

Aviation Demand Forecasting

The Mayor of London's response

March 2013

1. Purpose of paper

1.1. In February 2013, the Airports Commission issued a Discussion Paper on Aviation Demand Forecasting. This included a number of questions which are annexed to this response. This response addresses the questions posed under the following headings:

- The importance of aviation demand forecasts
- Historic trends in forecasting demand
- The DfT's National Air Passenger Demand Model
- The DfT's National Air Passenger Allocation Model
- The need for additional capacity

2. Summary of key issues for the Airports Commission

- 2.1. Accurate future projections of future aviation demand are helpful in informing critical infrastructure planning decisions which will take a number of years to plan, design and implement. Given the lead times, the risks are greater with under-delivery of capacity than with over-delivery.
- 2.2. We have a number of issues of concern regarding the DfT's current approach to demand forecasting. There is potential for refinement to improve its accuracy, particularly with regards to the allocation of demand between airports and the impacts on connectivity.
- 2.3. We recognise that the DfT have, over a number of years, developed a very complex set of modelling tools to assess the future demand for air travel. As part of their regular updating, there would be value in looking at the forecasts the model generates alongside other industry forecasts. The Commission might wish to initiate an approach that takes into account the expertise of those well-placed to anticipate how the industry will actually respond, rather than taking the model outputs as read.
- 2.4. Notwithstanding the details of the DfT's approach, their forecasts indicate that a step

change in hub airport capacity serving London is required to support and sustain the global economic position of both London and the UK..

3. The importance of aviation demand forecasts

- 3.1. The work of the Commission must be informed by projections of future air traffic demand for the UK airports. These forecasts will need to consider growth over the longer term in order to inform critical infrastructure planning decisions which will take a number of years to plan, design and implement. This is particularly the case in delivering any substantial new airport infrastructure (runways, terminals and surface access links). A similar approach is taken for other infrastructure with long lead times, notably in the energy sector.
- 3.2. Were capacity not to be provided in line with demand, there would be a number of consequences for the UK. Constraining demand would increase the cost of doing business in the UK, leaving us at a competitive disadvantage against those economies without such constraints. Without the right capacity provision (in the right configuration), the UK economy would also suffer from a reduced number of destinations and frequencies on offer.
- 3.3. The need for long term forecasts creates particular challenges because of the high levels of uncertainty around many of the key input assumptions, not least global economic recovery and growth, the UK's relative position within the global economy and changes in airline costs (notably relating to fuel and carbon impacts). Whilst the forecasts need to be prudent, not least in recognising the need for the UK to meet its climate change targets, the approach to forecasting needs to recognise the high level of uncertainty entailed in forecasting many decades ahead. An important consideration for the Commission will be whether the risks are greater with under-delivery of capacity than with over-delivery. This will colour the approach to forecasting uncertainty.
- 3.4. It is essential that any major airport capacity decision recognises this uncertainty, and the advantages of safeguarding or making passive provision for expansion. A well-planned, 'future-proofed' airport configuration which can expand organically will ensure both economic and environmental efficiency. Treatment of uncertainty and defining the appropriate basis for considering future options for airport capacity provision will be critical to the work of the Commission. The Department for Transport's (DfT) current demand forecasting approach is based on a relatively oversimplified central and 'high' and 'low' cases. It is essential that these scenarios are developed with sufficient rigour so as to properly inform decision making.

4. Historic trends in aviation demand forecasting

- 4.1. In adopting forecasts to be used for the purpose of planning airport capacity for the long term, it is important to be cognisant of the accuracy of past forecasts. We

would concur with the Commission when it notes, at para 3.36 of the Discussion Paper, that forecasts tend to perform better during periods of stable economic performance than when there are no major shocks of an economic or social nature. This is principally a function of lack of predictability in the key input variables.

- 4.2. However, examination of a number of historic DfT forecasts (back to 1991) over a longer period of time reveals that forecasts can underestimate future demand as well as overestimate it. There is clear evidence to suggest that short-term blips do not, in the long run, alter the overall average trend.
- 4.3. The most recent forecasts have been produced during the trough of the most severe economic cycle for 100 years. This could mean that there is greater likelihood of actual demand for air travel exceeding the current projections than it falling below. This would have major implications for the scale and timing of airport capacity solution required. Indeed, there is some indication that the 2013 forecasts may have already been exceeded, based on actual passenger numbers observed in 2011 and 2012.

5. The DfT's National Air Passenger Demand Model

- 5.1. It is useful to understand both capacity constrained and unconstrained forecasts. The DfT's approach to producing national unconstrained forecasts of passenger demand to use UK airports is generally reasonable. The forecasts derive from detailed econometric analysis of the key drivers of demand over many years. They were subject to extensive peer review in 2010-11, which considered the overall modelling approach to be robust. However, this peer review was technical in nature, focusing on the mathematics of the calibration, rather than a review of the reasonableness of the outcome in the industry context.
- 5.2. Identifying the right balance of demand drivers is important for the robustness of the forecast. Figure 2.2 in the DfT's 2013 forecasts and Figure 3.7 in the Commission's Discussion Paper both give indications of the extent to which the overall forecast outcomes are dependent on Gross Domestic Product (GDP) related factors and those relating to factors impacting on airline costs and, hence, air fares, notably oil prices.
- 5.3. Whilst GDP related factors, including consumer expenditure, may be the principal drivers, there are risks in simplifying relationships to a GDP multiple. Other than oil prices, there are other factors that could impact the cost of air travel, such as Air Passenger Duty (APD), changes to which are not assumed in the DfT methodology. For longhaul traffic, the potential for greater aviation liberalisation is similarly worth bearing in mind.
- 5.4. Recognising the challenges in predicting global macroeconomic indicators, a probability-based approach for a variety of factors would be more useful than a simple low/central/high approach.

- 5.5. There are also concerns about the world regions that the DfT forecast uses – just five, compared to the 19 that Airbus and Boeing employ in producing their demand forecasts. These DfT regions are far from homogeneous in their growth profiles; for example, the ‘Less Developed Countries’ category includes Brazil, India, Russia, Ukraine, the UAE and the poorest states in Africa. Treating them together erodes the effectiveness of the model.
- 5.6. We also have reservations about the way in which the DfT model treats international transfer traffic as a fixed input. This seems unwise given its dynamic nature, both in terms of the offering at UK airports and our rivals in continental Europe and beyond.

6. The Government’s National Air Passenger Allocation Model (NAPAM)

- 6.1. The DfT acknowledge, at para 1.4 of the 2013 forecasts, that ‘the uncertainty reflected in the range at the national level is compounded at the level of the individual airport. At the airport level, the DfT forecasts may differ from local airport forecasts. The latter may be produced for different purposes and may be informed by specific commercial and local considerations.’
- 6.2. However, without capturing these considerations, the model is flawed in its ability to fully understand the interaction between different airports and as such to support decision-making about airport capacity.
- 6.3. There are a number of examples of the model producing strange results, often compounded by its overstating of the willingness of passengers, in the face of capacity constraints, to travel considerable distances to fly. That a significant number of London and South East based passengers use Humberside airport in the constrained model in future years is a case in point.
- 6.4. The model is also limited in its ability to weigh up the balance between direct and indirect flight options for different market segments – and the weight to assign to a UK hub airport versus an alternative airport which might be more local but can offer fewer connections. As such, we do not believe that the model is able to sufficiently capture the impact of capacity constraints on routes and frequencies offered, and as a result, we cannot have the confidence in the accuracy of Table 4.2 of the Commission’s Discussion Paper that we would like.
- 6.5. In applying a relatively blunt approach to world regions, there is a risk that the model does not acknowledge the importance of serving a wide range of destinations, at the right frequency. In certain regions there will be a particular advantage in serving specific countries and cities. For example, the McKinsey Global Institute have identified the 25 cities with the highest forecast growth 2007–2025 (cf The Mayor of London, ‘A New Airport for London, Part 2, 2011’, Table 13). We believe that the Government’s model should be able to determine the extent to which destinations such as these would be served in different capacity scenarios.

- 6.6. We recognise that the DfT have, over a number of years, developed a very complex set of modelling tools to assess the future demand for air travel. As part of their regular updating, there would be value in looking at the forecasts the model generates alongside a range of other industry forecasts. The Commission might wish to initiate an approach that takes into account the expertise of those well-placed to anticipate how the industry will actually respond, rather than taking the model outputs as read.

7. The need for additional capacity

- 7.1. Notwithstanding the above concerns, the DfT forecasts are broadly in line with wider industry forecasts, albeit that they err on the cautious side. While those we have reviewed (Boeing, Airbus, Bombardier, ICAO, FAA, and Eurocontrol) report on varying global regions and with different metrics, they all confirm that significant global growth in air transport is forecast within both the short term and the long term.
- 7.2. The need for additional airport capacity is evident. The Government's forecasts identify in the capacity unconstrained scenario that Heathrow will grow to a size in excess of 170 million passengers per annum by 2050. We therefore interpret the Government's forecasts as indicating that a step change in hub airport capacity is required to support and sustain the global economic position of both London and the UK.
- 7.3. The Commission must acknowledge that the demand forecasting discussion is not simply a question of 'predict and provide'. Capacity built in excess of projected demand has the potential to stimulate additional growth by providing opportunities for activities which are difficult to predict or quantify today. This has generally been the case with infrastructure: the extension of London's Underground network through to the 1930s stimulated development and growth even though the capacity created was way beyond the demand that might have been reasonably predicted when it was delivered. Whether it is the benefits for UK business of a step-change competitive advantage in connectivity, or a transformation of logistics activity taking place in the UK, that potential should not be underestimated.

APPENDIX: Airports Commission questions presented in Discussion Paper 01

[including the section of this document in which they are addressed]

- To what extent do you consider that the DfT forecasts support or challenge the argument that additional capacity is needed? [chapter 7]
- What impact do you consider capacity constraints will have on the frequency and number of destinations served by the UK? [chapter 6]
- How effectively do the DfT forecasts capture the effect on UK aviation demand of trends in international aviation? [chapters 5 and 6]
- How could the DfT model be strengthened, for example to improve its handling of the international passenger transfer market? [chapters 5 and 6]
- What approach should the Commission take to forecasting the UK's share of the international aviation market and how this may change in different scenarios? [chapters 5 and 6]
- How well do you consider that the DfT's aviation model replicates current patterns of demand? How could it be improved? [chapters 5 and 6]
- Do you agree with the source of the input data and assumptions underpinning the DfT model? [chapters 4 and 5]
- Do you agree with the choice of outputs modelled? [chapters 5 and 6]
- Do you consider that the DfT modelling approach presents an accurate picture of current and future demand for air travel? If not, how could it be improved? [chapters 5 and 6]
- Is the DfT model suitable to underpin an assessment of the UK's aviation connectivity and capacity needs? [chapters 5 and 6]
- What alternative or complementary approaches could be used to assess the impact of international competition? [paragraphs 5.6 and 6.6]
- What factors, if any, are missing from the DfT's modelling approach? How can these be more effectively analysed? [chapters 5 and 6]
- Is the DfT model granular enough to underpin the Commission's assessment of future demand? [chapters 5 and 6]
- Does the DfT approach to demand uncertainty capture a reasonable range of uncertainty? Could the approach be improved? [paragraphs 3.3 & 3.4]
- Would a probability based approach to dealing with uncertainty help the Commission to test the robustness of the model's outputs? [paragraph 5.4]
- The Commission has reviewed four alternative forecasts. Do you consider that there are others which should be looked at and why? [paragraph 6.6]