



IoD proposals for Airports Commission

Long term capacity options

19 July 2013

Dear Sir/Madam,

We are grateful for the opportunity to present our proposals on long term airport capacity options.

About the IoD

The IoD is an independent, non-party political organisation of approximately 36,000 individual members. The membership is drawn from right across the business spectrum – 80% of FTSE 100 companies and 60% of FTSE 350 companies have IoD members on their boards, but the majority of members comprise directors of small and medium-sized enterprises, ranging from long-established businesses to start-ups.

In the context of the Airports Commission's work, it is important to stress that the IoD does not represent the aviation industry, but businesses in all sectors of the economy and from all parts of the UK.

Structure of our submission

Our submission draws on our report, *Flying into the Future*, published in December 2012 (<http://www.iod.com/influencing/policy-papers/infrastructure/infrastructure-for-business-flying-into-the-future>), where the proposals are explained in more detail. It should also be seen as complementary to our response to the short and medium term options consultation (<http://www.iod.com/influencing/policy-papers/infrastructure/iod-consultation-response-airports-commission-aviation>). Whether or not new runways are constructed in the UK, the short and medium term measures we recommended will be vital.

This document is structured into four parts:

1. Why more flying is a good thing.
2. UK airport capacity needs.
3. New capacity recommendations.
4. Noise and air pollution recommendations.

1. Why more flying is a good thing

The first point to address when considering additional airport capacity is whether or not additional flights are desirable. In our view, they unambiguously are.

Economy

The economic benefits of flying are not really in dispute:

- The aviation sector is important in its own right, contributing £50 billion to UK GDP and supporting 921,000 jobs across the economy.¹
- In addition, there are an estimated £21 billion in “catalytic” benefits from tourism, supporting a further 519,000 jobs.² This is not surprising. Nearly three quarters of international visitors to the UK arrive by air.³
- Air transport supports trade, with 35 million business passengers passing through UK airports every year and 30% of all UK exports by value transported by air. The aviation industry handles 55% of the UK’s exports, by value, of manufactured goods to countries outside the EU.⁴ According to the 2006 Eddington Transport Study, “each day there are 72,000 international air business passenger journeys made to and from the UK (compared to 60,000 long distance domestic business trips)”.⁵
- The UK and world economies are shifting, and several trends mean that aviation will be increasingly important. Knowledge-based services and high tech manufacturing have both become more important to the UK economy – and these areas of the economy rely more on air services than others. At the same time the high growth markets are accounting for an increasing share of global GDP and UK trade, while the EU is accounting for a smaller share – direct long-haul flights to a range of new destinations, primarily in Asia, are therefore vital. And by 2050, urban areas are set to grow by 2.5 billion people.
- According to a survey of 1,076 IoD members carried out in May 2012, 37% say that direct flights from the UK to emerging markets are important to their business at present, while 63% say that direct flights from the UK to emerging markets are likely to be important to their business in the next decade. The high growth markets are set to become far more important to IoD members in the near future, underlining the importance of developing new routes from the UK.

Video-conferencing will undoubtedly grow rapidly. But it is, of course, no substitute for tourism, for visiting friends and family, and for developing the business contacts vital to reach trade deals. Meeting people in person has always been crucial to forming business relationships and there is no likelihood of that changing. Indeed, personal relationships are, if anything, even more important in the high growth economies of Asia. While rail is a good substitute for air for shorter journeys, it is not possible to take the train to the Far East or Latin America. Both video conferencing and flying will grow over the coming years.

¹ Oxford Economics, Economic Benefits from Air Transport in the UK, 2011

² Oxford Economics, Economic Benefits from Air Transport in the UK, 2011

³ Oxford Economic Forecasting, The Economic Contribution of the Aviation Industry in the UK, October 2006 <http://www.oef.com/Free/pdfs/Aviation2006Final.pdf>

⁴ Oxford Economic Forecasting, The Economic Contribution of the Aviation Industry in the UK, October 2006 <http://www.oef.com/Free/pdfs/Aviation2006Final.pdf>

⁵ The Eddington Transport Study, December 2006, p.25

Environment

Concerning the global environment, flying can grow without adding to CO₂ emissions:

- According to the Committee on Climate Change, with reasonable fuel efficiency improvements and a gradual uptake of sustainable biofuels, UK aviation demand can increase by 75%-125% on its 2010 amount, without CO₂ emissions increasing beyond their 2005 levels.⁶
- UK aviation contributes around £50 billion to GDP, Air passenger Duty raises £2.6 billion, but at the current carbon price, UK aviation's CO₂ emissions only cost around £250 million.⁷

Concerning the local environment, noise and air pollution is becoming less of a problem over time, as airline fleets become quieter and cleaner:

- In 1980, there were 944,000 people living in the 57 decibel noise contour around Heathrow. By 2010, that number had fallen by three quarters to 228,700.⁸ Over the same period, the number of flights rose from 273,000 to 449,000 a year.⁹
- Between 2000 and 2010, the number of people affected by noise levels of 57dB or above at Stansted airport fell by three quarters – from 5,700 to 1,400 – even as the number of flights remained at roughly the same level.¹⁰
- The noise footprint of the new Boeing 787 Dreamliner is 60% smaller than other similarly sized aeroplanes,¹¹ while the Airbus A380 produces three to four times less noise on landing than other large aircraft.¹²
- The new Bombardier CSeries aircraft will emit up to 50% less NO_x than current aircraft of a similar size, while successive generations of Rolls Royce Trent engines are becoming ever cleaner.¹³

⁶ Committee on Climate Change, The 2050 target – achieving an 80% reduction including emissions from international aviation and shipping, April 2012, p.21

http://hmccc.s3.amazonaws.com/IA&S/CCC_IAS_Tech-Rep_2050Target_April2012.pdf

⁷ Oxford Economics, Economic Benefits from Air Transport in the UK, 2011, Table 3.1; HMRC, Air Passenger Duty (APD) Bulletin, June 2012, Table 4

<https://www.uktradeinfo.com/Statistics/Pages/TaxAndDutyBulletins.aspx>; CO₂ cost: 35 MtCO₂e emissions in 2005 multiplied by carbon price of €9 per tonne, converted into Sterling using 1.25 exchange rate

⁸ Developing a sustainable framework for UK aviation: Heathrow Airport submission, October 2011, p.4

⁹ Heathrow Airport, Environmental Noise Directive: Noise Action Plan 2010-2015, December 2010, p.5

http://www.heathrowairport.com/static/Heathrow_Noise/Downloads/PDF/NAP_main.pdf; Civil Aviation Authority, UK Airport Statistics 2011, Table 06

<http://www.caa.co.uk/default.aspx?catid=80&pagetype=88&sglid=3&fld=2011Annual>

¹⁰ Developing a sustainable framework for UK aviation: London Stansted's response, October 2011, p.12

¹¹ See http://www.boeing.com/aboutus/environment/environmental_report_09/inc/flash-2-3-2.html

¹² Sustainable Aviation, Progress Report 2011 <http://www.sustainableaviation.co.uk/wp-content/uploads/sa-progress-report-2011.pdf>

¹³ Sustainable Aviation, Progress Report 2011 <http://www.sustainableaviation.co.uk/wp-content/uploads/sa-progress-report-2011.pdf>

- The impact of road access to airports, both on carbon emissions and on local air quality, will fall over time, as car engines become cleaner and as the uptake of electric cars gradually increases.

Operational measures can also make a difference. Steeper descents can reduce noise impacts, continuous descent approaches and continuous climb departures can reduce fuel burn and noise, and using tugs to tow aircraft to and from the runways can lead to major savings. A Boeing 747 can consume a tonne of fuel and emit several tonnes of CO₂ during an average 17 minute taxi to take off. But towing the aircraft with a tug would use just 20-30 litres of fuel.¹⁴

2. UK airport capacity needs

Firstly, it is worth noting that the demand projections used to inform our *Flying into the Future* report were taken from the Department for Transport's (DfT's) unconstrained 2011 demand forecasts. The DfT's 2013 forecasts are of course slightly lower than the 2011 forecasts, but we don't believe they change the underlying picture greatly:

- Heathrow is full already, and the main South East airports are still set to be full overall by around 2030.
- The biggest falls in unconstrained demand projections are not at Heathrow. For 2030, Heathrow's unconstrained demand forecast is 5% lower than in the DfT's 2011 projections. For Manchester, the fall is 13%; for Gatwick, 12%; and for Birmingham, the reduction is 7%.¹⁵

Overall capacity

Overall, the UK has plenty of spare capacity:¹⁶

- In total, UK airports have the capacity to handle 372 million passengers a year. In 2010, 211 million passengers passed through UK airports.
- Using the current set of runways to the maximum, which may include constructing new or extended terminal buildings, lifting planning restrictions and making other improvements, UK airports will have the capacity to handle 540 million passengers a year. By 2050, according to the DfT's forecasts, 520 million passengers will be using UK airports.

The real issue, then, is not overall airport capacity, but where that capacity is located. And there is a stark divide between London and the rest of the country:¹⁷

¹⁴ The Economist, Preparing for take-off, 15 September 2012

<http://www.economist.com/node/21562895>

¹⁵ Department for Transport, UK Aviation Forecasts, January 2013, Annex D.8

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/183931/aviation-forecasts.pdf and August 2011 (unconstrained terminal passengers by airport – central forecast)

¹⁶ Department for Transport, *UK Aviation Forecasts*, August 2011, Tables 2.6 and 2.7 (central forecast)

¹⁷ Department for Transport, *UK Aviation Forecasts*, August 2011, Tables 2.6 and 2.7 (central forecast), and unconstrained terminal passenger forecasts by airport (central forecast)

- The five London airports – Heathrow, Gatwick, Stansted, Luton and City – are currently able to handle 181 million passengers a year. In 2010, 126 million passengers used these five airports.
- Using the current set of runways at these five airports to the maximum, which principally involves improvements to Luton airport, 188 million passengers could pass through them. By 2030, the DfT forecasts that 204 million passengers will want to fly from these airports. By 2050, demand is set to grow to 294 million.
- By contrast, the other UK airports currently have the capacity to handle 191 million passengers a year, a figure that could rise to 352 million if all runways were used to the maximum. But demand is far lower. In 2010, demand was 85 million, a figure which is forecast to rise to 141 million in 2030 and 226 million in 2050.

The airport capacity crunch is therefore principally a London crunch, although certain airports outside of London may need larger terminal facilities. But among the main London airports, there are also significant differences. The DfT's unconstrained demand forecasts suggest that:¹⁸

- Stansted is not projected to need additional runway capacity before 2050.
- Incremental demand growth at Gatwick is likely to mean that a second runway will be needed at the airport.
- Demand at Heathrow is set to grow strongly, necessitating a third and probably fourth runway.

It's worth remembering that forecasts, especially those as far out as 2050, are liable to be considerably wide of the mark. For example, the DfT's 2000 forecasts predicted that 257-297 million passengers would be using UK airports in 2010, with a central forecast of 276 million.¹⁹ The actual figure was 211 million, only around three quarters of the projected central forecast and 82% of the low forecast. Of course, 9/11, the large oil price rise and the global financial crash were not foreseen in 2000, but if such errors are possible only ten years out, 40-year projections are even more fallible.

Hub capacity

Although the UK has plenty of aviation capacity at present, its hub capacity is already constrained.

Heathrow is by far the UK's largest airport and its only hub airport:²⁰

- In 2011 Heathrow handled 69 million passengers, 32% of all UK passenger traffic and more than twice as many passengers as the next largest airport, Gatwick.
- Heathrow handled more passengers than the other four London airports combined.

¹⁸ Department for Transport, *UK Aviation Forecasts*, August 2011, Table 2.7 unconstrained terminal passenger forecasts by airport (central forecast)

¹⁹ Department for Transport, *Air traffic forecasts for the United Kingdom 2000*, Table 3.1

²⁰ Civil Aviation Authority, *UK Airport Statistics 2011*, Tables 10.3 and 13.2

<http://www.caa.co.uk/default.aspx?catid=80&pagetype=88&sqlid=3&fld=2011Annual>; Civil Aviation Authority, CAA Passenger Survey Report 2010, Table 1
<http://www.caa.co.uk/docs/81/2010CAAPaxSurveyReport.pdf>

- Heathrow handled more passengers than the nine largest airports outside of London combined (Manchester, Edinburgh, Birmingham, Glasgow, Bristol, Liverpool, Newcastle, East Midlands, and Belfast International).
- In 2011, Heathrow handled 1.5 million tonnes of freight, 65% of the total for UK airports. No other UK airport handled more than 300,000 tonnes of freight.
- In 2010, 36% of Heathrow's passengers were transferring onto other flights. Of these, 88% were transferring onto international flights.
- No other UK airport comes close to this proportion of transfer passengers. At Gatwick, the airport with the second highest proportion of transfer passengers, only 8% were connecting in 2010.

The UK's largest airport, and only hub airport, is already virtually full. Heathrow's terminals may be able to accommodate more passengers, but the airport has a regulated limit of 480,000 Air Traffic Movements (ATMs) a year, and in 2011, ATMs reached 476,000.²¹ Under existing arrangements, Heathrow has no more room. No forecasts are necessary – the numbers speak for themselves.

This is not a surprising state of affairs. Put simply, many long-haul routes need feeder traffic to fill planes. Without it, the routes aren't viable. That is why hub capacity matters, and why other airports have not been particularly successful in attracting long-haul traffic away from Heathrow.

Heathrow's lack of spare capacity has led to several problems:

- The number of destinations served by Heathrow has fallen from 227 in 1990 to 180 today. By contrast, Amsterdam's Schiphol airport serves 313 destinations, and both Frankfurt and Paris Charles de Gaulle serve more than 250.²²
- This is particularly true for the high growth destinations. Heathrow maintains excellent connections to established markets such as North America, but destinations in Asia and Latin America are far better served by continental hubs. There are daily direct flights from Heathrow to 26 cities in the US and Canada, but only 3 cities in South America.²³ In China, only Hong Kong, Beijing, Shanghai and Guangzhou are served, with most flights running to Hong Kong. Heathrow's market share of leading European airports serving mainland China (i.e. excluding Hong Kong) is 11%, compared with 18% for Paris, 17% for Frankfurt and 14% for Amsterdam.²⁴ There are 25 high growth destinations with daily flights from other European hubs, and 13 more with at least a weekly connection, that are not well served from Heathrow.²⁵
- Amsterdam is starting to become the main hub airport for a number of the UK's regions. Since 1990, the number of British regional airports with flights to Heathrow has fallen from 21 to 6. Three times as many regional airports – 18 – have direct links to Amsterdam.

²¹ Civil Aviation Authority, *UK Airport Statistics 2011*, Table 06

<http://www.caa.co.uk/default.aspx?catid=80&pagetype=88&sglid=3&fld=2011Annual>

²² House of Commons All Party Parliamentary Group for Aviation, *Inquiry into Aviation Policy and Air Passenger Duty*, August 2012, p.24

²³ Figures supplied by Heathrow Airport

²⁴ Figures supplied by Heathrow airport

²⁵ Frontier Economics, *Connecting for Growth: The role of Britain's hub airport in economic recovery*, September 2011, p.12

- According to the IoD member survey cited above, IoD members are as likely to fly indirect to European destinations via Amsterdam (7%) as Heathrow (7%). In some regions, IoD members are significantly more likely to fly to Europe via Amsterdam:
 - In the North East, 42% connect via Amsterdam and 11% via Heathrow;
 - In Scotland, 24% fly via Amsterdam and 22% via Heathrow;
 - In Yorkshire, 20% connect via Amsterdam and 6% via Heathrow;
 - In the North West, 11% fly via Amsterdam and just 1% via Heathrow.
- For destinations outside Europe, IoD members are more likely to fly via Heathrow, but Amsterdam is still the main hub airport in the North East, where 26% fly via Schiphol and 21% via Heathrow.
- Almost six in ten (59%) IoD members agree that a lack of spare capacity at Heathrow has a damaging effect on inward investment to the UK, compared to just 17% who disagree. In all regions of the UK, more IoD members agree than disagree with this statement.

3. New capacity recommendations

We strongly support the growth of airports outside of the South East. Our response to the short and medium term options consultation made several recommendations to support regional airports. The extension to Birmingham airport's runway will allow new long-haul routes to be developed at the airport, which we very strongly welcome.

But there is no fundamental blockage to the expansion of traffic at airports such as Birmingham and Manchester, or indeed Stansted, which have considerable spare capacity. Indeed, given the cost of acquiring landing slots at Heathrow, there is already a strong market incentive to develop new long-haul routes at other airports. We would suggest that the reason this is not happening to any great extent is the need for hub traffic to ensure that planes fly reasonably fully-loaded.

In our view, new runways at Stansted and outside the South East are not likely to be needed for some time, although we would not oppose their construction, if financed privately.

Our two capacity recommendations are as follows:

Recommendation 1: Allow Heathrow to expand, ideally by two runways, if privately financed.

Heathrow is the UK's only hub airport. Unless one or more other airports can be developed as hubs, the only way to increase the UK's hub capacity is to increase Heathrow's capacity. There are a number of reasons why Heathrow expansion is the best option:

- Heathrow is the location of choice for airlines. Previous attempts to move traffic away from Heathrow through the London Traffic Distribution Rules failed – as soon as the rules were lifted in 1991, Virgin Atlantic moved to Heathrow.
- Heathrow is well located for road access, and within a reasonable taxi ride of central London. According to the IoD member survey, most IoD members travel to the airport

that they use most frequently for business flights by car (70%) and taxi (31%). Even in London, 48% travel by taxi, 43% by car, 37% by rail and 24% by underground.

- Heathrow is well located for surface access from London via public transport, with the Heathrow Express and Piccadilly Line offering fast, or cheap, access to the airport.
- A number of rail infrastructure improvements currently underway or planned will greatly improve surface access to Heathrow:
 - Crossrail will deliver direct journeys within 45 minutes from Canary Wharf, and around 30 minutes from a number of stops in Central London;
 - A Western access line to the Great Western Main Line will reduce journey times to Heathrow from key cities to the West of London;
 - HS2 will bring the airport much closer to cities from the North West, the Midlands, Yorkshire and the North East;
 - The Piccadilly Line upgrade will reduce journey times to Central London by a fifth, and will increase the frequency of services;
 - A Southern rail link to Heathrow, probably via Staines, would provide direct rail access to the airport from South West London.
- When asked to choose just one option to increase capacity, a third runway at Heathrow was the preferred choice of IoD members (27%).
- Heathrow expansion can be funded privately, without any risks to the taxpayer, and construction can be undertaken relatively quickly. We would expect surface access improvements, as is the case for the existing rail improvements, to be funded publicly.

By contrast, a new hub airport – either a four-runway Stansted or a new airport east of London – would have a number of downsides:

- For most passengers, it would take longer and cost more to get to than Heathrow, and for some, would involve a long drive around the congested M25.
- An Isle of Grain airport would cost £50 billion, and an outer Thames estuary airport substantially more.²⁶ This would mean higher levels of taxpayer funding, or higher landing charges, or both.
- Unless Heathrow was to close, there would be no reason for airlines to move, given that airlines are not moving from Heathrow to other less congested airports at present. The closure of Heathrow may free up land for housing, but at the cost of tens of thousands of job losses and significant impacts on the business that choose to locate in the Thames Valley because of its proximity to Heathrow. International businesses may choose to move their headquarters to other countries rather than east of London.
- If a new Thames estuary airport required the closure of Heathrow, IoD members would be opposed, with 24% in favour and 45% against.

A third runway at Heathrow would dramatically improve the airport's connectivity, but a fourth runway is likely to be needed in the longer term in order to meet forecast demand. A phased expansion of the airport may be the best option, but any third runway solution should not prevent a fourth runway from being added.

²⁶ Mayor of London, *A new hub airport for London and the UK*, July 2013
<http://www.tfl.gov.uk/corporate/projectsandschemes/26458.aspx>

A number of options for Heathrow expansion have been proposed:

- A third runway to the North West or South West of the airport, with the option to construct a fourth runway over time.²⁷
- Lengthening Heathrow's existing two runways, and splitting each one in the middle, thereby creating four full-length runways.²⁸
- The construction of two pairs of close parallel runways immediately to the West of the existing site, with Terminals 2, 3 and 5 retained and a new Heathrow West terminal;²⁹
- A close-parallel runway to the South of the existing Southern runway, which could be contained almost entirely within the existing airport boundary, together with the demolition of Terminal 4 and its relocation to the central area;³⁰
- Reconfiguration of the runway at RAF Northolt to serve as a third (or a fourth) runway, with a fast rail link between the terminals;³¹

We do not have the technical expertise to favour one runway scheme in particular, but assuming the technical issues can be addressed, the main trade-offs appear to be fourfold:

- **Cost:** Lengthening and splitting the existing runways would appear to be the cheapest four-runway option.
- **Noise:** Moving the airport to the west would benefit west London but negatively impact on Windsor.
- **Noise:** Constructing runways to the north or south of the airport would bring new people under the flight paths, although would allow respite to be maintained.
- **Noise:** Lengthening and splitting the existing runways would not bring new people under the flight paths, although it may be harder (though not necessarily impossible) to maintain periods of respite for those living under the existing flight paths.

Recommendation 2: Allow Gatwick to build a second runway, if privately financed.

The UK's principal shortage is of hub capacity, but incremental growth at Gatwick may require a second runway at the airport. A second runway at Gatwick could complement Heathrow expansion, and provide a boost to competition.

Gatwick is currently about 80% full, and is likely to be completely full over the next 15 years. According to the DfT's forecasts, which assume that demand is not constrained at Heathrow, demand at Gatwick will increase to 45 million passengers per annum by 2030,

²⁷ Heathrow airport, *A New Approach: Heathrow's options for connecting the UK to growth*, July 2013. NB: Heathrow's preferred options cited

http://www.heathrowairport.com/file_source/Heathrow/Downloads/PDF/a-new-approach_LHR.pdf

²⁸ Heathrow Hub <http://heathrowhub.com/how-it-works>

²⁹ This proposal was made by Tim Leunig, *Bigger and quieter: The right answer for aviation*, Policy Exchange and Centre Forum, October 2012

<http://www.policyexchange.org.uk/publications/category/item/bigger-and-quieter-the-right-answer-for-aviation>

³⁰ This proposal was made by Aras Global Ltd

³¹ This proposal was made by Rothwell Aviation Ltd

50 million by 2040 and 60 million by 2050.³² The airport's current capacity is around 42 million passengers per annum. The DfT forecasts show that, even with expansion of Heathrow, demand at Gatwick will increase steadily.

There is therefore a good case for a second runway at Gatwick to enable the airport to meet the forecast demand increases, and the airport recently confirmed that it would examine various options.³³ The 2003 White Paper also concluded that there was a good case for a second runway on its own merits.

There are several further reasons why expansion of Gatwick should be permitted:

- The airport is well located for rail access, and its rail services will improve after the Thameslink upgrade is completed in 2018. It is currently far better located than Stansted for rail access.
- The investment risk would fall on the airport, not the taxpayer.
- It remains to be seen whether London can accommodate two hub airports, as per New York. A larger Gatwick may remain a very busy point to point airport, or start to develop a hub offering. A second runway at Gatwick would offer a low-risk way of finding out whether two hub airports in the South East are feasible – certainly far less risky than Stansted.

Gatwick expansion could be privately financed, although surface access improvements will likely need to be financed publicly. We are, however, not certain that a second runway at Gatwick could be privately financed at present if Heathrow also expands, so this option may be one for the longer term. As with Heathrow, we would expect surface access improvements to be publicly funded.

4. Noise and air pollution recommendations

The biggest downsides to Heathrow expansion are noise and local air pollution. Any expansion of Heathrow (or indeed of any other airport) must be accompanied by an extensive package of mitigation measures. The measures recommended below apply to airports expanding with new runways, or new airports, only:

Recommendation 3: Airports building new runways, or a new airport, should be subject to strict noise measures.

These standards should be applied to the whole airport, not just to new runways, and should come into effect when the new runways open. Given that it will take a number of years before new runways are completed, the airport and airlines would have time to adjust. Applying the standards to the whole airport may also help to balance local interests, by providing some relief to residents already affected.

There are several measures that stand out in particular:

- First, ensuring that no planes above a certain noise threshold are permitted to use the airport, except in an emergency. The noise limits should be agreed as part of the

³² Department for Transport, *UK Aviation Forecasts*, August 2011, unconstrained terminal passenger forecasts by airport (central forecast)

³³ Gatwick Airport, 17 October 2012 <http://www.mediacentre.gatwickairport.com/News/Gatwick-Airport-to-develop-options-for-a-new-runway-79d.aspx>

planning process and therefore announced before the construction of any new runways, giving airlines a number of years to adjust. They should also fall further over time. It is outside the IoD's competence to determine exactly what the noise levels should be, although we are persuaded by the conclusions of a recent Policy Exchange and Centre Forum report. The report stated that all planes arriving at their suggested four-runway Heathrow would have to be QC 0.5 or lower on arrival, while narrow bodied departures would be QC 1 or lower and wide bodied departures QC 2 or lower. This would allow a large range of existing long-haul and short-haul aircraft to operate, although would mean that a number of airlines, not least British Airways, would have to upgrade their fleets.³⁴ Further work would be needed, but this may be a sensible noise limit for any airport building new runways.

- Second, increasing the angle of descent so that planes are higher above people's homes when they land. This can also dramatically reduce noise levels. Planes currently descend to land at Heathrow at an angle of 3 degrees, compared to 5.5 degrees at London City. Although the steeper angle of descent is necessary at London City because of the M25 bridge at Dartford, rather than as a noise mitigation measure, it illustrates that steeper landings for smaller planes are perfectly possible. Although it is unlikely that wide-bodied planes could land at 5.5 degrees, it may be possible to raise their angle of descent above 3 degrees by the time new runways open. Again, further work would be needed to determine the precise angles that would be safe.
- Third, improved technology and an end to 'westerly preference' at Heathrow should allow more dispersed arrival paths, reducing the concentration of noise. This would allow respite to be maintained, or even increased, particularly for early morning and late evening arrivals, which have the greatest impact on quality of life. If the option to extend and split the existing runways is chosen, this measure would be particularly important.

Recommendation 4: Airports building new runways, or a new airport, should be required to implement best practice ground procedures.

Operational measures can reduce emissions and noise on the ground, and it would be sensible for an airport building new runways to be subject to strict requirements to implement best practice. Three areas stand out:

- First, in 2009, aircraft ground movements at Heathrow accounted for almost 600,000 tonnes of CO₂ – around the same amount as emissions from approaching and departing aircraft – as well as considerable quantities of harmful air pollutants.³⁵ A Boeing 747 can consume a tonne of fuel during an average 17 minute taxi to take off. Towing aircraft by tugs to and from the runways could save huge quantities of fuel, reduce emissions of CO₂ and air pollutants, and cut down on airport noise. For example, the TaxiBot tug, currently being developed by Israel Aerospace Industries, would use just 20-30 litres of fuel, while it may also be possible to use electric power to drive aircraft to and from the runway.³⁶
- Second, using fixed electrical ground power (especially if powered by low carbon sources) rather than running auxiliary power units on stationary aircraft also has the

³⁴ Tim Leunig, *Bigger and quieter: The right answer for aviation*, Policy Exchange and Centre Forum, October 2012, pp. 43-45 <http://www.policyexchange.org.uk/publications/category/item/bigger-and-quieter-the-right-answer-for-aviation>

³⁵ Sustainable Aviation, *Progress Report 2011* <http://www.sustainableaviation.co.uk/wp-content/uploads/sa-progress-report-2011.pdf>

³⁶ The Economist, *Preparing for take-off*, 15 September 2012 <http://www.economist.com/node/21562895>

potential to reduce emissions, and we would encourage further work to be undertaken to establish a baseline of best practice that expanding airports would have to adhere to.

- Third, it would be desirable to require expanding airports to use electric vehicles for airport operations. The biggest problem that electric vehicles have is range, which is clearly not an issue at a specific location such as an airport.

Recommendation 5: Airports building new runways, or a new airport, must have a strategy to reduce air pollution and CO₂ resulting from road access to the airport.

Parts of London in particular suffer from poor air quality, with high levels of Nitrogen Dioxide (NO₂) and particulates. Central London, key trunk roads and the area around Heathrow are worst affected.³⁷

Over time, CO₂ and air pollution from road transport will gradually fall, as engines become cleaner, the uptake of hybrid and stop-start non-hybrid engines increases, as electric car technology develops, and as the potential for natural gas vehicles increases. But, especially for Heathrow, these improvements are unlikely to come fast enough.

Any expanding airport, especially Heathrow, should therefore be required to produce a strategy to reduce emissions of CO₂ and air pollution from road access to the airport, with measurable goals. Such a strategy should both inform, and be informed by, improvements to public transport services to the airport – if public transport services are improved, it will be easier to restrict car access.

The rail improvements currently underway or planned should allow a reduction in the proportion of car journeys to and from Heathrow, while a southern rail access would provide a further boost to public transport options.

Thank you for considering this response. Should you wish to discuss any of the points raised in more detail, please do not hesitate to contact me. We wish you well with your work.

Yours faithfully,

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³⁷ For maps of NO₂ and PM10 particulates within the M25, see <http://www.londonair.org.uk/london/asp/annualmaps.asp?species=NO2&LayerStrength=75&lat=51.5008010864&lon=-0.124632000923&zoom=14>