMs). There are just over 18,000 in the UK, ranging from mediaeval castles to ancient burial grounds. These nationally important monuments have priority over other competing land uses. Only in very exceptional circumstances would they be demolished.

Afforded no specific legal protection but considered as worthy of preservation for their historical or architectural interest are listed buildings. There are 370,000 presently in the UK. They are graded in terms of importance.

- ➔ Grade I (Two per cent of the total) – Of 'exceptional' interest
- ➔ Grade II\* (Four per cent of the total) – particularly important buildings of more than special interest
- ➔ Grade II (92 per cent) – of special interest warranting every effort to preserve them

Most demolition applications, 90 in 2001, are for Grade II buildings with between twenty and thirty of these typically lost nationwide in any given year.

Finally conservation areas have the least level of statutory protection and are designated for planning protection by the local authority. Conservation areas by virtue of their scale are particularly unique areas for heritage preservation.

➔ *How much heritage would we lose?*

A new runway at Heathrow would see a quarter of the Harmondsworth conservation area destroyed (DfT 2003a). Under both runway options at Birmingham the whole of the Bickenhill conservation area would meet the ball and chain (DfT 2002h). The number of grade II buildings lost under the larger Stansted options are considerable, offering a scale of heritage destruction rarely witnessed since listed protection became adopted in the 1970s (DfT 2003a).

Where information has been made available, the table below shows some of the impacts on heritage caused by unconstrained airport development.

table 5.5 Heritage under threat?

<i>Airport</i>	<i>Scheduled monument</i>	<i>Grade I</i>	<i>Grade II*</i>	<i>Grade II</i>
Heathrow (one runway)	1	1	1	8
Stansted (one runway)	2	0	0	29
Stansted (two runways)	2	0	1	50
Stansted (three runways)	2	0	1	64
Luton (re-aligned runway)	0	0	0	2
Cliffe (four runways)	0	1	1	8
Edinburgh	3	n/a	n/a	n/a
Glasgow	1	n/a	n/a	n/a
Wales	0	0	0	0
Birmingham	0	1	0	Several
Manchester	0	0	0	0

source DfT 2002 a, b, c, d

#### Key recommendations

- Appraisals for airport developments should factor in the economic and social costs as well as the benefits. These might include the effects of developing airports for reducing regional domestic tourism, and labour migration from the regions (see sections two and three).
- Subject to legal constraints, demand management measures like 'congestion charging' for runway slots should be actively pursued at UK airports.
- The Government should appraise the long-term effects on more balanced economic development as part of an overall regional strategy.

## 6 social progress for everyone

### Travel benefits

The Future of Aviation consultation paper suggests a range of social benefits from the growth in air travel opportunities flowing to the UK traveller (DETR 2000a). These range from opportunities for cultural and educational exchange, to visiting families and friends and relaxation.

The range of destinations at Heathrow now numbers over 200. Never before have UK travellers had so much choice on where to spend their holidays. Almost a quarter of London's population is composed of ethnic minorities, many of whom keep up links with friends and relatives overseas. Immigration to other parts of the UK makes international access important across the whole country.

The equity impacts of further growth to travellers themselves are particularly stressed by the Future of Aviation consultation.

*Foreign travel and holidays are now within reach of a broad cross-section of the population for education, leisure and visiting friends and families (DETR 2000a)*

According to a recent government air travel survey, nearly half the UK population had flown overseas in 2001 (DfT 2003a). Over 20 per cent of the population expected to be flying more regularly in the future against 13 per cent who expected to fly less. Almost 90 per cent of trips amongst those who had flown were for leisure purposes. Tourist experts confirm that there is room for much more market growth. The maximum amount of people who will take leisure flights in the population is about 80 per cent (Graham 2000).

In this context it is important to reaffirm the notion that government is not powerless against an unstoppable tide of greater demand for air travel. Demand to fly is not a factor outside of the realm of public policy. 'It involves decision-making, perception of needs and desires that are obviously amenable to change, most obviously via associated price' (Upham 2002). With the cost of flying falling while other public transport fares have increased (figure 6.1) it is not surprising that demand to fly has been growing at a rate more than twice as fast as growth in the wider economy. Neither is it surprising that the Government's attempts to get more people using the bus and train have not progressed.

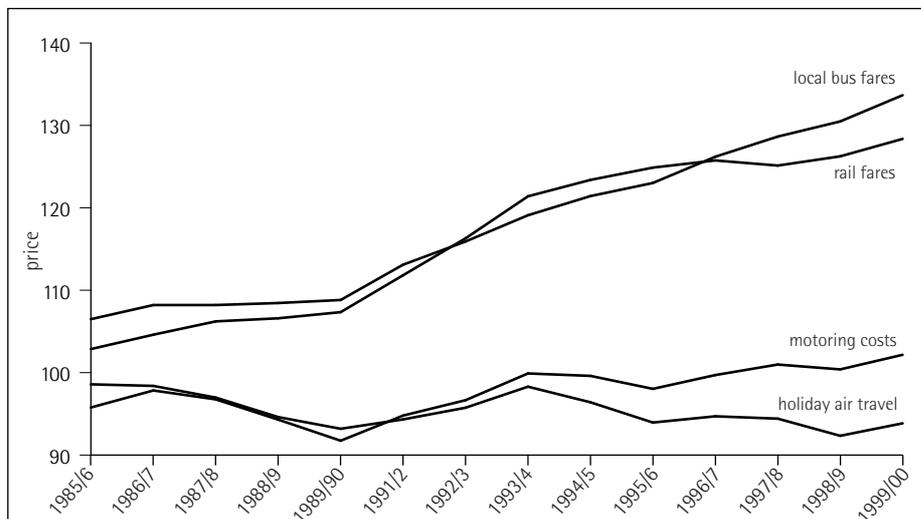
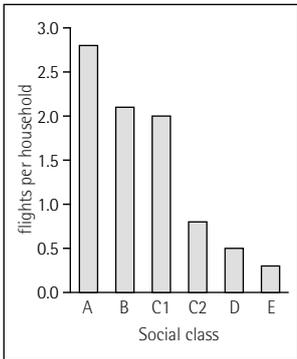


figure 6.1 Passenger transport prices in the UK (1985-2000)

source DTLR 2001c

**The equity benefits of air travel in the UK**

figure 6.2 UK leisure flights by social class 1999



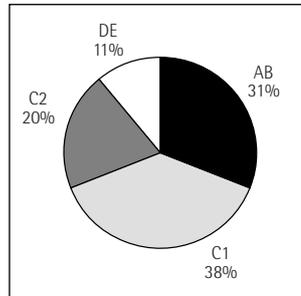
source CAA 1999

Despite the fall in relative prices, leisure air travel remains highly skewed towards the better off. The graph below shows the average number of leisure flights taken per household in each of the social classes in 1999, the last time the CAA surveyed a mix of regional as well as the main London airports. People from the top three social classes take, on average more than four times as many flights per year than those in the bottom three. Any tax on aviation to either pay for environmental costs or redress the fiscal imbalance would be relatively progressive.

If the same social distribution of flights persists in 2030, the very richest could be taking on average over ten return flights a year, the poorest only one. At ten flights a year there are likely to be diminishing consumer benefits for more seasoned leisure travellers balanced by the greater benefits to those who are entering the market for the first time.

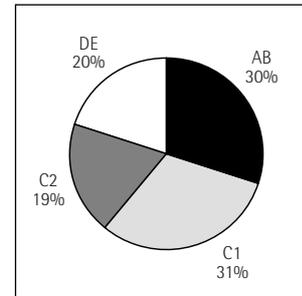
In comparison to air travel, domestic tourism is more patronised by the less well off. Representing roughly one third of the population at the time of the last census, UK domestic tourists from the two poorest social classes accounted for 20 per cent of the total, compared to less than 11 per cent travelling on foreign holidays by air.

figure 6.3 Social class distribution of UK leisure flights 1999



sources CAA 2002b, Star UK 2001

figure 6.4 Social class distribution of English holidays 2000

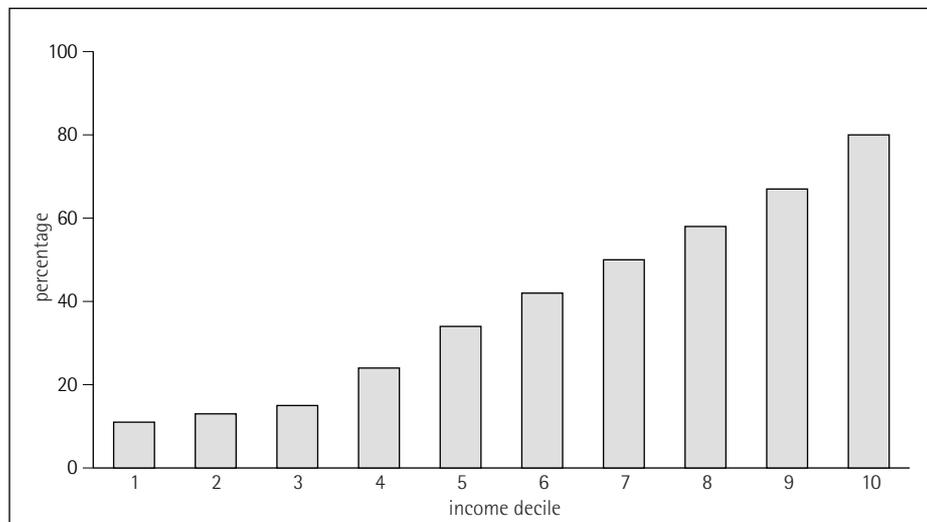


sources CAA 2002b, Star UK 2001

**The effects of low cost air travel**

Whilst some might argue that the emergence of low cost travel has introduced a qualitatively different picture, taking advantage of these bargain flights increasingly involves access to Internet facilities. Easyjet currently sells more than nine out of ten tickets online, a figure nearly matched by other low cost operators (Easyjet 2002). In this respect a widening digital divide exists in the UK.

figure 6.5 UK access to the internet by household income 2002



source Office of the e-Envoy 2002

Less than fifteen per cent of homes in the bottom two UK income groups have access to the Internet in comparison to over 65 per cent in the top two. The divide has grown in the last two years (Office of the e-Envoy 2002). It might be argued that those deprived of a computer could book flights on the phone. However, many deprived people have no access to credit or debit cards. This partly explains why the top three social classes take more than three quarters of all low cost flights.

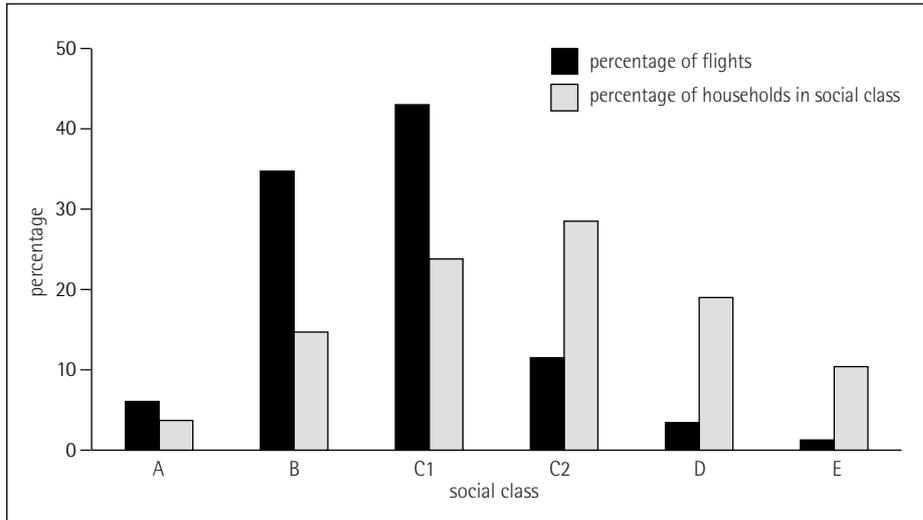


figure 6.6 Distribution of low cost flights by social class 2001

source CAA 2002

Another explanation is that an air ticket is only one component in the overall holiday package. Excluding accommodation, the average weekly holiday spend per person travelling by air was almost £500 in 2001. This helps put foreign holidays out of the reach of almost one in four households (JRF 2002).

**global and intergenerational equity**

Forging a case for taxing aviation fairly is not the only consideration that the Government must take into account when considering the expansion or otherwise of UK airports. The long-term social costs imposed on others as a consequence of aviation-induced climate change are very difficult to quantify.

They are also likely to fall on different people from those who benefit from aviation, across geographies and generations. Our descendants will feel the most serious impacts of today's greenhouse gas emissions in fifty years time. Over half of the contribution of aviation to climate change is currently generated by traffic within or between Europe and the US. One of the areas most threatened by climate change, Africa by 2020 will still only constitute four per cent of the world's air traffic the same proportion as it does presently (Rolls Royce 2001).

Region	Proportion of total traffic kilometres (%)
North America	35
Europe	29
Asia Pacific	22
Latin America	5
Africa and the Middle East	4
Freight	5

table 6.1 World traffic kilometres (2001)

source Rolls Royce Outlook 2001

Whilst a more rigorous approach to environmental protection from aviation is essential it is equally important to accept that there is pressure for more people to fly throughout the world. Chinese international air travel alone is expected to grow from four million trips presently to over 100 million by 2020. One of the most important long-term solutions to the environmental impacts of aviation must be to investigate ways to cut its contribution to global warming (see chapter 5).

### Assessment of the social impacts of our proposals

An important part of any appraisal process culminating in policy recommendations is to assess their impacts on different sections of society. Our main proposals for a sustainable development policy framework for aviation involve:

Aviation congestion charging:

- airport take-off and landing slot auctions
- the dual till, separating out the regulation of aeronautical charges at airports from retail activities
- peak and off-peak airspace charges

Environmental policy instruments:

- emissions from international flights should be included in national inventories under the international climate change convention
- including emissions from aviation in an international trading regime
- a European aviation emissions charge
- bringing airport-related air pollution and noise under Environment Agency regulatory controls
- Public Health and Safety Zones developed in concert with the Health and Safety Executive, and the Environment Agency
- A statutory role for local consultative committees composed of representatives from Regional Development Agencies, the airport, airlines, local government and residents' groups, to negotiate noise amelioration packages overseen by the Environment Agency.

Funds raised from environmental charges should go towards:

- mitigating the environmental impacts of aviation
- improving public transport links to airports
- developing high-speed rail as an alternative to short-haul flights

Such a radical new departure will undoubtedly raise serious questions. Below we try to answer some of the inevitable criticism that will be made against our recommendations.

## Our critics answered

*Won't the public just look at ippr's proposals as a holiday tax?*

It is true that any extra costs arising from our proposals will, in the main fall on leisure travellers who constitute over three-quarters of the air passenger market. This is counterbalanced by the long run trend for air travel prices to fall. The fact that the majority of flyers fall into the top three social class categories means that any charges would be a highly progressive way of raising money for environmental measures or public services, including public transport improvements. Alternatively the Government could choose to cut other taxes or increase benefits.

*Even if most of the revenue comes from those who can afford to pay, your proposals will still stop some people on low incomes from travelling abroad, won't they?*

Research by the Joseph Rowntree Foundation confirms the difficulty of going on holiday for a poor family. Nearly one fifth of the UK population do not go at all. Of those who do, UK tourism is still the most common way of spending a holiday. People from the bottom two social class categories are nearly twice as likely to be taking their vacation in the UK than travelling abroad (UK Domestic Tourism Survey 1995 – 2000). Of the 50 per cent of the UK population who flew last year by far the majority were people in the top three social classes. The poor are conversely far more likely to benefit from additional expenditure on public investment in areas like health, education, crime prevention and local public transport.

*But aren't people selfish and want their cheap travel regardless what it means for others here and especially in developing countries affected by climate change?*

A recent official survey found over 60 per cent of flyers claiming they would not fly at all if it damaged the environment. At the same time nearly 90 per cent of respondents were unaware that climate change had any connection with air travel at all. Given the reluctance of the Government to give aviation's fast growing contribution to climate change the importance it deserves it is not surprising that a lack of general knowledge characterises public attitudes to flying and the environment. Until this changes it may well be the case that higher charges are seen purely as a 'holiday tax'.

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