UK / Europe / Equity

Transport

November 2003

Dresdner Kleinwort Wasserstein Research

Aviation emissions

Another cost to bear

Emissions charges could be the *quid pro quo* for more runways

The UK's APD is a strong template for an EU-wide charge

Material earnings implications for airlines and airports

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Aviation emissions

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Aviation and climate change

Overweight

Unchanged

Aviation is the fastest-growing source of green house gases and is widely regarded as undertaxed. We attach a 60% probability to an increase in the UK´s APD next year and an EU-wide emissions charge could be introduced as soon as 2005. Both measures could have a material negative impact on airline and airport earnings.

- **The fastest-growing source of emissions:** International aviation is excluded from Kyoto and will not be included in Europe's emissions trading structure until 2008 (and more probably 2013). In the meantime the EU or national governments are likely to tax aviation emissions. The greatest near-term risk is in the UK, where a White Paper is due this autumn and higher taxes could be the *quid pro quo* for more runways.
- **UK options:** We think the UK has three policy options: introduce an all new emissions charge, do nothing before the introduction of an EU-wide charge (which could happen in 2005) or convert the existing Air Passenger Duty (APD) into an emissions charge. Raising APD by 64-100% would cover the £1.5bn climate change costs of UK aviation.
- **Raising APD:** Our base case assumes the short-haul and long-haul APD rates are raised by 50% and 75%, respectively (plus 64% on average). The financial impact of higher taxes is a function of price elasticities and margins: in our base case the negative earnings impact on British Airways, Easyjet and Ryanair is 17%, 15% and 10%, respectively. The airports are relatively defensive: we estimate BAA's earnings would decline by only 6%.
- **An EU-wide charge:** The UK could use its EU presidency in 2005 to introduce an EU-wide charge, which, if set at the same levels as a UK charge, would raise €10bn. We estimate a negative earnings impact of over 20% for BA, Lufthansa and Iberia, over 30% for both Easyjet and Ryanair and around 80% for Air France. If an EU charge *replaces* APD, the impact on UK-based airlines and airports would be much diminished.

Mike Powell
+44 (0)20 7475 6441
mike.powell@drkw.com

Rebecca Langley
+44 (0)20 7475 2379
rebecca.langley@drkw.com

Mark McVicar
+44 (0)20 7475 2370
mark.mcvicar@drkw.com

Joel Copp-Barton
+44 (0)20 7475 2424
joel.copp-barton@drkw.com

Dresdner Kleinwort Wasserstein Securities Limited, Regulated by FSA and a Member Firm of the London Stock Exchange PO Box 560, 20 Fenchurch Street, London EC3P 3DB. Telephone: +44 20 7623 8000 Telex: 916486 Registered in England No. 1767419 Registered Office: 20 Fenchurch Street, London EC3P 3DB. A Member of the Dresdner Bank Group.

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Summary

Although Kyoto excludes international aviation, which is unlikely to be included in Europe's emissions trading structure before 2013, the EU or national governments may tax aviation emissions in the meantime. The UK government, which has the most ambitious GHG reduction targets and is due to publish an Aviation White Paper next month, is likely to propose higher aviation taxes as the *quid pro quo* for more runways.

This document focuses on the impact of aviation on climate change through the emission of greenhouse gases, the possible policy solutions and their impact on the airlines and airport operators.

Fastest-growing source of emissions

On the face of it, aviation accounts for a small proportion of EU greenhouse gas (GHG) emissions. However, emissions from international flights are excluded from the official figures and take no account of radiative forcing (see explanation later). In reality, aviation is the fastest-growing source of greenhouse gases and stands out as a target for policymakers, particularly in countries with ambitious GHG reduction targets such as the UK.

Aviation White Paper

Before the end of the year the government will release a White Paper setting out air transport policy for the next 30 years. We expect it to open the door to new runways in London and Birmingham, but also to make clear that aviation must cover its external costs. This would clear a path for an £550- 800m hike in Air Passenger Duty (APD) or a new £1.5bn emissions charge on the airlines as soon as next year.

UK policy options

We believe the UK has three policy options: introduce an all new £1.5bn emissions charge, do nothing before the introduction of an EU-wide charge (which could happen as soon as 2005) or convert APD into an emissions charge. The last of these three options must be appealing: the Treasury could use the 2004 Budget to raise APD to a level that covers the climate change costs of UK aviation.

Impact of raising APD

Unlike when APD was first introduced, we expect higher charges to have an impact on the demand for air travel. This reinforces our view that airline earnings will recover more slowly than in previous cycles.

As our base case we examine the theoretical impact on volumes and earnings of a 50% increase in short-haul APD and a 75% hike in long-haul APD rates (an average increase of 64%) from next April.

The theoretical financial impact of higher or new taxes is a function of the interplay between price elasticities and margins.

The greatest *volume* impact is likely to be at the low-cost end of the market where airfares are lowest and demand elasticities are highest. This increase in APD could reduce the passenger volumes of British Airways, Easyjet and Ryanair by 2.3%, 4.8% and 7.6%, respectively.

Although the theoretical volume impact is greatest for Ryanair, its fat margins insulate the bottom line. Hence the ranking by *financial* impact is reversed. The negative earnings impact of higher APD on British Airways, Easyjet and Ryanair is 17%, 15% and 10%, respectively.

The airports are relatively defensive: our base case could reduce BAA's passenger numbers and earnings by 3% and 6%, respectively.

An EU-wide emissions charge

A new €10bn emissions charge would in theory reduce the passenger volumes of the network airlines by around 4%. The volume impact on Easyjet and Ryanair could be as much as 10% and 19%, respectively.

BA, Lufthansa and Iberia could see earnings fall over 20% if an emissions charge is introduced. Using the same assumptions, Air France could experience an earnings decline of as much as 80%.

We estimate that the volume impact of a €10bn emissions charge that *replaces* APD in its current form would reduce the volumes of BA, Easyjet and Ryanair by only 1.6%, 3.3% and 5.8%, respectively.

The financial impact of these volume reductions is also correspondingly lower: the theoretical earnings impact being 9% for both BA and Ryanair and 12% for Easyjet.

The scale of the earnings impact suggests a charge may be introduced in stages. If a charge of only €5bn is levied initially, the financial impact would be approximately half these levels.

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The case for emissions charges: the EU perspective

On the face of it, aviation accounts for a small proportion of EU greenhouse gas emissions. However, emissions from international flights are excluded from the official figures and take no account of radiative forcing. In reality, aviation is the fastest-growing source of GHGs and stands out as a target for policymakers, particularly in countries with ambitious GHG reduction targets such as the UK.

Different kinds of environmental impact

The environmental effects of aviation are usually broken down into four categories:

- Aircraft noise near airports
- Air quality near airports
- Surface traffic and congestion generated by airlines and their passengers
- The impact of aviation on climate change

Aviation's impact on climate change is at the top of the political agenda

Airlines obviously have an impact on noise levels, air quality and traffic volumes around airports but global warming is the issue at the top of the environmental agenda and hence it is the impact of aircraft emissions on climate change that is currently judged the most serious issue by policymakers.

This document focuses on the impact of aviation on climate change through the emission of greenhouse gases, the possible policy solutions and their impact on the airlines and airport operators.

Climate change and Kyoto

Six greenhouse gases (GHGs) are covered by the Kyoto Protocol of December 1997: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. However, carbon dioxide (CO_2) is the most important, accounting for over 80% of greenhouse gas emissions. As a result, the emissions of all greenhouse gases are measured and quoted in terms of CO_2 equivalents.

Contrails contribute to global warming but are not covered by the Kyoto Protocol

An important natural GHG that is not covered by the protocol is water vapour. Aircraft flying at altitude produces contrails, which consist of water vapour and have the effect of increasing cloud cover. This in turn contributes to global warming.

Developed countries as a whole agreed to a 5% reduction in greenhouse gases from 1990 by 2010. The EU agreed to cut emissions to 8% below 1990 levels by 2010 (although so far a reduction of only 2% has been achieved and the EEA forecasts a reduction of only 5% by 2010).

The European Commission targets further reductions of 1% per annum up to 2020 but these targets have no legal status. Similarly, several national governments have their own targets. For example, the UK government has promised a 60% reduction in carbon emissions by 2050, the largest reduction promised by any country.

Officially aviation has a small share of emissions

Air transport accounted for 0.8% of EU emissions in 2000

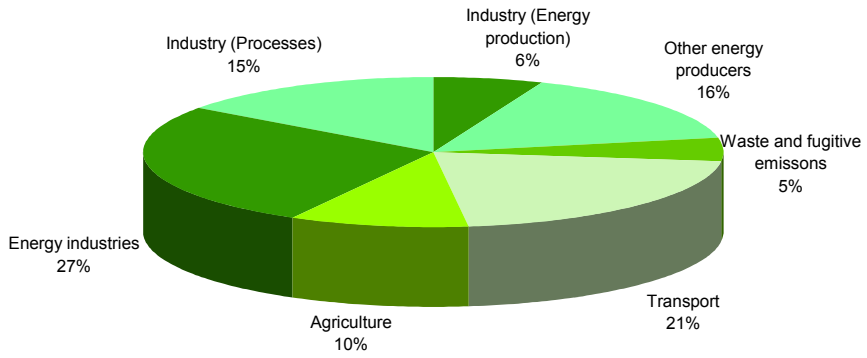
As the table below illustrates, transport was responsible for 21% of EU GHG emissions in 2000. 92% of these emissions were generated by the various forms of road transport and 'air transport' accounted for only 4% of EU transport emissions and a mere 0.8% of the total EU GHG inventory.

Transport's share of total emissions

Source of emissions	1990	(%)	2000	(%)	% change 2000 vs 1990
Transport	711	17.0	850	20.9	20
- of which 'air transport'	**27**	**0.6**	**33**	**0.8**	**25**
Agriculture	NA	NA	407	10.0	NA
Energy Industries	NA	NA	1098	27.0	NA
Industry (Processes)	NA	NA	610	15.0	NA
Industry (Energy production)	NA	NA	244	6.0	NA
Other energy producers	NA	NA	651	16.0	NA
Waste and fugitive emissions	NA	NA	207	5.1	NA
Other sectors	**3481**	**83.0**	**3217**	**79.1**	**(8)**
Total emissions	**4192**	**100.0**	**4067**	**100.0**	**(3)**

Source: EEA

Transport's share of total emissions



Source: EEA

But official figures exclude international flights

But official figures exclude emissions from international flights

However, this inventory of GHGs only includes the emissions of domestic flights as international air transport and international shipping are excluded from the Kyoto reduction targets (although parties to the protocol are still expected to act to limit or reduce emissions from these sources by working through the International Civil Aviation Organisation and the International Maritime Organisation, respectively).

As the table below illustrates, including international aviation and shipping implies aviation was responsible for 14% of carbon dioxide emissions from transport sources in 2000 (carbon dioxide accounts for 98% of GHGs generated by transport and therefore is a reasonable proxy for total emissions).

Transport emissions of carbon dioxide: 1990, 2000, 2010E

Source of emissions (CO_2 MT)	1990	(%)	2000	(%)	2010E	(%)
Road transport	630	90.7	755	91.7	812	90.4
Rail	8	1.1	6	0.7	2	0.2
Inland navigation	20	2.9	18	2.2	27	3.0
Domestic air transport	26	3.8	34	4.1	45	5.0
Other transport	10	1.5	11	1.3	12	1.3
Total transport (excluding international)	**695**	**100**	**823**	**100**	**898**	**100**
International air transport	55		101		135	
International shipping	100		130		155	
Transport (including international)	**850**		**968**		**1091**	
Aviation share of CO_2 from transport sources						
Domestic air transport	26	3.1	34	3.5	45	4.2
International air transport	55	6.5	101	10.4	135	12.4
Total aviation	**82**	**9.6**	**134**	**13.9**	**181**	**16.6**
Aviation share of GHGs from all sectors						
Aviation	84	1.9	139	3.3	186	4.5
Surface transport	792	18	859	20	938	23
Other sectors	3,481	80	3,217	76	3,022	73
Total	**4,357**	**100**	**4,215**	**100**	**4,147**	**100**

Source: EEA, DrKW Equity research estimates

Even including emissions from international flights, aviation's share of EU-wide GHGs was only 3.3% in 2000. However, its emissions had increased by 65% compared to 10 years earlier, and the European Energy Agency forecasts a further 14% increase in aviation emissions by 2010, by which time aviation should account for 3.9% of total EU emissions. This would equate to a doubling in its share of emissions since 1990 but still does not sound like a level that demands immediate action from policymakers.

Aircraft emissions are generally expected to grow by 3% per annum

We believe, however, that the EEA forecast (which represents emissions growth of just over 1% per annum) is very conservative. In general, global passenger volumes are expected to grow 5% per annum and aircraft emissions by 3% per annum, reflecting gradual improvements in aircraft fuel efficiency and a gentle upward trend in load factors.

This methodology suggests EU aviation emissions will rise 35% between 2000 and 2010 and will account for 4.5% of GHG emissions at that date.

Radiative forcing

Impact of emissions is magnified by radiative forcing

More importantly, any estimate of the climate change impact of aviation has to take account of radiative forcing. As the following section on the UK situation illustrates in more detail, the impact of CO_2 emissions is magnified by a range of secondary emissions and their specific effects at altitude.

Experts estimate the total impact of aviation emissions on climate change by multiplying the volume of CO_2 released by 2.7. This is known as the *radiative forcing index*.

Fastest growing source of GHGs

EU situation

Aircraft emissions are a major issue for the EU

Not surprisingly, the longer the perspective, the more alarming the growth in aviation emissions appears. Unfortunately there is a dearth of detailed long-term forecasts at the EU level but with an Aviation White Paper due out before the end of the year, there are detailed forecasts relating to the situation in the UK.

Applying the UK emissions growth rates to EU emissions (not unreasonable given the UK economy in many ways is close to the EU average) and comparing them to targeted reductions of 8% by 2010 and an 'aspirational' target reduction of 1% per annum thereafter, gives an indication of the scale of the problem at an EU level.

EU CO_2 emissions, including radiative forcing, 1990 - 2050

	Aviation emissions (CO_2 MT)	Average growth rate (%)	EU total emissions (CO_2 MT)	Average annual growth rate (%)	% of EU total
1990	227		4357		5
2000	375	5.2	4215	(0.3)	9
2010	502	3.0	3878	(0.8)	13
2020	675	3.0	3507	(1.0)	19
2030	864	2.5	3172	(1.0)	27
2050	950	1.0	2868	(1.0)	33

Source: EEA, DrKW Equity research estimates

Allowing for radiative forcing implies aviation produced 9% of GHG emissions in 2000 and that this proportion will rise to 13% by 2010 and 33% by 2050.

The UK situation

The UK government has the most ambitious emissions reduction targets

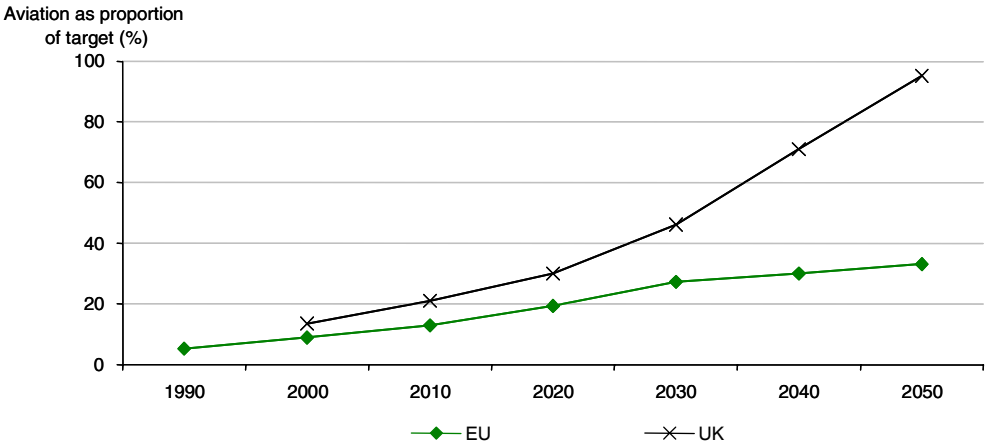
The UK situation (examined in detail in the following section) is more serious than the EU in general because the UK government has announced its intention to reduce emissions from all sources by 60% by 2050. No other EU country has such an ambitious target, but the UK predicament illustrates the problem faced by the rest of Europe:

- The UK government expects aviation emissions to rise 83% by 2020 (a growth rate of 3% per annum) and 130% by 2030.
- Excluding radiative forcing, aviation will account for 11% of targeted emissions in 2020, 17% in 2030 and 35% in 2050.

- *Including* radiative forcing, aviation would account for 30% of targeted emissions in 2020, 46% in 2030 and 95% in 2050!

The last of these figures suggest the government's GHG reduction target is more than just ambitious!

Aviation's share of total emissions, 1990-2050E



Source: DfT. EEA, DrKW Equity research estimates

Taking radiative forcing into account identifies aviation as the fastest growing source of GHGs and, with the biggest polluters (industry and power generators) steadily reducing their emissions, the inexorable growth in aviation emissions has captured the attention of policymakers.

Emissions charges are on the way

A political consensus is emerging in Europe

So what are policymakers planning to do about rising aviation emissions? International obligations of the EU and member countries limit the scope for action: international aviation is unlikely to ever be included within the Kyoto Protocol because it is assumed the US would block such a move.

Similarly, the EU recently rejected a plan to tax aviation fuel but only because it would require changing the Chicago Convention, a move that other countries (notably the US) would almost certainly block.

The German government is also keen to raise aviation taxes for environmental reasons. It recently shelved a plan to charge VAT on the proportion of international flights that were within German airspace on the grounds that it would penalise German carriers.

Individual airports and local governments across Europe are gradually introducing environmental charges of their own. A more coordinated approach across the EU seems both desirable and inevitable.

Why not simply tax aviation growth?

Aviation emissions are rising because there is no sign of a leap in technology that would enable aircraft to fly without burning fossil fuels and the demand for air travel keeps rising. Therefore why not simply tax air travel such that it stops growing?

The problem with this is that such a tax would have to be so high that the political repercussions would be unacceptable. An ICAO study estimated that a fuel tax of between 800-900% would be necessary just to halve the *growth rate* in emissions.

Given that aviation fuel accounts for 10% of airline operating costs, this implies a near doubling in the cost of air travel. No democratic government in the world could successfully implement such a tax that could even be seen as an assault on an individual's right to travel.

Economic instruments

The UK Aviation White Paper is likely to make clear that aviation must cover its external costs. This would leave the door open for the Treasury to introduce an emissions charge next year. Alternatively the government may choose to wait until its EU presidency in 2005 to oversee the introduction of an EU-wide charge.

An EU study proposes two alternatives to a direct tax on aviation fuel

Following the failure of its plan to tax aviation fuel, the EU is also examining the possibility of using economic instruments (taxes or charges) that would force airlines to cover the environmental cost of their emissions and encourage the use of cleaner aircraft.

The EU-commissioned CE Delft study proposes two alternatives:

- An **environmental charge** that would raise between €1-9bn depending upon the financial valuation of emissions. The revenue raised could be allocated to member states or invested in abatement measures by the EU.
- A more complicated scheme based on a **Performance Standard Incentive (PSI).** Such a scheme would be designed to be revenue neutral and still provide an incentive for airlines to reduce their emissions.

Both would favour the more fuel-efficient airlines

Under the first alternative, aircraft would incur a charge proportional to the amount of emissions discharged within EU airspace. Airlines with relatively fuel-efficient fleets and high load factors would pay the lowest charges per passenger.

Under the second alternative, fuel-efficient airlines could beat the PSI and hence receive credits whilst airlines with older, less fuel-efficient fleets operating at low load factors would be penalised. The size of this financial penalty would clearly depend upon the PSI level set. This would essentially be a political decision.

A PSI scheme could be similar to the planned EU-wide emissions trading system (which comes into operation in 2005). If the PSI level set reflected the clearing price of CO_2 within the EU-emissions trading scheme it could be relatively easy for PSI to be rolled into this system from 2008 or 2013.

The relative merits of different charging systems are discussed in more detail later.

Emissions trading

There are a number of legal and practical obstacles to the integration of aviation into the EU emissions trading scheme:

- Emissions from international aviation have not yet been legally allocated to individual countries
- Aviation's non- CO_2 effects are not yet legally designated as climate impacts under the Kyoto Protocol
- It is not yet possible to accurately quantify the contrail impact of any given flight

Negotiations for the second commitment period ('Kyoto 2'), which starts from 2013, do not even start until 2005. Hence we doubt emissions from international aviation can be included in the EU emissions trading scheme before 2013.

Of course the EU could insist on emissions from intra-EU flights being included in the trading scheme sooner than this. Some commentators believe partial integration of intra-EU aviation CO_2 and NOx emissions with EU emissions trading is possible from 2008.

However, the legal allocation of emissions to country governments would remain an issue that the EU may not wish to prejudge. Also the exclusion of the non- CO_2 effects of aviation would undermine such a scheme.

Those pushing for inclusion in the EU emissions trading scheme know that it would be fraught with legal and practical pitfalls. We see this as a thinly disguised attempt to delay the cost increases necessary for aviation to cover its climate change costs.

We believe full integration of aviation into the EU emissions trading scheme is likely but probably not until 2013. In the meantime EU governments will probably want to be seen to be doing something about aviation emissions and this points directly to some kind of emissions charge.

Conclusion

Airlines could face an EU-wide emissions charge in 2005

We see an EU-wide consensus emerging on the issue of aviation emissions and are convinced that the airlines will face some form of EU-wide emissions charge, possibly as early as 2005.

As the following section illustrates the UK is particularly keen to make sure that aviation covers its external costs. We suspect the UK will try to introduce an EU-wide environmental charge as part of its EU Presidency in 2005.

This charge could be based on the UK's Air Passenger Duty, aimed at raising an amount equivalent to the environmental cost of aviation emissions and fine-tuned to broadly reflect the different emissions levels of short and long-haul flights.

Aviation could be included in the EU emissions trading scheme from 2008, but a more likely date seems to be 2013 when 'Kyoto 2' comes into effect.

The UK situation: the Aviation White Paper

Before the end of the year the government will release a White Paper setting out air transport policy for the next 30 years. We expect it to open the door to new runways in London and Birmingham but also to make clear that aviation must cover its external costs. This would clear a path for an £550-800m hike in Air Passenger Duty or a new £1.5bn emissions charge on the airlines as soon as next year.

New runways, new taxes

The UK White Paper due by year-end...

The UK government is due to publish an aviation White Paper by the end of 2003. It is expected to set out its plans for the development of air transport for the next 30 years. These will include:

- Decisions on the options for airport development and
- An environmental framework to ensure sustainable development.

Most press comment has focussed on the case for additional runways in South East England and elsewhere, but there is also an active debate about how to ensure the sustainable development of air transport.

Due to the proximity of the White Paper, this debate is more advanced in the UK than elsewhere and more specific information is available on the subject of aviation's growing impact on climate change.

New framework for airport development

... and is expected to approve the new runways

We expect the White Paper to set out the broad criteria under which the government would approve the development of new infrastructure, including new runways. Airport operators would then be able to submit development proposals that they could be confident government would approve.

There would then be a scaled-down public inquiry that would detail the conditions (in terms of ground access, local air quality and noise restrictions) under which a new runway or terminal could be built.

This new framework should be seen as an attempt to short circuit the process of approval for new airport infrastructure and stems from the Heathrow terminal five inquiry which at four years was the longest in UK history.

Profile of London airports, 2003

Airport	Passengers (m)	Share of Greater London demand %	Greater London as a % of passengers
Heathrow	63.0	55	50
Gatwick	29.6	27	40
Stansted	16.7	5	45
Luton	6.6	5	33

Source: DrKW Equity research estimates

A second hub in the South East?

The decisions regarding runway capacity in the south-east of England are essentially about where to build a second hub. The following quotes from the DfT's SERAS study make this painfully clear:

"The underlying demand that we are forecasting by 2030 would be large enough to support two large airports."

"Heathrow, even with a new runway, would not be large enough to support the hub operations of two alliances; so one alliance would need to shift to another airport."

"UK air travellers would benefit from competition between airlines (perhaps airline alliances) operating at different airports".

As the following discussion illustrates, providing capacity for the rapidly expanding low cost airlines at Stansted and Luton is relatively uncontroversial. The real issues seem to be:

- Whether to build a third runway at Heathrow
- Which airport should be developed as a second hub airport
- In what order should new runways be built

No to Cliffe and Rugby

The White Paper is unlikely to specifically approve new runways at any UK airport but we believe it will specifically rule out new airports at Cliffe to the east of London and at Rugby in the Midlands as these locations are unlikely to meet the government's criteria in terms of cost, economic benefit or environmental impact.

A third runway for Heathrow

A third runway at Heathrow is the most controversial issue

The door will be left open to other airport operators (BAA, TBI and Birmingham Airport) to submit proposals for new runways. The most controversial site for additional runway capacity is Heathrow, but we expect the criteria to be set such that BAA could be confident of government approval of a third runway there.

A scaled-down public inquiry may enable BAA to compress the entire approval process into less than three years and to have a third runway operational as soon as 2010-11.

Local air quality is a big issue at Heathrow. Perhaps surprisingly, it is this issue rather than aircraft noise that may ultimately block or delay a third runway.

The White Paper may also shed some light on the issue of Heathrow moving from single to mixed mode operations. This would at least enable the airport to make the most of the existing two runways.

Stansted: a dead cert

Environmental constraints are lowest at Stansted

We believe Stansted is the location most likely to meet the government criteria and it may ultimately develop into an airport with as many as four runways.

However, the urgency for a new runway is not as great as at Heathrow. BAA could submit a proposal towards the end of the decade with a new runway opening around 2016.

Alternatively, if a third runway at Heathrow is blocked or delayed, the first new runway may be built at Stansted. This would be less attractive to BA because it would result in more competition from the low cost airlines. It would also be more difficult to make pay: BAA's Stansted airport charges are already well below the regulatory price cap.

Gatwick: the poor relation

A new runway at Gatwick unlikely before 2019

In our opinion, Gatwick's location and constrained site make it sub-optimal for an additional runway within the next decade. It looks set to remain the poor relation to Heathrow.

Being on the right side of London for most of the UK population, with a customer base composed almost entirely of low-cost airlines and a second runway, Stansted would be on course to overtake Gatwick in terms of passenger numbers sometime around the year 2020.

Another runway at Gatwick would require the government to overturn a commitment by BAA not to build a new runway there before 2019. We believe both BAA and the government are keen to honour this agreement.

Luton: a 'no-brainer'

Luton runway extension would enable it to take pressure off both Heathrow and Stansted

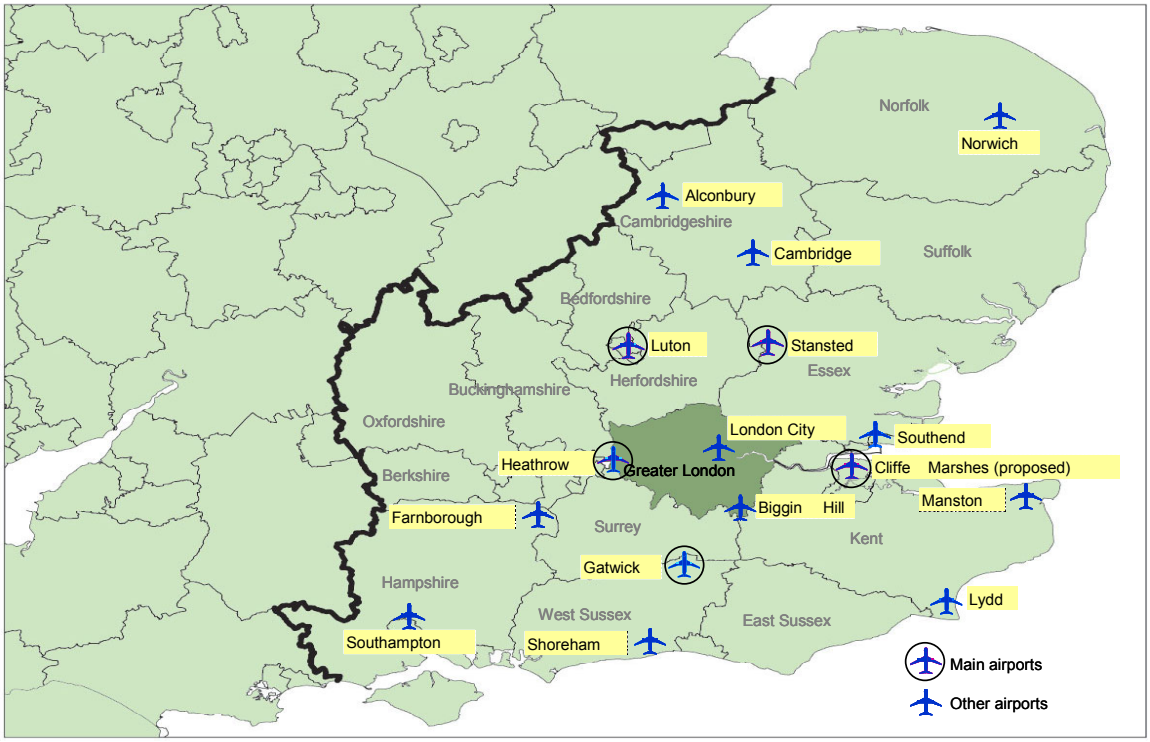
Luton airport (owned 71% by TBI) has engaged actively in the runway debate.

Possibly the most logical way to provide additional runway capacity in the London area would be to allow a 1000 metre extension of Luton's existing 2000 metre runway. This would enable Luton to be developed into a 'proper' airport capable of handling more than 30 million passengers per annum (current capacity is only about 11 million) with no need for an all-new runway or, possibly, a public inquiry.

This alternative seems to make most economic and environmental sense and Luton would finally be in a position to absorb a significant chunk of the excess demand from the Heathrow catchment area.

In the long run Luton could also develop a second runway.

Civilian airports in South East England



Source: DfT

Alternative scenarios for runway development in South East England

Year	Scenario 1	Scenario 2	Comments
2008-2012	Luton runway extension	Luton runway extension	Existing capacity 11m raised to 31m. No need for public inquiry Luton absorbs excess demand from Heathrow and Stansted
2010-2015	Heathrow 3rd runway	Gatwick 2nd runway	If 3rd runway ruled out at Heathrow, 2nd runway at Gatwick brought forward Low cost growth may result in Stansted being developed before Gatwick Gatwick the only realistic alternative hub airport
2015-2020	Stansted 2nd runway	Stansted 2nd runway	Stansted a relatively easy option due to relatively few environmental issues
2020-2030	Gatwick 2nd runway	New runways at Stansted or Luton	Gatwick agreement with local council expires 2019 Depending on demand, new runways at any of Gatwick, Stansted or Luton

Source: DrKW Equity research estimates

Stansted is an unlikely hub airport

Clearly Heathrow is the key piece in the puzzle. If the government completely rules out a third runway at Heathrow it will have to decide which other airport in the south-east should be developed as an international hub. Such an airport requires at least two runways to provide connectivity between short- and long-haul flights.

Few network airlines would choose to move into a low-cost stronghold

The low cost growth at Stansted makes it a favourite for a new runway, but this capacity would soon be filled by low cost operators and a third runway would be required for it to become a hub airport.

The question is then what airline(s) would want to develop a hub and spoke network at an airport that is a stronghold of the low cost airlines and has an inferior catchment area to Heathrow. Seeding the airport, ie, forcing a major airline (BA or BMI) to move to Stansted, seems highly improbable.

For these reasons, if a third runway is ruled out at Heathrow, Gatwick, with an existing base of full service carriers and the infrastructure to match, is still the next best alternative hub. Either way we believe Stansted will have an additional runway and Luton will be allowed to extend its existing runway, but we expect them to remain low cost airline airports.

Conclusion

Any new runway is at least eight years away

If Heathrow's environmental issues (principally relating to local air quality) can be resolved, we believe its runway will be built first. But it could still be 8-10 years before a third runway at Heathrow becomes operational. In the meantime, extending Luton's runway would enable it to take some of the pressure off Heathrow and Stansted.

A second runway at Stansted could open around 2016. Some time in the 2020s, the government would need to decide whether to develop Gatwick or Stansted into the second hub.

If a third runway is turned down at Heathrow then Gatwick appears to be a more likely second hub airport than Stansted. The government would have to overturn BAA's Gatwick agreement for this to be possible before 2019.

Political versus economic considerations

New runway capacity will be allowed but at a price

Aviation is rightly viewed as one of the UK's more successful industries. It is important in its own right and facilitates the functioning and growth of many other important sectors. We believe the government wishes to facilitate the growth in civil aviation by providing much needed runway capacity.

However, we suspect the government would also like to enhance its 'green' credentials (or at least minimise any negative impact on them). In this context, it is worth remembering that the government has committed the UK to a 60% reduction in carbon emissions by 2050, the largest reduction promised by any country.

Reconciling policies that allow new runways with its environmental aims sounds impossible, but we believe the gap could be bridged by insisting that aviation covers its external costs. This would open the door to a new charge on aircraft emissions (or a sharp increase in the existing Air Passenger Duty) as well as measures to tackle local noise and air quality issues.

Opening the door to a new charge on aircraft emissions

An emissions charge would enable the government to kill several birds with one stone. It would:

- Allow the government to approve new runways, enabling the airlines to meet rising demand for air travel from both business and leisure travellers.
- Avoid any damage to UK competitiveness that may result from air transport links becoming inferior compared to other locations.
- Demonstrate that the government requires airlines to meet the environmental (or at least the climate change) impact of their activities.
- Raise additional revenue (as much as £1.5bn per annum) to help finance planned improvements to public services.

Government's case for emissions charges

The UK government's March 2003 paper entitled *Aviation and the environment: using economic instruments*, set out four objectives for aviation:

- Aviation development should be sustainable: that is, maintain a proper balance between economic, environmental and social considerations.
- Aviation should meet the external costs of its activities: the 'polluter pays' principle.
- Economic instruments may be of use in reducing aviation's environmental impact, notably by encouraging the use of cleaner and quieter aircraft.
- Any use of these instruments should be appropriate and practical, taking account of international and European obligations, including the Kyoto Protocol.

An example of market failure

The paper sets out to express the environmental costs of aviation in **monetary terms**. It makes clear that aviation is considered an example of market failure because its environmental costs are not currently covered by the prices paid by those who benefit from aviation. This market failure justifies government intervention.

Before introducing a new tax the government would take into account its environmental, economic, distributional and competitive impacts. However, international law limits the scope of government action.

Why not just tax aviation fuel?

The clearest example of this relates to the imposition of taxes on aviation fuel. Aviation fuel (unlike petrol) is currently exempt from taxes. Environmentalists claim this is an anomaly that should be rectified; however, no form of public transport pays tax on its fuel and the airlines point out that in most EU countries electricity (which provides 70% of rail energy) is also untaxed and that road users meet only a fraction of their infrastructure costs at the point of consumption.

Similarly, across Europe some countries impose a sales tax but usually on domestic flights and at rates that vary widely. Other countries impose no sales tax at all. In the UK for instance, no form of public transport attracts VAT.

The outcome of this argument is academic because the Chicago Convention prohibits the imposition of taxes on fuel kept onboard aircraft and used for international flights. Given that most countries in the world are party to the Chicago Convention it would be very difficult to change this clause. Similarly, EU Directive 92/81/EC exempts air carriers from fuel consumed within the EU, although this could be altered to reflect any changes to the Convention.

Passenger numbers keep growing

The basic problem for policymakers is that passenger volumes keep growing. The number of passengers passing through UK airports increased almost six-fold between 1970 and 2000, an annual average growth rate of around 6% (see table overleaf).

Passenger numbers expected to triple by 2030

The government's forecasts assume some slowdown in this growth rate but the advent of low-cost airlines is likely to sustain growth for some time to come. Low-cost passengers still account for only 10% of all European short-haul passengers versus over 20% in the US. Hence the government expects passenger numbers to increase a further 180% by 2030.

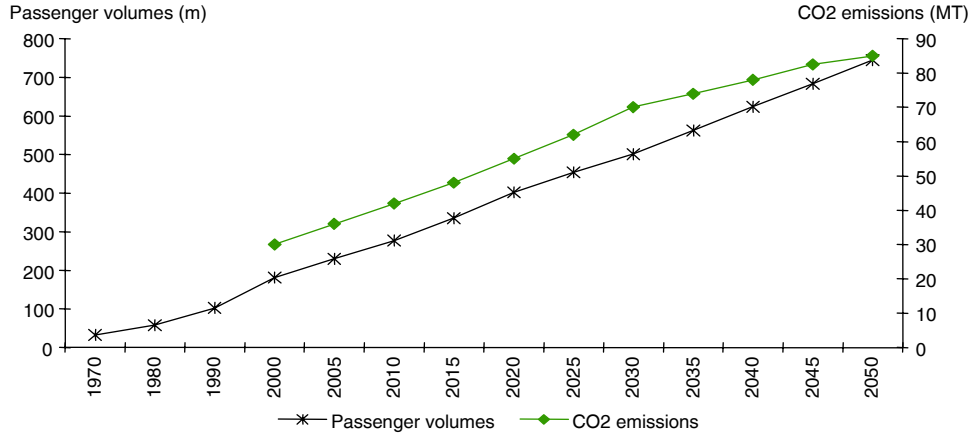
Aviation emissions are expected to grow at a slightly slower rate than passenger volumes reflecting a gradual uptrend in load factors and the replacement of older aircraft in the UK fleet with more fuel-efficient types. The government predicts aviation CO_2 emissions rising from 30m tonnes to 70m tonnes over the same 30-year period, an increase of 133%.

UK passenger volume and emissions, 1970-2050E

Year	Passengers (m)	Average growth rate (% per annum)	Aviation emissions CO_2 (MT)	Average growth rate (% per annum)
1970	32			
1980	58	6.1		
1990	102	5.8		
2000	181	5.9	30	
2005	230	4.9	36	3.7
2010	277	3.8	42	3.1
2015	335	3.9	48	2.7
2020	402	3.7	55	2.8
2025	454	2.5	62	2.4
2030	501	2.0	70	2.5
2050	744	2.0	85	1.0

Source: DfT, DrKW Equity research estimates

UK passenger volumes and emissions, 1970-2050E



Source: DfT, DrKW Equity research estimates

Whilst current production aircraft are significantly (35-40%) more fuel-efficient than aircraft built 20-25 years ago, there is no sign of a step change in technology that would dramatically improve fuel efficiency and hence reduce the growth in emissions.

Government emissions targets

Under the Kyoto agreement the UK agreed to cut its emissions by 8.5% by 2010 (from 1990 levels). Last year the government went further and announced its intention to reduce emissions from all sources by 60% by 2050. No other EU country has such an ambitious target and this target conflicts sharply with the predicted growth in aviation volumes and emissions.

Aviation emissions forecast to rise 130% by 2030

As already mentioned the government expects aviation emissions to rise 83% by 2020 (a growth rate of 3% per annum) and 130% by 2030. This implies aviation will account for 11% of targeted emissions in 2020 and 17% in 2030.

Aviation emissions forecasts, 2000-50E (excluding radiative forcing)

Year	Aviation emissions (CO_2 MT)	UK total emissions[1] (CO_2 MT)	% of UK total
2000	30	602	5
2020	55	495	11
2030	70	410	17
2050	85	241	35

[1]Extrapolating UK government 60% emissions reduction target
Source: DfT, DrKW Equity research estimates

Extrapolating the government's forecasts beyond 2030 to 2050 (assuming passenger volume growth of 2% per annum and emissions growth of 1% per annum) suggests that aviation will account for 35% of targeted emissions in 2050.

Radiative forcing again

However, these targets take no account of radiative forcing. This phenomenon describes how the impact of CO_2 is magnified by a range of secondary emissions and their effects at altitude.

As the following table illustrates, *including* radiative forcing, aviation would account for 30% of targeted emissions in 2020, 46% in 2030 and 95% in 2050. The last of these figures suggest the government's GHG reduction target is more than just ambitious!

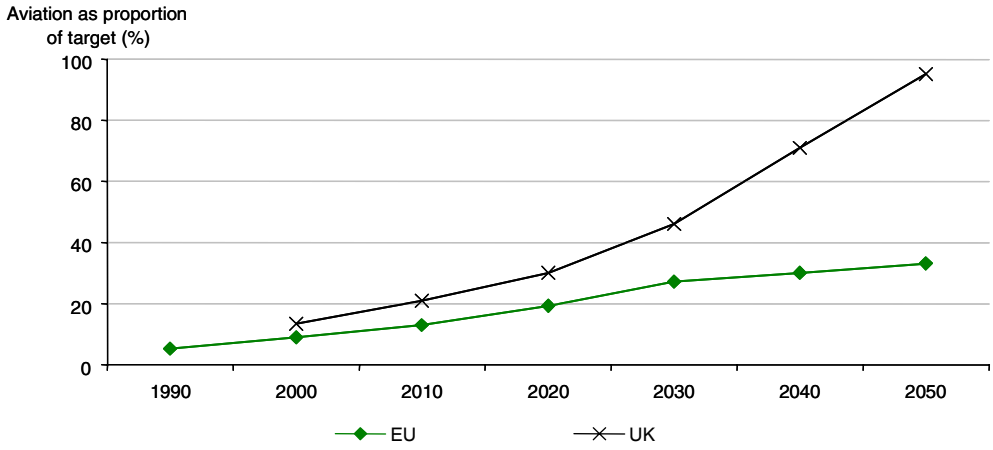
Even ignoring radiative forcing, aviation is the fastest growing source of GHGs. Growth in aviation emissions threaten to undermine emission reduction targets long before 2050.

Aviation emissions forecasts, 2000-50 (including radiative forcing)

Year	Aviation emissions (CO_2 MT)	UK total emissions[1] (CO_2 MT)	% of UK total
2000	81	602	13
2020	149	495	30
2030	189	410	46
2050	230	241	95

[1]Extrapolating UK government 60% emissions reduction target
Source: DfT, DrKW Equity research estimates

Aviation's share of total emissions, 1990-2050E



Source: DfT. EEA, DrKW Equity research estimates

Aviation emissions in monetary terms

This section describes the methodology behind calculating the cost of the environmental damage caused by aviation emissions. This is important because this cost is the amount that the government will look to raise via a new emissions tax.

Aircraft engines emit carbon dioxide (CO_2) and nitrogen oxides (NOx). CO_2 is a greenhouse gas and NOx results in ozone (also a GHG) and both contribute to global warming.

Carbon dioxide is the key GHG

Carbon dioxide is the main GHG

The aviation emission for which external costs can be most easily calculated is CO_2. Burning one tonne of aviation fuel produces 3.15 tonnes of carbon dioxide. The monetary cost of climate change caused by CO_2 is evaluated by calculating the amount of *carbon* produced and multiplying this by an estimate of the cost per tonne of carbon released.

In this discussion, it is also important to note the difference between *carbon* and *carbon dioxide* (3.67 tonnes of carbon dioxide are equivalent to one tonne of carbon).

As already mentioned, the total impact of all aviation emissions on climate change is estimated by applying a *radiative forcing index* of 2.7.

Cost of carbon

The *cost of carbon* refers to the cost to society of climate change effects caused by releasing carbon into the atmosphere in the form of carbon dioxide. Various studies have been undertaken (all using different methodologies) to estimate the cost of global environmental damage caused by climate change and then relating this to the amount of carbon released as CO_2. This gives a cost per tonne of carbon.

The government uses a figure of £70 per tonne (2000 prices) in line with that recommended by a DEFRA paper, which reviewed these studies. DEFRA also recommended using a range of £35-140 per tonne of carbon and raising the cost per tonne by £1 per tonne in real terms from the year 2000.

Calculating climate change costs

Using this methodology and assuming the UK contribution from international trips is half the effect of the whole trip, it is possible to calculate the climate change costs of UK aviation.

Climate change costs expected to rise from £1.4bn to £4.8bn

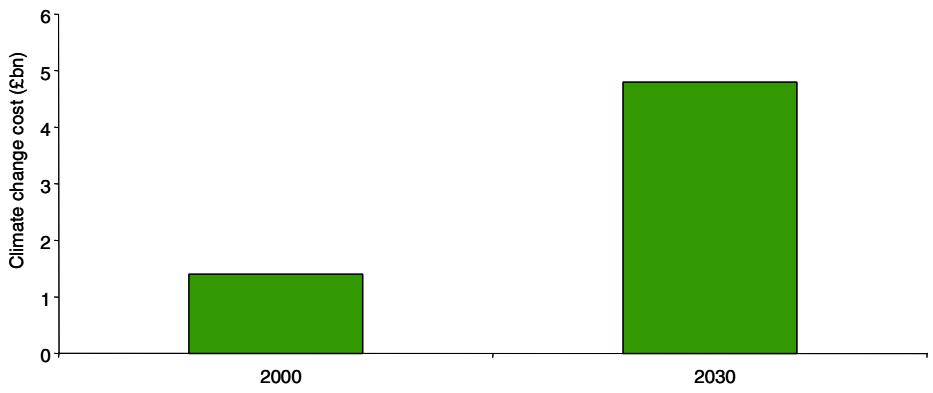
As mentioned earlier, the government estimates that the amount of carbon dioxide emitted by passenger flights in 2000 was 30 million tonnes, equivalent to 8.2 million tonnes of carbon.

Climate change cost of UK passenger flights, 2000 and 2030

Year	Carbon emitted (m tonnes)	Radiative forcing index (multiple)	Effective carbon (m tonnes)	Cost of carbon (£ per tonne)	UK cost (£bn)
2000	8.2	2.4	20	70	1.4
2030	19	2.5	48	100	4.8

Source: DfT

Climate change cost of UK aviation, 2000 and 2030



Source: DfT

Applying the radiative forcing index (an average of 2.4 when allowing for different emissions rates during landing and take-off) and assuming a cost of carbon of £70/tonne, implies a total climate change cost from UK aviation of £1.4bn.

The table above illustrates how carbon emissions are expected to rise to 19 million tonnes by 2030. This is equivalent to effective emissions of 48MT, which, at a cost of £100 per tonne, amounts to a cost of £4.8bn.

The UK government could use these figures to justify a new emissions charge that would generate about £1.5bn initially, rising towards £5bn 30 years from now. Alternatively, the government could finally recognise APD as an environmental charge and increase it to a level that raises a total of £1.5bn, an increase in the aviation 'tax burden' of around £800m.

Revision likely

The Aviation White Paper is likely to revise some of these figures, but we suspect that the estimated total cost of emissions is likely to be in the range of £1.0-1.5bn.

It has been suggested that the government should assume a lower cost of carbon in its calculations and that aviation's radiative forcing index should adjusted to those of other forms of transport.

These changes would reduce the cost of £1.4bn quoted by the government, but this is likely to be largely offset by assuming a higher radiative forcing index for aviation.

Case against an emissions charge

Charges are unlikely to result in lower emissions

Faced with the possibility of a new £1.5bn charge, the airline industry has been lobbying hard:

- The airlines argue that they already make an £810m contribution to their environmental costs through the existing Air Passenger Duty. To be fair to the airlines, APD was referred to as an environmental tax when it was originally introduced and is listed as such in the Treasury's Red Book.
- Although APD is levied on all passengers departing a UK airport (irrespective of the nationality of the airline), it does have a disproportionate effect on UK-based carriers. They argue the government should avoid increasing this competitive disadvantage.
- The airlines also argue that with aircraft fuel accounting for up to 20% of direct operating costs (and 10% of total costs) there is already a strong incentive for airlines to be fuel efficient and hence reduce emissions.
- Rolls Royce has produced a forecast of the profile of the UK fleet that shows it will be almost entirely composed of the most fuel-efficient aircraft by the end of the Kyoto period (2012). Therefore there is no case for additional measures to push the airlines to reduce emissions.

- Furthermore, any emissions charge that targets CO_2 may be counterproductive because it could encourage engine technologies that produce higher NOx emissions or cruise altitudes that generate more water vapour (contrails) that also contribute to global warming.

Conclusions

We believe the Aviation White Paper will open the door to new runways at Heathrow, Stansted, Luton and Birmingham. This would be positive news for both BAA and TBI.

The *quid pro quo* for providing aviation with the infrastructure it needs to grow would be an assertion that the industry must cover its external costs.

This would allow the Treasury to introduce a new £1.5bn emissions tax, on top of the £810m already raised from APD, as soon as next year.

Alternatively, the airlines (supported by the DfT) may convince the Treasury to accept that APD *is* an environmental charge. In this case the Treasury may simply fine-tune and increase the APD to a level where it raised a sum equivalent to aviation's external cost of £1.5bn.

The government may use the White Paper to announce its intention to push for an EU-wide emissions charge that could be introduced as soon as 2005. This charging system could be based on the revised APD.

The UK accounts for 21.6% of EU aviation emissions implying an EU-wide charge could raise as much as £7bn (€10bn).

Aviation could be included in the EU's emissions trading system from 2008. Though at this stage it is unclear how this could be combined with a system of emissions charges.

UK policy options

We believe the UK has three policy options: introduce an all new £1.5bn emissions charge, do nothing before the introduction of an EU-wide charge or convert Air Passenger Duty into an emissions charge. The last of these three options must be appealing. The Treasury could use the 2004 Budget to raise APD such that it covered the climate change costs of UK aviation.

Alternative scenarios

APD likely to be raised by between 50-100%

The UK situation is complicated by the proximity of the Aviation White Paper, the existence of APD and the government's ambitious emissions reduction targets. In the near term, we foresee three potential scenarios for the UK's emissions charge policy:

- **An all-new emissions charge:** The UK could introduce an all-new £1.5bn emissions charge of its own in 2004, with a view to extending it to the rest of the EU in 2005.
- **The wait and see approach:** The UK could leave APD unchanged and await the introduction of an EU charge.
- **Convert APD into an emissions charge:** The Treasury could raise APD to a level equivalent to the White Paper's estimate of the cost of UK aviation emissions. This would require explicit acceptance that APD is an environmental charge.

We attach the lowest probability (10%) to the first scenario. This is because it would require the UK to pre-judge the structure of an EU emissions charge and we believe the negative competitive impact on UK airlines would be considered too great. We examine the impact of an EU-wide charge in the following section.

From the government's point of view, the second scenario (30% probability) is attractive in as far as it leaves all the options open. In particular, the UK would be free to concentrate on promoting and shaping an EU charging scheme. Moreover, it would enable the Treasury to continue arguing that APD is not an environmental tax, leaving it free to receive whatever revenues flow from an EU-wide emissions charge as well.

We consider scenario three the most likely (60%) because there cannot be absolute certainty about the timing or level of income that might be generated by an EU scheme and converting APD into an environmental charge would produce additional revenues immediately.

We also believe APD provides a strong template for an EU-wide charge. It could be promoted by the UK next year and introduced as soon as 2005 (see section on an EU-wide charge).

The airline industry is pushing the government to do nothing at this stage, but we believe the government sees aviation as under-taxed and a soft target for much needed additional revenues.

Converting APD into an emissions charge

Replacing an indiscriminate consumer tax with a more politically palatable 'green' tax must seem an attractive proposition to government. We also believe it could sound attractive to the Treasury, which has so far resisted recognising APD as an environmental tax:

- Receipts from APD will decline again this year. The decline last year reflected moving passengers departing UK airports on routes to Switzerland, Turkey, Norway and EU candidate countries to the discounted rate of £5 (from the standard rate of £20). But this only happened in November 2002 and therefore the tax may provide the Treasury with as little as £750m in 2003.
- The government's current estimates of the cost of UK aviation emissions justify raising £1.5bn from APD now, rising steadily to £4.8bn in 2030.

To understand how APD might be changed into an emissions charge it is first necessary to examine how APD works currently.

APD at the moment

APD currently raises about £800m a year

The table overleaf illustrates the structure of APD. It is a tax levied on all passengers *departing* a UK airport and raised a total of £807m in the FY2003 financial year. No less than 82% of the revenues from APD are generated by leisure travellers, 45% to destinations outside the EEA, 37% to destinations within the EEA.

Analysis of air passenger duty, FY2003

2002-03	Leisure	Business	Total
Passengers (m)			
EEA	59.4	3.3	62.7
Non EEA	18.4	2.7	21.1
Total	**77.8**	**6.0**	**83.8**
Breakdown (%)			
EEA	95	5	75
Non EEA	87	13	25
Total	**93**	**7**	**100**
Rate (£ per passenger)			
EEA	5	10	5.26
Non EEA	20	40	22.59
Total (yield per pax)	**8.54**	**23.57**	**9.63**
Revenues (£m)			
EEA	297	33	330
Non EEA	367	109	476
Total	**664**	**142**	**807**

Source: HM Customs and Excise

As the table below illustrates, APD has been a useful source of revenue for the Treasury. It was introduced in 1994 and doubled in 1997, with no discernable impact on passenger volumes.

APD is yielding less and less although emissions keep rising

However, lower passenger numbers since '9-11' and the extension of the lower band rate to passengers departing to Switzerland, Turkey and Norway and EU accession countries in November 2003 have led to revenues falling from £931m in 2000 to possibly £775m this year (half the government's estimate of the cost of aviation emissions).

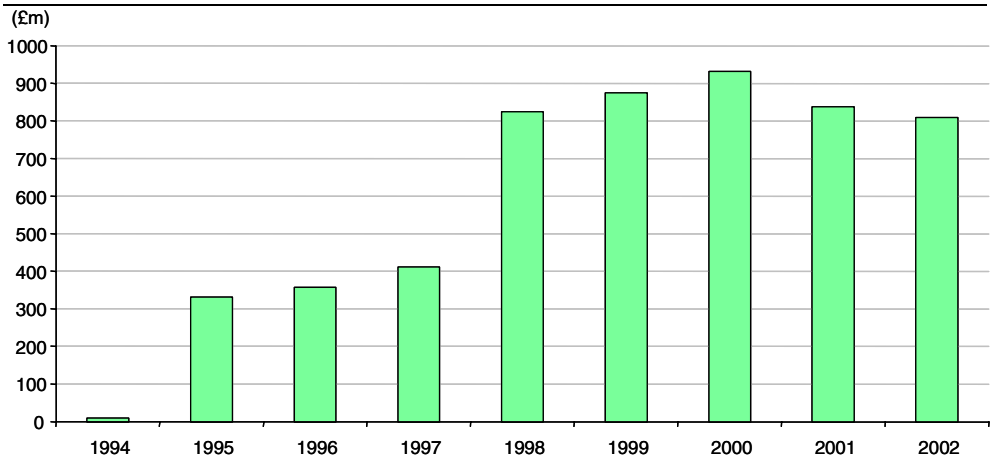
The latter change sees around five million passengers moving from the Non-EEA band to the EEA band. This amounts to a revenue loss of £75m from the non-EEA category and a £25m gain to the EEA category.

A profile of Air Passenger Duty, 1994-2002

Calendar years	Terminal pax (m)	Departing pax (m)	Exemptions (m)	Taxable pax (m)	Treasury receipts (£m)	Tax yield (£/pax)
1994	122	61	8	53	9	0.17
1995	130	65	9	56	331	5.90
1996	136	68	9	59	357	6.07
1997	147	73	10	64	411	6.47
1998	159	79	11	69	824	11.98
1999	168	84	11	73	875	12.01
2000	180	90	12	78	931	11.96
2001	181	91	12	78	837	10.68
2002	189	94	11	84	810	9.67

Source: HM Customs and Excise, DrKW Equity research estimates

Revenues from air passenger duty, 1994-02



Source: HM Customs and Excise

Analysis of air passenger duty, FY2004E

2003-04E	Leisure	Business	Total
Passengers (m)			
EEA	66.5	3.4	69.9
Non EEA	14.8	2.8	17.6
Total	**81.3**	**6.2**	**87.5**
Breakdown (%)			
EEA	95	5	80
Non EEA	84	16	20
Total	**93**	**7**	**100**
Rates (£ per passenger)			
EEA	5	10	5.24
Non EEA	20	40	23.18
Total (yield per passenger)	**7.73**	**23.55**	**8.85**
Revenues (£m)			
EEA	333	34	367
Non EEA	296	112	408
Total	**629**	**146**	**775**

Source: HM Customs and Excise, DrKW Equity research estimates

APD receipts need to double

With APD expected to raise £775m in FY2004, the rate per passenger basically needs to double for revenues to reflect the government's £1.4bn estimate of the emissions costs of UK aviation (bear in mind the figure of £1.4bn was an estimate for 2000, so the estimate for 2004 is likely to be £100-200m higher).

Long haul versus short haul

Using the same methodology as that used for the entire industry, it is possible to calculate the climate change costs of specific flights. The table below illustrates the figures presented by the DfT for typical long-haul and short-haul flights. This exercise assumes:

- One tonne of aviation fuel is equivalent to 3.15 tonnes of CO_2 emissions
- The CO_2 released is scaled up by 2.7x to account for radiative forcing
- 3.67 tonnes of CO_2 equals one tonne of carbon
- The cost of one tonne of carbon is £70 (see page 21)

Climate change costs for typical long and short-haul flights

Flight	Distance (nautical miles)	Fuel consumed (tonnes)	CO_2 emitted (tonnes)	Including radiative forcing (tonnes)	As carbon (tonnes)	Total cost (£)
Long haul	3724	74.1	233.4	630	171.7	12021
Short haul	599	3.5	11	29.7	8.2	566

Source: DfT

In this way it is possible to calculate the climate change cost of typical long and short-haul flights as being £12,021 and £566, respectively.

Climate change costs vary widely between long-haul and short-haul flights

Given that the capacity of these aircraft is known, a load factor assumption is all that is required to calculate the emissions cost per passenger on these flights. The table below illustrates how the climate change costs of a long-haul passenger (£35) are almost six times higher than those of short-haul passengers (£6).

Climate change costs for typical long- and short-haul passenger

Flight	Total cost (£)	Aircraft capacity Pax	Load factor assumed (%)	Passengers on board Pax	Cost per passenger (£)
Long haul	12021	410	85	349	34.5
Short haul	566	141	65	92	6.2

Source: DfT and DrKW Equity research estimates

These figures imply that short-haul passengers are already substantially covering their climate change costs by paying an APD of £5/£10, but that long-haul passengers are falling well short.

Long-haul rates up 75%, short-haul up 50%

For this reason we suspect the long-haul rates could be raised 75% to £35 (from £20) and £70 (from £40). This could enable revenues from long-haul passengers to rise to £741m in FY2005 (from £476m in F2003) (see table overleaf).

However, leaving the short-haul rates unchanged would leave the government well short of its target receipts of £1.5bn. Raising the short-haul APD rates could be justified on the grounds that most exemptions from APD are short-haul transfer passengers.

Therefore we assume the EEA rates rise 50% to £7.5 and £15 per departing passenger. The table shows how this would enable receipts from short-haul passengers to reach £591m in FY2005.

The higher rates paid by business class travellers are justified on the grounds that business class passengers on average occupy twice the space of economy class passengers (1.5x on short haul, 2.5x long haul). These differentials are unlikely to be adjusted.

Analysis of air passenger duty, FY2005E

2004-05E	Leisure	Business	Total
Passengers (m)			
EEA	71.9	3.5	75.3
Non EEA	15.4	2.9	18.3
Total	**87.2**	**6.4**	**93.6**
Breakdown (%)			
EEA	95	5	80
Non EEA	84	16	20
Total	**93**	**7**	**100**
Rates (£ per passenger)			
EEA	7.5	15	7.85
Non EEA	35	70	40.52
Total	**12.35**	**39.97**	**14.23**
Revenues (£m)			
EEA	539	52	591
Non EEA	539	202	741
Total	**1078**	**254**	**1331**

Source: DrKW Equity research estimates

These changes amount to an increase of 64% in the average rate of APD. We estimate that it would take total revenues from APD to £1331m, a useful step towards the government's climate change cost estimate.

Raising APD seems more likely outcome than introducing an all-new charge

In the following section we also model the impact of a straightforward doubling in all the APD rates (APD raising £1634m) and an all-new tax raising £1.5bn on top of what is currently raised by APD.

We believe the four rating bands will be raised in a way that reflects the relative emissions costs of short and long haul, business and leisure passengers. Our base case is that the short-haul rates of APD will be raised 50% and the long-haul rates will be raised 75% (a weighted average increase of 64%).

Financial impact of higher APD

Unlike when APD was first introduced, we expect higher charges to have some impact on the demand for air travel. Thus the probability of emissions taxes reinforces our view that the recovery in airline earnings will be relatively slow. The greatest volume impact could be experienced in the low-cost segment, where the percentage impact on fares will be highest and price elasticities are highest.

Demand impact of a charge

Depending upon whether the government chooses to double APD or introduce a new emissions charge, the airline industry is facing an additional tax burden of between £800m and £1.5bn, respectively.

This tax is likely to be collected by the airlines on behalf of government, as is the case with APD. This would have the effect of raising the average ticket price by between 5% and 10%.

We make the following assumptions:

- None of the additional taxes are absorbed by the industry
- Net prices, before taxes and charges, drive overall demand levels

Price elasticities of demand

Volume impact a function of average fare levels and demand elasticities

The price elasticity of demand in the airline industry is generally considered to be around minus one. However, the range of elasticities is wide from below minus 0.5 in premium cabins to above minus 2.5 at the bottom end of the leisure market.

HM Customs and Excise accept the view of Oxford Economic Forecasting that business class elasticity is minus 0.5 and leisure elasticity average minus 1.5.

Can an emissions charge be absorbed?

As mentioned in the previous section, when APD was introduced in 1994 and then doubled in 1997, there was no discernable impact on volume growth. The airlines contend that they absorbed the additional tax, but it is worth noting that:

- Market conditions were stronger than at present
- Airline earnings were higher and rising
- Low-cost airlines were a less significant force
- Average fare levels were significantly higher than they are now
- Consumers have become much more price conscious in recent years

We doubt an additional tax of between £800m and £1.5bn can be absorbed by the airline industry in its current weakened state. In addition, lower average fare levels and greater price awareness amongst consumers are likely to result in some impact on consumers. These factors alone may be sufficient to persuade the Treasury to raise the tax burden over a number of years.

Airport operators

Airports are only partially insulated from the impact of higher APD

Airports are unlikely to be directly involved in the collection of an emissions tax. They also produce only a very small proportion of aviation emissions. For example, BAA is responsible for only 6% of the emissions at Heathrow airport, with airlines responsible for the remaining 94%.

Nonetheless, any tax or charge that has an impact on passenger volumes has implications for the airport operators. The expansion plans of the airports are based on long-term forecasts of passenger volumes. For obvious reasons these forecasts are usually based on conservative assumptions. For instance BAA has long forecast passenger volume growth of between 3.5% and 4%. These figures have been comfortably exceeded in all but the exceptional circumstances of 2001 and 2003.

Using an average price elasticity of minus one, the DfT estimates that a tax equivalent to a 10% rise in ticket prices would produce a volume decline of the same magnitude. However, the same paper assumes that average ticket prices fall at average rate of 2% per annum implying a 10% tax would have no discernable impact on volumes over a five-year period.

We believe this misses two points:

- Existing volume forecasts already assume a certain level of price erosion
- A tax of £500m or £1.5bn is unlikely to be phased in over such a long period

The table overleaf illustrates the potential impact of a 3%, 5% and 8% decline in passenger volumes on BAA's earnings. These figures assume that in the short term BAA could only offset 20% of the consequent revenue decline. Phasing in a tax increase would obviously allow BAA to realign its cost base and investment plans to allow for lower passenger numbers.

Given that we believe in the lower of these three tax increases and have assumed that consumers bear all the impact of higher taxes, we consider a 6% earnings impact a worst-case scenario for BAA.

BAA: earnings impact of volume declines of 3%, 5% and 8%

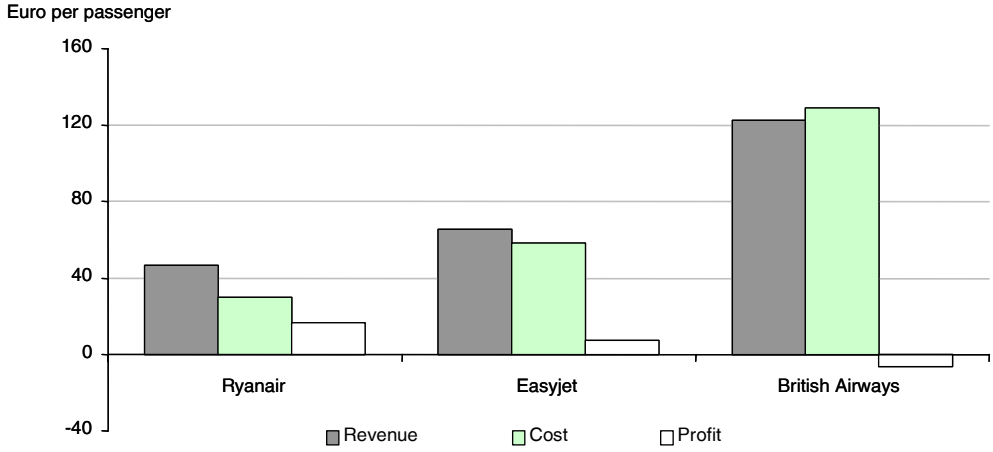
Percentage increase in aviation tax burden	64%	100%	New tax
Estimated total tax revenue	1330	1635	2275
Current proceeds	775	775	775
Net tax increase	555	860	1500
Assumed volume impact (%)	3	5	8
Revenue impact	47	78	126
20% cost offset	(9)	(16)	(25)
PBT impact	38	62	101
FY 2005 PBT	597	597	597
% impact	6	10	17

Source: DrKW Equity research estimates

Airlines

As usual the airlines are in the front line and are likely to be responsible for passing on any tax increase to consumers. To assess the impact on the different airlines it is necessary to consider how a tax might affect long- and short-haul prices and volumes.

Average short-haul revenues, cost and profits (£ per pax)



Source: DrKW Equity research estimates

Domestic services

APD is only levied on passengers departing a UK airport and therefore any increase in APD will hit both legs of a return journey on domestic routes but only the outbound leg of an international service.

Domestic shares

Any increase in APD will have a greater impact on airlines with a higher proportion of UK domestic passengers. These proportions are shown for several airlines in the table overleaf (the figures for Ryanair are our estimates because the company does not disclose a passenger breakdown by region).

These figures imply that 69% of all BA's short-haul passengers pay APD (38% plus the outbound half of passengers on UK-Europe routes. Similarly, we estimate 65% Easyjet's and 58% of Ryanair's total passengers pay APD.

Breakdown of short-haul passenger volumes

	British Airways FY2003	Easyjet FY2002	Ryanair[1] FY2003
Passengers (m)			
UK domestic	9.0	5.7	4.7
UK-Europe	14.6	9.3	8.7
Intra Europe	0.0	1.0	2.4
Total short haul	**23.6**	**16.0**	**15.7**
Breakdown (%)			
UK domestic	38	36	30
UK-Europe	62	58	55
Intra Europe	0	6	15
Total short haul	100	100	100

[1]DrKW estimates because Ryanair provides no breakdown
Source: Company accounts, DrKW Equity research estimates

Ground transportation alternatives

Domestic volumes likely to be hit hardest

Domestic routes compete with road and rail services much more than international short-haul flights. Any increase in APD that leads to higher airfares could cause passengers to switch to alternative modes of transport, particularly on shorter routes.

Average fare levels

Average fare levels are also likely to affect how readily any increase in APD can be absorbed. The following table compares different levels of APD with average one-way fares. It illustrates that raising the rate of APD by 50% would be the equivalent of about a 3% increase in British Airways' average short-haul fare. However, this figure rises to 5.5% for Easyjet and 7.7% for Ryanair.

Impact of higher APD on average one-way fares

Rate increase (%)		25%	50%	75%	100%
New rate per passenger (£)	£/pax	6.25	7.50	8.75	10.00
British Airways	85.8	1.5	2.9	4.4	5.8
Easyjet	45.8	2.7	5.5	8.2	10.9
Ryanair	32.6	3.8	7.7	11.5	15.3

Source: DrKW Equity research estimates

We believe these sensitivities apply to 38% of BA's short-haul passengers and 33% and 25% of Easyjet's and Ryanair's total passengers, respectively.

These figures probably overstate the scale of the price increase to the final consumer because the average airfare figures exclude existing taxes and charges that probably increase the base fares by between 25-50%.

International short haul

Any increase in APD will only hit the outbound leg of an international flight and therefore the relevant comparison is with return fares on these routes. Unsurprisingly the sensitivities are half that of one-way fares.

APD applies to only the outbound leg of an international flight

Hence the table illustrates that raising the rate of APD by 50% would be the equivalent of a 1.5% increase in British Airways' average short-haul fare. However, this figure rises to 2.7% for Easyjet and 3.8% for Ryanair.

Rate increase as % of average return fares

Rate increase		25%	50%	75%	100%
New rate per passenger (£)	£/pax	6.25	7.50	8.75	10.00
British Airways	172	0.7%	1.5%	2.2%	2.9%
Easyjet	92	1.4%	2.7%	4.1%	5.5%
Ryanair	65	1.9%	3.8%	5.8%	7.7%

Source: Company accounts, DrKW Equity research estimates

Long haul

As already mentioned, long-haul APD could be doubled on environmental grounds. In the first instance we assume it is raised 75%. This implies a new rate of £35 for leisure passengers (versus £20 at present) and £70 for passengers in the premium classes (£40).

The table shows BA's average one-way long-haul fare to be £444. Knowing that the premium class (first, business and economy plus) to economy class split is about 15:85, we estimate that the average one-way fares in the two categories are £1,800 and £200, respectively. This obviously implies average *return* fares of £3,600 and £400.

British Airways average one-way fares by region, FY2003

Region	Revenues (£m)	Passengers (m)	Rev/pax (£)
Short haul	**2,285**	**26,632**	**86**
Americas	2,732	6,672	410
Asia-Pacific	1,186	1,552	764
Africa-Middle East	871	2,568	339
Long haul	**4,789**	**10,792**	**444**
Total network	**7,074**	**37,424**	**189**

Source: Company reports

Premium cabins

We doubt moving APD from £40 to £70 would have a discernable effect on long-haul premium volumes because as the table overleaf illustrates, it would add only 0.8% to BA's average two-way premium fare (£3600). Also, demand elasticities are low in premium cabins, implying a decline in demand of only 0.4%.

Nonetheless we should warn that a substantially larger increase in APD could slow the long-awaited recovery in business class demand.

Dresdner Kleinwort Wasserstein Research

Economy class

Premium demand unlikely to be affected as much as leisure

We estimate that raising the economy class APD rate from £20 to £35 could reduce economy class volumes by 3.8%. This reflects that £15 equates to a 3.8% increase in BA's average return economy class fare of £400 and elasticity of demand is around minus 1.0 in these cabins.

Taking into account the 15:85 split between premium and economy classes implies that a 75% increase in long-haul APD rates could reduce BA's long-haul passenger volumes by 3.3%.

Theoretical impact of higher APD on long-haul volumes

Cabin	Premium	Leisure
APD increase (£ per pax)	30	15
Average return fare (£ per pax)	3,600	400
Increase as a proportion (%)	0.8	3.8
Assumed elasticity (x)	(0.5)	(1.0)
Theoretical volume impact (%)	(0.4)	(3.8)
Passenger shares (%)	15	85
Impact on total long haul (%)	(0.1)	(3.2)
Theoretical total volume impact (%)		(3.3)

Source: DrKW Equity research estimates

Leisure passenger price elasticities are higher

Another factor to take into account is that the price elasticity of demand is low at the top end of the market and very high at the bottom end. Hence the price elasticity of demand for business traffic is generally judged to be about minus 0.5.

Volume declines greatest for the low cost airlines

For leisure traffic demand, elasticity is between minus 1.5-2.5. So, for example, a 50% increase in APD would equate to a 7.7% increase in Ryanair's UK domestic airfares and, in turn, this could depress demand by between 11% and 19%.

The table overleaf pulls together all these points about different price elasticities and fare types.

The bottom line is that we believe a 50% hike in short-haul APD combined with a 75% increase in long-haul APD could reduce the passenger volumes of British Airways, Easyjet and Ryanair by 2.3%, 4.8% and 7.6%, respectively.

Financial impact

The financial impact of these volume declines reflects the operating margins of the three airlines. We assume that the geographical profile of the three airlines' passengers does not change significantly by FY2005 and then assume the volume decline feeds through to a revenue decline of the same magnitude.

In order to assess the earnings impact we assume that approximately 50% of costs are variable and therefore that in the first year of an APD increase the airlines can offset only half the revenue impact. The net profit impact is simply a function of each company's reported tax charge.

High margins insulate the bottom line

High margins provide some insulation for low cost carriers

As the table illustrates, although the theoretical volume impact is greatest for Ryanair, its fat margins insulate the bottom line. The theoretical negative earnings impact of higher APD on British Airways, Easyjet and Ryanair is 17%, 15% and 10%, respectively.

Clearly, if the government decided to introduce an all new £1.5bn emissions charge next year (which we doubt), the theoretical earnings impact would be approximately double that detailed above.

Volume impact of APD increase

Airline	British Airways	Easyjet	Ryanair
Domestic			
Impact on average airfare (%)	2.9	5.5	7.7
Assumed elasticity (x)	(1.0)	(1.5)	(2.0)
Theoretical volume impact (%)	**(2.9)**	**(8.3)**	**(15.4)**
International short haul			
Impact on average airfare (%)	1.5	2.7	3.8
Assumed elasticity (x)	(0.8)	(1.3)	(1.8)
Theoretical volume impact (%)	**(1.2)**	**(3.5)**	**(6.8)**
Long haul (%)	**(3.3)**	**NA**	**NA**
Passenger breakdown by region (m)			
Domestic	9.0	5.3	3.9
International short haul	14.6	9.4	8.7
Intra-EU	0.0	1.3	3.1
Long haul	10.8	NA	NA
Total	**34.4**	**16.0**	**15.7**
Passenger breakdown by region (%)			
Domestic	26.2	33.0	25.1
International short haul	42.4	58.9	55.2
Intra-EU	0.0	8.1	19.8
Long haul	31.4	NA	NA
Total	**100.0**	**100.0**	**100.0**
Volume impact			
Passengers (m)	(0.8)	(0.8)	(1.2)
Proportion of total (%)	**(2.3)**	**(4.8)**	**(7.6)**

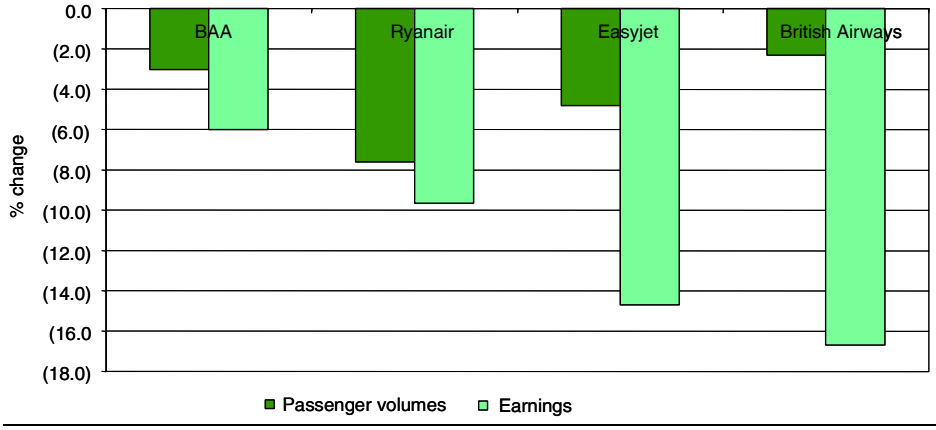
Source: DrKW Equity research estimates

Financial impact of APD increase, FY2005

Airline	British Airways (£m)	Easyjet[1] (£m)	Ryanair (€m)
Current forecast			
Revenue	7,907	1,240	1,320
EBIT	450	132	387
Margin (%)	5.7	10.6	29.3
Net profit	315	96	317
Impact (local currency)			
Revenue	(150)	(41)	(68)
EBIT	(75)	(21)	(34)
Net profit	(53)	(14)	(31)
Impact (%)			
Revenue	(2)	(3)	(5)
EBIT	(17)	(18)	(9)
Net profit (%)	**(17)**	**(15)**	**(10)**

[1]Easyjet estimates for year to March 2005
Source: DrKW Equity research estimates

Volume and earnings impact of higher APD (base case of 64% average increase)



Source: DrKW Equity research estimates

Conclusions

We believe the easiest way for the UK government to raise a sum equivalent to its estimate of the climate change costs of aviation is to designate APD an environmental charge and to double it.

In the first instance, APD could be raised between 50-100% with a bias towards increasing the long-haul rate, as this is where current APD rates lag the per capita climate change costs by the greatest margin.

Nonetheless, the short-haul APD rate is also likely to rise. As our central case we examine the theoretical impact on volumes and earnings of a 50% increase in short-haul APD and a 75% hike in long-haul APD rates from next April.

The greatest volume impact is likely to be at the low-cost end of the market where airfares are lowest and demand elasticities are highest. The bottom line is that we believe this increase in APD could reduce the passenger volumes of British Airways, Easyjet and Ryanair by 2.3%, 4.8% and 7.6%, respectively.

Although the theoretical volume impact is greatest for Ryanair, its fat margins insulate the bottom line. The theoretical negative earnings impact of higher APD on British Airways, Easyjet and Ryanair is 17%, 15% and 10% respectively.

A doubling in APD could reduce BAA's passenger numbers by 3% and result in a 6% earnings decline.

For now we leave our forecasts unchanged but the likelihood of higher aviation charges reinforces our belief in a slow recovery in airline profits compared to previous cycles.

An EU-wide emissions charge

We believe the two economic instruments being considered by the EU are too complicated, distort competition and raise little or no revenue for cash-strapped governments. We expect them to be dropped in favour of a departure tax similar to APD. We assess the impact of an EU-wide charge raising between €5-10bn. The financial impact of such a charge is a function of the interplay between volumes and margins.

EU proposals

The EU is at an earlier stage than the UK in assessing the policy options in this area. However, having ruled out the possibility of taxing aviation fuel on practical grounds, it is examining other ways of using economic instruments.

Current EU proposals appear to be unworkable

We doubt any scheme will contribute significantly to a reduction in aviation emissions but it could force aviation to cover its external costs, raise additional revenue for cash-strapped governments and make politicians look or feel more environmentally friendly.

A paper commissioned by the EU looks into two types of scheme:

- A revenue-neutral Performance Standard Incentive
- An environmental charge

Performance Standard Initiative

A performance standard initiative would set a target standard for emissions possibly in terms of CO_2 generated per passenger or per flight.

Fuel-efficient airlines could beat the PSI and hence receive credits whilst airlines with older, less fuel-efficient fleets would be penalised. The size of this financial penalty would clearly depend upon the PSI level set. This would essentially be a political decision.

A PSI scheme could be similar to the planned EU-wide emissions trading system. If the PSI level set reflected the clearing price of CO_2 within the EU-emissions trading scheme (which comes into operation in 2005), it could be relatively easy for PSI to be rolled into this system from 2008.

A PSI scheme would provide an incentive for airlines to operate more fuel-efficient aircraft but, as discussed elsewhere in this document, airlines already have a huge incentive to operate fuel-efficient aircraft.

Arguably, buying modern aircraft is one thing Europe's airlines are good at: the cost savings that come from operating modern aircraft are more easily achieved than those that would come from changing antiquated working practices!

In addition, a PSI scheme would be difficult and expensive to administer: airlines would have to undergo regular environmental audits. Actual performance could differ considerably from planned performance: flights get cancelled, different equipment may be used from that scheduled.

Another problem would be that the EU would have no jurisdiction over airlines registered outside the EU. Introducing a scheme covering only EU airlines would put them at a competitive disadvantage.

In our opinion, policing a PSI scheme would be a nightmare, it would put EU airlines at a competitive disadvantage and it would not raise any money for European governments.

An environmental charge

An environmental charge would get around some of these disadvantages, but we consider the scheme being considered by the EU to be unnecessarily complicated.

An environmental charge based on departing passengers would be a neater solution

It would be levied on all airlines using EU airspace and airlines would pay a charge related to the proportion of a flight undertaken within EU airspace. This might work for flights entirely within EU airspace but parts of many short-haul flights would not be covered.

As little as 15% of some long-haul flights are within EU airspace. Hence such a charge could not meet the objective of covering the full climate change costs of aviation.

The charge would be collected by Eurocontrol, the umbrella body for Europe's myriad air traffic control authorities. But how would the proceeds be distributed? Even if it is distributed to national governments, we foresee difficulties agreeing a formula for such distributions.

There must also be a risk that foreign airlines would challenge the EU's right to levy such a charge.

A departure tax is better

An environmental charge based on departing passengers is clearly a better alternative:

- It would be fair because it can be structured to broadly reflect the climate change costs of short-haul and long-haul, premium and economy class passengers.
- It would be relatively simple to understand and collect.
- It would be levied on all passengers regardless of which airline they travel with, thereby minimising damage to the competitive position of EU airlines.
- Most importantly it would raise much needed revenues for European governments.

An EU-wide emissions charge (set at similar levels to those set out in the previous section) would raise about €10bn for EU governments. This estimate is based on the fact that the UK accounts for 21.6% of EU aviation emissions and the UK government estimates the climate change costs of UK aviation are £1.5bn (€2.1bn).

Of course, this figure assumes that the EU comes to the same conclusions as the UK regarding the climate change cost of aviation across the EU. In the following exercise we assume that the structure of an EU-wide charge matches the rates for long-haul and short-haul, premium and economy class passengers that are set out below.

Possible structure of an EU-wide emissions charge (€ per passenger)

Total proceeds	€5bn	€10bn
Short haul		
Premium	10	20
Economy	5	10
Long haul		
Premium	50	100
Economy	25	50

Source: DrKW Equity research estimates

A system of short-haul rates of £7.5 (approximately €10) and £15 (€20) per passenger and long-haul rates of £35 (€50) and £70 (€100) per passenger would raise around €10bn per annum initially. Rates of half this level would obviously raise only €5bn.

Charging rates could be similar to APD rates in the UK

Alternatively the EU may choose to introduce such a system in stages to soften the blow to continental European airlines that currently have no such charge. The following analysis examines the impact of two charging levels – equating to total revenues of €5bn and €10bn – on the major EU-based airlines.

We use the same methodology as presented in the previous section, first assessing the effect of a charge on average fares and then estimating the volume and financial impact of higher fare levels.

Short-haul fares and charges

The tables below illustrate the average short-haul fares of the major European airlines. As an emissions charge would be levied on both legs of a short-haul journey, the correct comparison is with average one-way fares.

Assuming that 5-10% of network airline passengers travel in business class, we calculate that an EU-wide charge would add between 4-5% to network airline fares and 8-11% to average low-cost airline fares.

Average one-way short-haul fares (€ per pax)

Airline	Period	Short-haul revenues €m	Short-haul passengers m	Average short-haul fare €
Lufthansa	Dec-02	5,022	34	146
Air France	Mar-03	4,584	32	142
British Airways	Mar-03	3,265	27	123
Iberia	Dec-02	2,440	22	110
Easyjet	Sep-02	1,046	16	65
Ryanair	Mar-03	732	16	47
Total		**17,088**	**147**	**116**

Source: DrKW Equity research estimates

Impact of a €10bn EU-wide emissions charge on short-haul fares

Charge level	Average fare €	Business class %	Average charge €	Charge as proportion %
Lufthansa	146	10	5.5	3.8
Air France	142	10	5.5	3.9
British Airways	123	10	5.5	4.5
Iberia	110	5	5.3	4.8
Easyjet	65	0	5.0	7.7
Ryanair	47	0	5.0	10.8

Source: DrKW Equity research estimates

Long-haul fares and charges

Once again the volume impact reflects fare levels and elasticities

In the case of long-haul charges, they would be levied only on the outbound leg of a journey originating in Europe. Therefore the correct comparison is between average charges and average return fares.

We assume 10-15% of network airline passengers travel in premium classes and, as the table below illustrates, this suggests the average charge would equate to a fare increase of between 4.5% and 7.2%.

Impact of a €10bn EU-wide emissions charge on long-haul return fares

Charge level	Average return fare €	Premium classes %	Average charge €	Charge as proportion %
British Airways	1,268	15	57.5	4.5
Lufthansa	992	15	57.5	5.8
Air France	904	15	57.5	6.4
Iberia	768	10	55.0	7.2

Source: DrKW Equity research estimates

Volume impact

The table overleaf sets out the theoretical volume impact of an EU-wide charge. For the network airlines we assume price elasticities of minus 0.8 (short haul) and minus 1.0 (long haul). The low-cost airline elasticities are higher due to the large leisure element within customer bases.

In the first instance we assume that an EU-wide charge would be in addition to any existing charges levied by European governments. Hence in the case of British Airways, Easyjet and Ryanair, we assume that the EU-wide charge is in addition to existing levels of APD.

As the table overleaf illustrates, an EU-wide charge would in theory reduce the passenger volumes of the network airlines by around 4%, but the volume impact on Easyjet and Ryanair could be as much as 10% and 19%, respectively.

Volume impact of an emissions charge (no offset against APD)

Airline	Lufthansa	Air France	British Airways	Iberia	Easyjet	Ryanair
Short haul						
Impact on average airfare (%)	3.8	3.9	4.5	4.8	7.7	10.8
Assumed elasticity (x)	(0.8)	(0.8)	(0.8)	(0.8)	(1.3)	(1.8)
Theoretical volume impact (%)	(3.0)	(3.1)	(3.6)	(3.8)	(10.0)	(19.4)
Long haul						
Impact on average airfare (%)	5.8	6.4	4.5	7.2	NA	NA
Assumed elasticity (x)	(1.0)	(1.0)	(1.0)	(1.0)	NA	NA
Theoretical volume impact (%)	(5.8)	(6.4)	(4.5)	(7.2)	NA	NA
Passenger breakdown by region (m)						
Short haul	34.4	32.3	23.6	22.1	16.0	15.7
Long haul	9.5	10.9	10.8	2.8	NA	NA
Total	43.9	43.2	34.4	25.0	16.0	15.7
Passenger breakdown by region (%)						
Short haul	78.4	74.9	68.6	88.6	100.0	100.0
Long haul	21.6	25.1	31.4	11.4	NA	NA
Total	100.0	100.0	100.0	100.0	100.0	100.0
Volume impact						
Passengers (m)	(1.6)	(1.7)	(1.3)	(1.1)	(1.6)	(3.1)
Proportion of total (%)	(3.6)	(3.9)	(3.9)	(4.2)	(10.0)	(19.4)

Source: DrKW Equity research estimates

Financial impact

The financial impact of such volume declines is modelled against our forecasts for December 2005 and March 2006 (in the case of Easyjet, we take an average of the years to September 2005 and 2006).

The financial impact reflects margins and tax rates

Whilst we stress that this is a theoretical exercise, it is clear that an emissions charge of €10bn could have a dramatic impact on airline earnings. Margin levels have a big influence on the ultimate earnings impact: Air France's relatively low margins make it appear more exposed than the other network airlines.

BA, Lufthansa and Iberia could see earnings fall over 20% if a €10bn emissions charge is introduced. Air France has the lowest margins in the sector and we estimate it could experience an earnings decline of as much as 80%. Easyjet and Ryanair's volumes would be hit hardest and they could see earnings decline by 36% and 31% respectively.

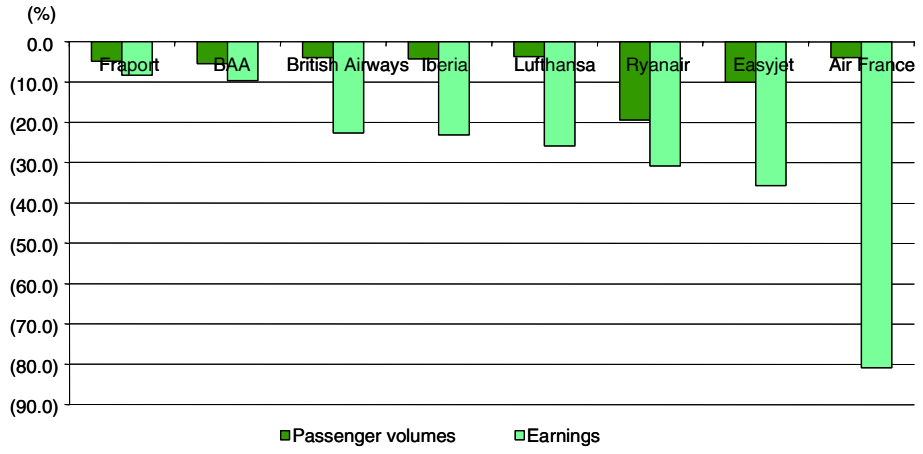
If a charge of only €5bn is levied, the theoretical impact on volumes and earnings would be approximately half these levels.

Financial impact of €10bn emissions charge (no offset against APD)

Airline	Lufthansa	Air France	British Airways	Iberia	Easyjet[1]	Ryanair
Financial year	Dec-05	Mar-06	Mar-06	Dec-05	Mar-06	Mar-06
Currency	€m	€m	£m	€m	£m	€m
Current forecast						
Revenue	20,092	13,699	8,375	5,293	1,509	1,544
EBIT	991	277	717	281	163	448
Margin (%)	4.9	2.0	8.6	5.3	10.8	29.0
Net profit	429	144	420	221	115	366
Impact (local currency)						
Revenue	(357)	(358)	(270)	(146)	(119)	(250)
EBIT	(179)	(179)	(135)	(73)	(60)	(125)
Net profit	(111)	(116)	(95)	(51)	(41)	(113)
Impact (%)						
Revenue	(2)	(3)	(3)	(3)	(8)	(16)
EBIT	(18)	(65)	(19)	(26)	(37)	(28)
Net profit	(26)	(81)	(23)	(23)	(36)	(31)

[1]Easyjet figures for year to March 2006
Source: DrKW Equity research estimates

Volume and earnings impact of a €10bn emissions charge (no offset against APD)



Source: DrKW Equity research estimates

Allowing for an offset against APD

It is likely that an EU charge will replace APD so the impact on UK-based airlines is lower

We also adjust the figures of British Airways, Easyjet and Ryanair to allow for the fact that an EU emissions charge is likely to replace APD. Clearly a large proportion of their business is already exposed to a charge approximately half the levels assumed above.

The tables below adjust for this by stripping the proportion of passengers exposed to APD at present. Thus we estimate that the volume impact of a €10bn emissions charge that replaces APD in its current form would reduce the volumes of BA, Easyjet and Ryanair by only 1.6%, 3.3% and 5.8%, respectively.

The financial impact of these volume reductions is also correspondingly lower: the theoretical earnings impact being 9% for both BA and Ryanair and 12% for Easyjet.

Volume impact of an EU-wide charge (offset against APD)

Airline	British Airways	Easyjet	Ryanair
Short haul			
Impact on average airfare (%)	4.5	7.7	10.8
Assumed elasticity (x)	(0.8)	(1.3)	(1.8)
Theoretical volume impact (%)	(3.6)	(10.0)	(19.4)
Current exposure (%)	69.0	65.0	60.0
Current charging level (%)	50.0	50.0	50.0
Net volume impact (%)	(1.2)	(3.3)	(5.8)
Long haul			
Impact on average airfare (%)	4.5	NA	NA
Assumed elasticity (x)	(1.0)	NA	NA
Theoretical volume impact (%)	(4.5)	NA	NA
Current exposure (%)	100.0	NA	NA
Current charging level (%)	50.0	NA	NA
Net volume impact (%)	(2.3)	NA	NA
Passenger breakdown by region (m)			
Short haul	23.6	16.0	15.7
Long haul	10.8	NA	NA
Total	34.4	16.0	15.7
Passenger breakdown by region (%)			
Short haul	68.6	100.0	100.0
Long haul	31.4	NA	NA
Total	100.0	100.0	100.0
Volume impact			
Passengers (m)	(0.5)	(0.5)	(0.9)
Proportion of total (%)	(1.6)	(3.3)	(5.8)

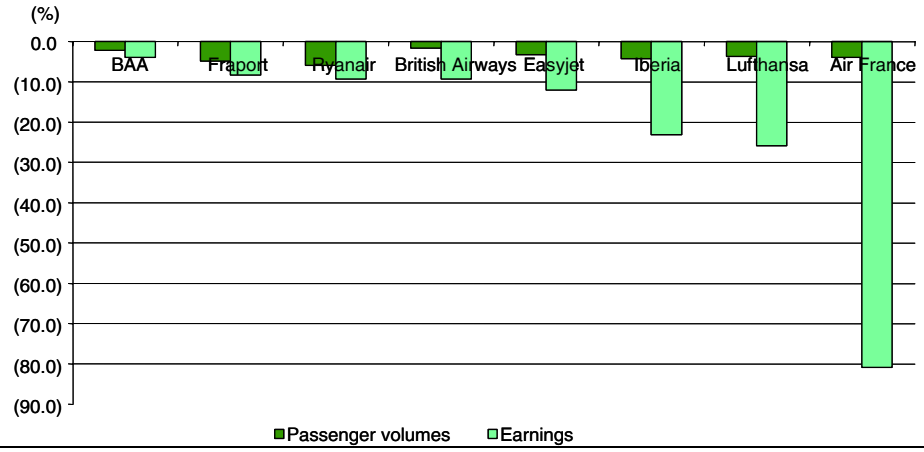
Source: DrKW Equity research estimates

Financial impact of €10bn emissions charge (offset against APD)

Airline	British Airways	Easyjet	Ryanair
Financial year	Mar-06	Mar-06	Mar-06
Currency	£m	£m	€m
Current forecast			
Revenue	8375	1509	1544
EBIT	717	163	448
Margin (%)	8.6%	10.8%	29.0%
Net profit	420	115	366
Impact (local currency)			
Revenue	(111)	(40)	(75)
EBIT	(56)	(20)	(38)
Net profit	(39)	(14)	(34)
Impact (%)			
Revenue	(1)	(3)	(5)
EBIT	(8)	(12)	(8)
Net profit	(9)	(12)	(9)

Source: DrKW Equity research estimates

Volume and earnings impact of a €10bn emissions charge (with offset against APD)



Source: DrKW Equity research estimates

Airports are more defensive

Assuming a range of effects on traditional short haul, budget short haul and long haul passengers and applying them to the passenger breakdowns of the two major quoted airport companies, BAA and Fraport, suggests an all-new €10bn emissions charge would reduce both companies' passenger volumes by about 5%.

Airport earnings are relatively defensive

Allowing for only a 20% cost reduction against revenues for both companies points to an earnings impacts of 10% and 8% in the case of BAA and Fraport respectively.

If the emissions charge *replaces* APD, our estimate of the negative earnings impact on BAA falls to 4%.

Airports: impact of EU charge

Traffic type	Long haul	Traditional short haul	Budget short haul	Total
Assumed impact (%)	6	4	8	
Passengers (m)				
BAA	39.3	62.9	25.5	127.7
Fraport	17.1	31.4	1.4	49.9
Passengers (%)				
BAA	31	49	20	100
Fraport	34	63	3	100
Passengers lost (m)				
BAA	(2.4)	(2.5)	(2.0)	(6.9)
Fraport	(1.0)	(1.3)	(0.1)	(2.4)
Passengers lost (%)				
BAA				(5.4)
Fraport				(4.8)

Source: DrKW Equity research estimates

BAA and Fraport: earnings impact of EU emissions tax

Company	BAA	BAA	Fraport
Period	Mar-06	Mar-06	Dec-05
Currency	£m	£m	€m
Assumed volume impact (%)	5.4	2.1	4.8
Revenue impact	79	32	36
20% cost offset	(16)	(6)	(7)
PBT impact	63	26	29
FY 2005 PBT	657	657	350
% impact	10	4	8

Source: DrKW Equity research estimates

Critique

We accept that in this analysis we could make less conservative assumptions, in particular that:

- Price elasticities may be lower than we have assumed.
- The greatest volume impact may be on the lowest fare passengers and therefore using average fares may exaggerate the actual revenue impact.
- Consumer behaviour does not necessarily perfectly reflect actual price changes, price perceptions may matter more.
- The airlines may be able to react and offset more than 50% of a revenue impact in a full year.

However, we do believe that taxes of the magnitude discussed are likely to have a material effect on overall demand levels and on the distribution of that demand. This in turn is likely to have an impact on the earnings of airlines and airports.

This analysis at least establishes a framework to assess the potential impact of emissions taxes that we consider inevitable. We will refine this framework as the EU's policy in this area evolves.

Conclusions

We believe the two alternative schemes being considered by the EU are fatally flawed. An emissions charge based on passengers departing EU airports is the best alternative in our view.

An all-new €10bn emissions charge would in theory reduce the passenger volumes of the network airlines by around 4%. The volume impact on Easyjet and Ryanair could be as much as 10% and 19%, respectively.

BA, Lufthansa and Iberia could see earnings fall over 20% if an emissions charge is introduced. Using the same assumptions, Air France could experience an earnings decline of as much as 80%.

If a charge of only €5bn is levied, we can assume that the theoretical volume and financial impact would be approximately half these levels.

We estimate that the volume impact of a €10bn emissions charge that *replaces* APD in its current form would reduce the volumes of BA, Easyjet and Ryanair by only 1.6%, 3.3% and 5.8%, respectively.

The financial impact of these volume reductions is also correspondingly lower: the theoretical earnings impact being 9% for both BA and Ryanair and 12% for Easyjet.

This analysis establishes a framework to assess the potential impact of emissions taxes that we consider inevitable. We will refine this framework as the EU's policy in this area evolves.

Appendix 1: average network airline fares

Average one-way fares of major EU airlines

Region	Revenues (€m)	Pax (m)	Rev/pax
British Airways			
Europe	**3,265**	**26,632**	**123**
Americas	3,903	6,672	585
Asia-Pacific	1,694	1,552	1,091
Africa-Middle East	1,244	2,568	484
Long haul	**6,841**	**10,792**	**634**
Total network	**10,106**	**37,424**	**270**
Lufthansa			
Europe	**5,022**	**34,434**	**146**
North America	1,965	4,486	438
South America	282	547	515
Americas	2,246	5,033	446
Asia-Pacific	1,918	2,996	640
Africa-Middle East	531	1,432	371
Long haul	**4,695**	**9,461**	**496**
Total network	**9,717**	**43,895**	**221**
Air France			
Domestic	2,026	17.3	117
Medium haul	2,558	15.0	170
Europe	**4,584**	**32.3**	**142**
Caribbean and Indian Ocean	918	1.7	540
Americas	1,894	4.3	441
Asia-Pacific	1,120	2.1	533
Africa-Middle East	975	2.8	354
Long haul	**4,907**	**10.9**	**452**
Total network	**9,491**	**43.2**	**220**
Iberia			
Domestic	1,313	14,447	90.9
Medium haul	1,127	7,664	147.0
Europe	**2,440**	**22,111**	**110.3**
Americas	1,092	2,845	383.9
Total network	**3,532**	**24,956**	**141.5**

Source: Company reports

Prices of stocks mentioned in this report

Company	Price
Air France	€13.06
Alitalia	€0.27
British Airways	226.5p
Iberia	€2.17
KLM	€13.37
Lufthansa	€12.91
SAS	SEK71.00
Easyjet	271p
Ryanair	€6.4
BAA	481p
Fraport	€23.5
Copenhagen Airport	DKK698
TBI	62p
Vienna Airport	€35.0
Zurich Airport	CHF66

Source: RIMES

Notes

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DRESDNER KLEINWORT WASSERSTEIN RESEARCH – RECOMMENDATION DEFINITION

(Except as otherwise noted, expected performance over next 12 months)

Buy	10% or greater increase in share price	Reduce	5-10% decrease in share price
Add	5-10% increase in share price	Sell	10% or more decrease in share price
Hold	+5%/-5% variation in share price		

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	All covered companies		Companies where a DrKW company has provided investment banking services (in the last 12 months)	
Buy/Add	300	49%	57	59%
Hold	201	33%	28	29%
Sell/Reduce	117	19%	12	12%
Total	618		97	

Source: DrKW