Implications for the Air Freight Sector of Different Airport Capacity Options

Prepared for the Freight Transport Association
and Transport for London

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York Aviation

Contents

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Key Points

Key Points (1)

- So far, the work undertaken by the Airports Commission has focussed strongly on the needs and requirements of the passenger market at London's airports. Issues around the freight market have largely been underestimated and there are also concerns in the freight industry that the Commission has little understanding of how the air freight market operates or its importance in supporting the UK economy.
- Air freight accounts for about 40% of UK imports and exports by value. It is an essential enabler for a wide range of industry sectors, handling high value goods, which require rapid, secure and reliable transport to destinations all over the globe.
- The UK air freight market is dominated by London and more specifically by Heathrow. In 2013, the main London airports handled around 1.8 million tonnes of freight, with Heathrow accounting for around 1.4 million tonnes.
- Air freight tonnage at the London airports has grown over the last 20 years. However, this disguises a worrying trend. The market grew rapidly until 2000, but since that time it has largely stagnated. This stagnation has coincided with growing capacity constraints at Heathrow and the inability of the London hub to grow in terms of Air Transport Movements (ATMs). The air freight market in London is already being constrained by the capacity issues at Heathrow. It is also seems clear that to a significant degree other airports cannot step in to provide relief as they do not have the long haul networks to support bellyhold capacity. Only Stansted, with its significant spare runway capacity, has emerged as an alternative for pure freighter airlines.
- Air freight is a significant driver for the UK economy. Damaging its ability to function effectively in the longer term through the failure to deliver capacity improvements or the development of the wrong options could have serious implications for the UK economy.
- In 2010, Steer Davies Gleave (SDG), as part of their work for Department for Transport on Air Freight in the UK, estimated the total economic footprint of the sector (direct, indirect and induced effects) to be around £7.3 billion in Gross Value Added (GVA) and 135,300 jobs. The impact of the sector on the wider economy is difficult to quantify effectively. However, SDG estimated that the total value of air freight services including wider impacts to the UK economy was around £14.3 billion and 282,400 jobs.
- By 2050, the London system airports will be full if either no capacity is added or a third runway is added at Heathrow or a second runway is built at Gatwick. Only a 4 Runway Hub would provide some spare capacity at 2050. This has significant implications for the ability to service air freight demand from London. We would expect significant volumes to have to be trucked elsewhere by 2050 in constrained scenarios:
  - No Expansion – 2.1 million tonnes of freight or around half of total freight demand in 2050;
  - Heathrow Runway 3 – 1.2 million tonnes of freight or around 85% of the freight throughput of Heathrow now;
  - 2nd Runway at Gatwick – 1.7 million tonnes of freight.
- This will ultimately have significant negative impacts on the UK economy.
- If no additional capacity is provided in London (No Expansion), the additional trucking costs are estimated to be around £41.6 million per annum in 2050. With a 2nd Runway at Gatwick, these costs reduce to a total of around £36.1 million per annum. Heathrow Runway 3 results in additional costs of around £23.5 million per annum. These costs are likely to be passed through to users of freight services.

Key Points (2)

- There are also potentially significant impacts on freight users time costs from increased transit times. No Expansion of capacity will result in a loss of user time costs of around £378 million per annum. The addition of a second runway at Gatwick improves the situation but the costs are still ultimately significant at around £321 million per annum. Heathrow Runway 3 results in a loss of around £213 million per annum.
- The consequent impacts on long term GVA in the wider economy are again significant. No Expansion results in lost GVA of around £978 million per annum by 2050. Heathrow Runway 3 results in a GVA loss of around £551 million per annum by 2050. 2nd Runway at Gatwick results in a GVA loss of around £836 million per annum by 2050.
- In addition, the impact on the sector's economic footprint (direct, indirect and induced impacts) in 2050 could be :
  - No Expansion – around £637 million in GVA and 6,800 jobs;
  - Heathrow Runway 3 - £359 million in GVA and 3,800 jobs;
  - 2nd Runway at Gatwick - £544 million in GVA and around 5,800 jobs.
- Ultimately, our analysis demonstrates clearly the importance of the provision of sufficient concentrated airport hub capacity in London by 2050. Without this capacity the air freight industry will suffer, as, ultimately, will the end users in the UK economy.

Introduction

Introduction

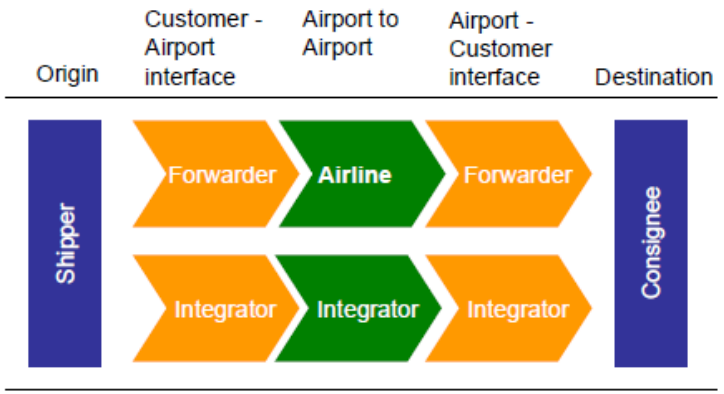
- In August 2014, York Aviation was commissioned by the Freight Transport Association and Transport for London, to consider the potential long term effects on the UK economy from changes in the air freight industry in the UK resulting from different potential development scenarios for runway capacity in London.
- So far, the work undertaken by the Airports Commission has focussed strongly on the needs and requirements of the passenger market at London's airports. The Commission has identified the need for one more runway in London by 2030 and has chosen to focus its work on considering where this additional runway should be located and is currently appraising options at Heathrow and Gatwick and up until September, it was considering the Mayor of London's proposal for a four runway hub in the inner Thames estuary. The Commission has recognised that further runway capacity, beyond the initial additional runway, is likely to be needed soon after 2030 and that certainly by 2050 as, even with one more runway in London, the London airports will be full.
- Clearly, the debate around the location of further runway capacity and, ultimately the amount of further capacity, will not just affect passengers and passenger airlines. There are significant potential implications for air freight operations, with knock-on implications for the broader freight industry and ultimately for freight users. However, to date, issues around the freight market have largely been underestimated in the Commission's publications and there are also concerns in the freight industry that the Commission has limited understanding of how the air freight market operates or its importance in supporting the UK economy.
- This short report seeks to address some of these issues, building on previous work undertaken by York Aviation and on a range of other publicly available information:
  - focussing on potential impacts in the longer term at 2050;
  - examining the implications for air freight capacity in London;
  - considering how the freight industry might react in different scenarios to service demand;
  - identifying and where possible quantifying the potential impacts on freight users.
- The analysis undertaken here necessarily adopts a range of simplifying assumptions given the timescales for the study, the limited availability of information on air freight operations and demand compared to the passenger market and the lack of information on air freight in the forecasting work undertaken by the Department for Transport in its 2013 UK Aviation Forecasts and latterly by the Airports Commission.
- This report is structured as follows:
  - in **Section 2** we set out some basic information on the air freight market in London and across the UK;
  - in **Section 3** we provide some background on the importance of air freight to the economy;
  - in **Section 4** we present our estimates of the impact on air freight capacity in London of the runway development scenarios;
  - in **Section 5** we discuss how the industry might react to these scenarios and present our estimates of the impact on the UK economy;
  - in **Section 6** we outline our conclusions.
- In addition, given the options now being considered by the Airports Commission, we have included an Appendix that specifically considers the relative merits of expansion at Heathrow and Gatwick using the evidence developed during this study.

The Air Freight Market in the UK

Air Freight in the UK

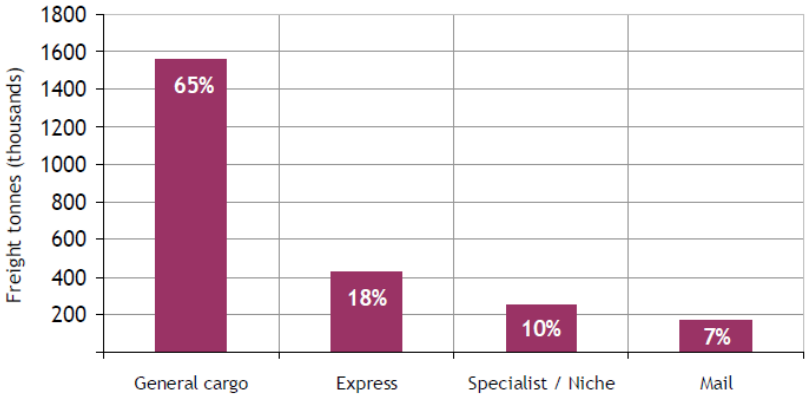
- Air freight accounts for about 40% of UK imports and exports by value. It is an essential enabler for a wide range of industry sectors, handling high value goods, which require rapid, secure and reliable transport to destinations all over the globe. Key users include high end manufacturing, engineering, pharmaceuticals, retailing, financial and business services and the automotive sector.
- Steer Davies Gleave (SDG), in its work for the Department of Transport on UK Air Freight in 2010, identified two broad business models operating in the UK:
  - General Cargo transported by passenger and freight airlines with collection and delivery organised by freight forwarders; and
  - The Integrator model, which tends to focus on smaller consignments, where collection and delivery, and often the air component of the journey are all managed by a single organisation.
- The integrator model, as operated by companies such as DHL, UPS, TNT and Federal Express, has been of growing in importance in the last two decades. This model focussed originally on express courier services but has broadened out substantially. As a consequence, the two models increasingly crossover.
- Broadly, SDG split the air freight market in to four product types. General air cargo, express freight, specialist / niche freight and mail (see figure opposite). Express freight is the fastest growing segment of the market and, while speed is a feature of all air freight, it is within this segment that time critical activities are most extreme.

FIGURE 1.4 SIMPLE DOOR TO DOOR AIR FREIGHT VALUE CHAIN



Source: SDG.

FIGURE 5.1 TOTAL FLOWN UK AIR FREIGHT BY MARKET TYPE 2008 (INBOUND AND OUTBOUND)

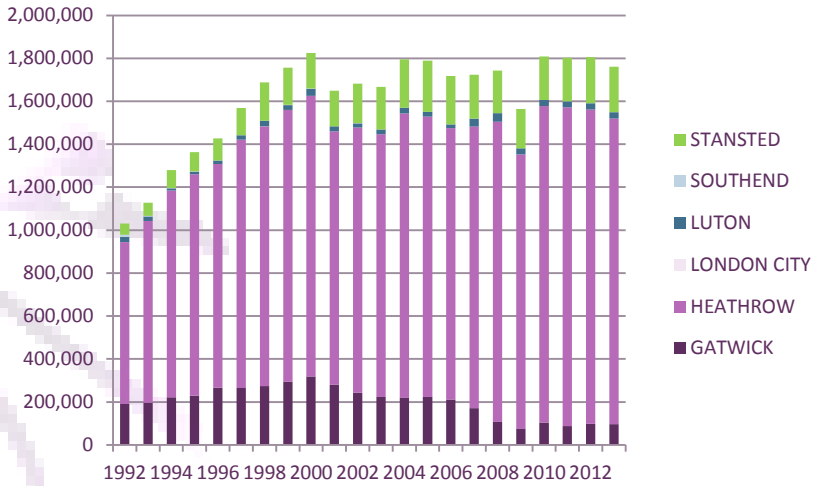


Source: SDG analysis of CAA and other sources.

Air Freight Market in London (1)

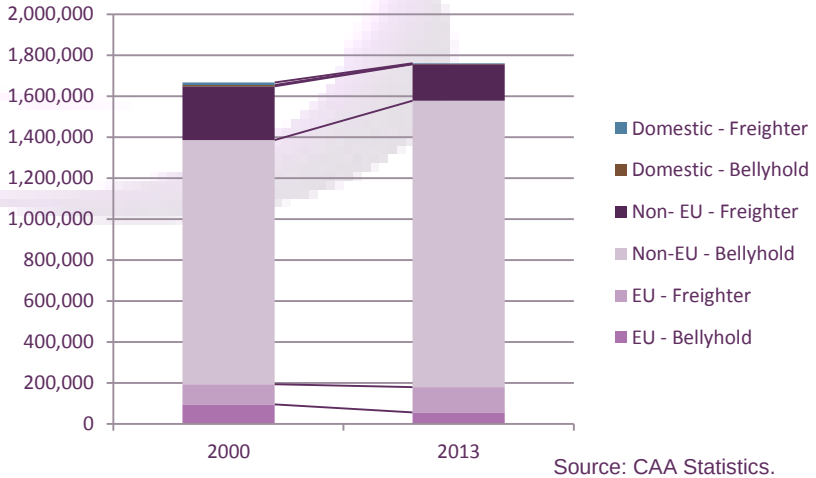
- The UK air freight market is dominated by London and more specifically by Heathrow. In 2013, the main London airports handled around 1.8 million tonnes of freight, with Heathrow accounting for around 1.4 million tonnes. The only other significant player in the London market was Stansted, which handled around 0.2 million tonnes, with Gatwick handling around 0.1 million tonnes. The market has been largely constant over the last 10 years following rapid growth in the 1990s.
- The air freight market is predominantly long haul and had become increasingly so over time. For domestic and short haul destinations in Europe, it is often cheaper, faster and more flexible to truck freight to its destination. It is difficult to precisely define where the tipping point lies between trucking and air freight in terms of distance. However, for overnight parcels it is believed to around 500km but, for less urgent freight, it could be substantially further.
- Air freight is carried in both the bellyhold of passenger aircraft and in dedicated freighter aircraft. The existence of the former method helps to explain the dominance of Heathrow in the market in London. Heathrow, as a global hub airport, offers by far the largest range of long haul destinations of the London airports and by far the most aircraft capacity. Almost all of the 1.4 million tonnes of freight handled at Heathrow in 2013 was carried in the bellyhold of passenger aircraft. Increasingly, pure freighter operations have moved out of Heathrow as higher yielding passenger services have taken over their slots. The same is true of air freight operations at Gatwick
- Conversely, at Stansted Airport, the only other major player in the London market, the focus is on pure freighter aircraft, operated by a range of freight airlines. The Airport's passenger airlines focus on short haul travel using narrow body aircraft. Their business models do not fit well with carrying freight, particularly the low fares airlines.

Freight Tonnage at London Airports



Source: CAA Statistics.

Freight Tonnage at London Airports by Destination and Configuration

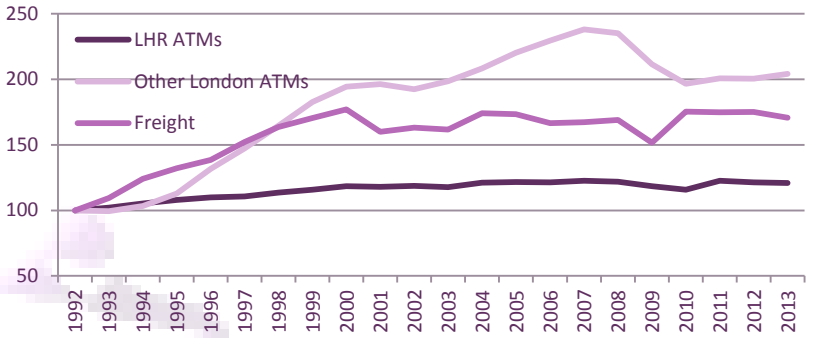


Source: CAA Statistics.

Air Freight Market in London (2)

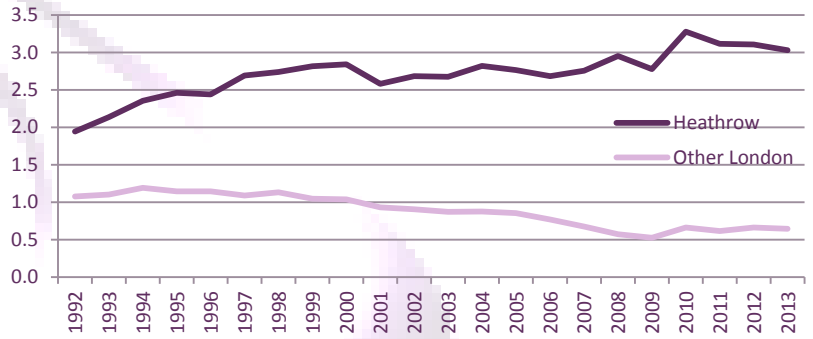
- Air freight tonnage at the London airports has grown over the last 20 years. However, this disguises a worrying trend. The market grew rapidly until 2000, but since that time it has largely stagnated. This stagnation has coincided with growing capacity constraints at Heathrow and the inability of the London hub to grow in terms of Air Transport Movements (ATMs).
- This is demonstrated in the chart opposite which shows freight tonnage tracking ATM growth at Heathrow. The growth in ATMs across the London system as a whole appears to have had no influence at all on air freight growth. This re-emphasises the importance of Heathrow in the air freight market as the primary provider of air freight capacity. The other airports, without Heathrow's long haul connections, simply do not provide an alternative. Only Stansted, with its significant spare runway capacity, has emerged as alternative for pure freighter airlines, albeit the range of destinations served by these aircraft is substantially smaller than is available using bellyhold capacity in passenger aircraft.
- The impact of constraint at Heathrow can also be seen in terms of the increasing freight loads per movement at the airport. Since 1992, the average amount of freight per movement has grown from around two tonnes to around three tonnes. At the same time, the average load at the other London airports has nearly halved, with airlines at the other London airports increasingly focussing on low cost, short haul travel.
- It is also interesting to compare Heathrow's performance to the other major European hub airports. In the last 10 years, both Paris and Frankfurt have outperformed Heathrow. Amsterdam was performing well prior to the global recession but experienced a more significant drop in freight throughput than the others and has still not recovered.
- Overall, it seems to reasonable to suggest that the air freight market in London is already being constrained by the capacity issues at Heathrow. It is also seems clear that to a significant degree other airports cannot step in to provide relief as they do not have the long haul networks to support bellyhold capacity.

Freight Tonnage vs ATM Growth (Index: 1992 = 100)



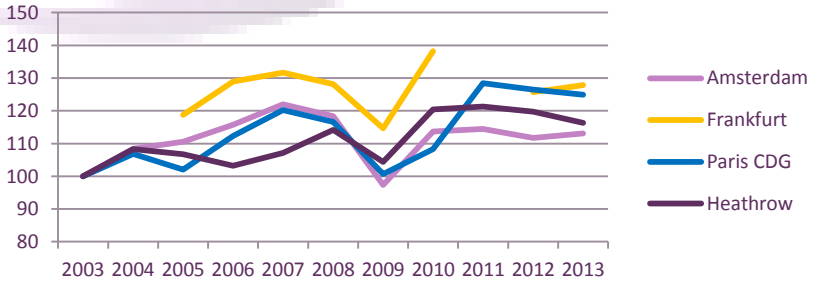
Source: CAA Statistics.

Freight Tonnes per Movement



Source: CAA Statistics.

Freight Tonnes at Europe's Hub Airports (Index: 2003 = 100)



Source: Eurostat.

Air Freight in the Rest of the UK

- Outside of London and the South East, there are only a limited number of UK airports with a significant air freight presence (the main London airports account for 77% of the market).
- East Midlands is by some margin the most significant freight airport outside London, with nearly 0.3 million tonned. It focuses on pure freighter operations and is the main UK base for DHL and a significant base for UPS and TNT.
- Manchester Airport is the largest bellyhold freight airport outside of London. The airport is also the largest long haul passenger gateway outside London, so this is not surprising. Birmingham Airport also has some bellyhold freight traffic, supported by the airport's long haul services, but is substantially smaller than Manchester.
- Manston Airport in Kent did, until recently, provide some additional freighter capacity for London. However, the airport closed in May 2014 following financial difficulties.
- Overall, this suggests that there is no 'ready made' solution to air freight capacity constraints in London immediately obvious in the UK regions.
- East Midlands clearly has the potential and capacity to be significant freighter only location but does not have a long haul passenger offer to support a bellyhold capability.
- Manchester has some potential to offer an alternative for bellyhold freight but is obviously a considerable distance from London and alternatives on the continent, such as Paris CDG or Amsterdam, offer a significantly greater long haul networks if freight needs to be trucked some distance.
- Birmingham may offer some options for bellyhold capacity but again will struggle to compete with the broader long haul networks at the continental hubs.

Air Freight Tonnes at UK Airports

	Tonnes	%
London - Bellyhold	1,455,725	64%
London - Freighter	304,965	13%
East Midlands - Bellyhold	16	0%
East Midlands - Freighter	266,952	12%
Manchester - Bellyhold	81,927	4%
Manchester - Freighter	14,446	1%
Manston - Bellyhold	9	0%
Manston - Freighter	29,297	1%
Belfast - Bellyhold	106	0%
Belfast - Freighter	29,181	1%
Birmingham - Bellyhold	15,269	1%
Birmingham - Freighter	5,797	0%
Other UK - Bellyhold	21,763	1%
Other UK - Freighter	42,356	2%
Total	**2,267,811**	**100%**

Source: CAA Statistics.

Current Economic Importance of Air Freight in the UK

The Economic Impact of Air Freight

GVA and Employment Impact of Air Freight on the UK Economy

Source: SDG.

- The importance of air freight to the UK economy can be demonstrated by its economic impact. It is not only important as an economic activity in its own right, providing jobs and supporting Gross Value Added (GVA), but, as we have described above, it also supports significant employment and Gross Value Added in the wider economy through the provision of its services to a range of industries in the UK economy.
- In 2010, SDG, as part of their work for Department for Transport on Air Freight in the UK, considered the economic impacts of the sector on the UK economy. It estimated that air freight services directly supported around £2 billion in GVA and around 39,100 jobs. In addition, through its supply chain (indirect effects) and through the expenditure of incomes earned in the direct and supply chain activities (induced effects), it supported significant GVA and employment. SDG estimated the total economic footprint of the sector (direct, indirect and induced effects) to be around £7.3 billion in GVA and 135,300 jobs.
- The impact of the sector on the wider economy is difficult to quantify effectively. However, using a multiplier analysis based on the UK input-output tables, SDG developed an estimate of what it termed forward linkage effects in the economy. Taking these impacts into account, SDG estimated that the total value of air freight services to the UK economy was around £14.3 billion and 282,400 jobs.
- Given the dominance of London in the air freight market in the UK, it is reasonable to assume that a significant proportion of these benefits accrue in the greater South East region and relate to activity at the London airports.
- This analysis also begins to demonstrate what is at stake in terms of the potential impact of different airport capacity development scenarios in London. Air freight is a significant driver for the UK economy. Damaging its ability to function effectively in the longer term through the failure to deliver capacity improvements or the development of the wrong options could have serious implications for the UK economy.

Economic Value of Air Freight to Users

- The value of air freight to users and, hence, ultimately its impact on the wider UK economy is driven by what it offers in terms of advantages over freight transport modes. SDG identified four key features and rated their importance to different users based on surveys and consultations.
- It shows that speed is important for all but, for some, it is a key feature of the service. This is potentially important in considering the potential impacts of different capacity scenarios for London, as, if demand cannot be met within the London system, freight will need to be trucked elsewhere, resulting in longer transit times or earlier final pick-up times for shipments. For some parts of the market, this could represent a critical loss of utility with significant impacts on their operations.
- The other key features are subordinate to speed but for some sectors they are valuable features, notably security for jewellery and art, and reach for aircraft parts.
- A number of quotes from the Freight Transport Association's Sky-High Value report, show the real world importance of air freight to example users. FTA members clearly demonstrate the importance of the existing Heathrow hub to their operations.

Ford's air freight needs can vary considerably, from a handful of parts to significant volumes. These can be sent by air in response to scheduling or engineering changes and Ford can also air-freight prototype parts, urgent replacement parts for customer vehicles, and occasionally complete vehicles for auto shows or short-notice testing under different conditions.
Ford

Air Freight Drivers by Importance to Key User Groups

	Security	Speed	Information	Reach
Machinery Parts	●	●●●	●●	●●
Electrical Components	●●	●	●	●
Aircraft Parts	●	●●●	●●	●●●
Jewellery	●●●	●	●●	●
Art	●●●	●	●●	●
High Street Fashion		●		
Pharmaceuticals	●●	●		●
Perishables		●●●		

Key: ● = Important ●● = Very Important ●●● = Key Feature

Source: SDG.

"It is no coincidence that suppliers to the music industry, as with other sectors such as motor sport, are clustered in the West London area. Heathrow's multiple daily departures for a huge number of international destinations are crucial to the company meeting the ever tightening time pressure on tour schedules."
Sound Moves, International Logistics for Bands and Artists

"Our products are used in scanning for, and treating, serious health conditions. However, our products decay continually, so it is essential that we can make and ship the product on the same day a clinician orders it, so that they receive a useable amount"
Pharmaceutical Manufacturer

Estimates of Air Freight Demand and Capacity in 2050

Potential Runway Capacity Development Scenarios

Forecast Movements and Movement Capacity in the London System in 2050 (000s)

	No Expansion	4 Runway Hub	Heathrow Runway 3	2nd Runway at Gatwick
Forecast Movements				
Heathrow / Hub	480,000	903,000	740,000	480,000
Gatwick	280,000	280,000	280,000	540,000
Other London	592,000	592,000	592,000	592,000
Movement Capacity				
Heathrow / Hub	480,000	1,080,000	740,000	480,000
Gatwick	280,000	280,000	280,000	540,000
Other London	592,000	592,000	592,000	592,000
% ATM Capacity Used	*100%*	*91%*	*100%*	*100%*

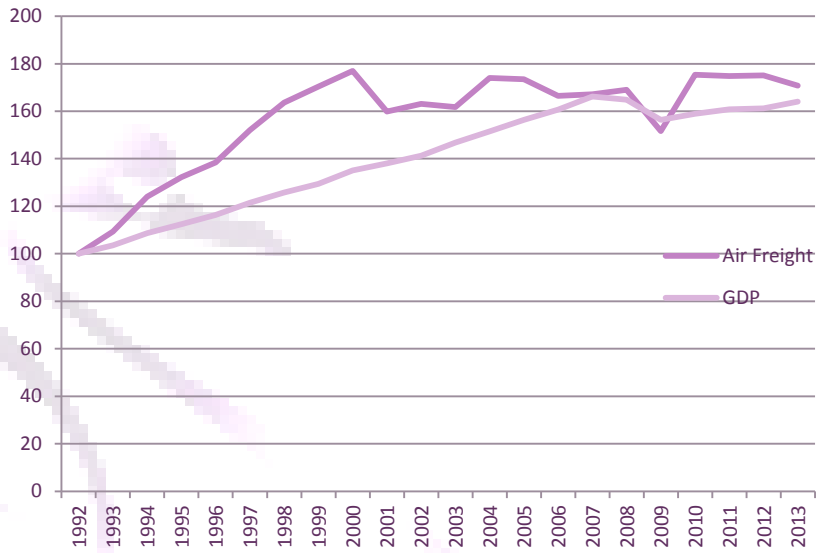
Source: York Aviation analysis of Airports Commission Interim Report, Heathrow and Gatwick submissions.

- In our analysis, we have considered four potential scenarios for runway capacity development in the London system by 2050:
  - No Expansion – no additional runway capacity is built in London before 2050. Movements and movement capacity are as assumed in the Airports Commission Interim Report;
  - 4 Runway Hub – a non-location specific four runway hub airport is developed. This is the only scenario in which there is any spare capacity in the London system. Movements at the hub are assumed to be at a similar level to an unconstrained Heathrow from the Airports Commission Interim Report. Other airports are full and capacities are assumed to be as per the Airports Commission Interim Report. This is included to demonstrate the importance of developing adequate hub capacity in London beyond the 2030 scope of the Airports Commission's current deliberations;
  - Heathrow Runway 3 – a third runway is built at Heathrow, in line with Heathrow Airport Limited's plans as set out on its website. This runway is full before 2050. All other airports are also full and capacities are taken from the Airport's Commission Interim Report;
  - 2nd Runway at Gatwick – a second runway is built at Gatwick in line with Gatwick Airport Limited's published plans on its website. This runway is full before 2050. All other airports are also full and capacities are taken from the Airport's Commission Interim Report.
- These movement forecasts and airport capacities form the basis for our assessment of potential freight capacity in the London system and the extent to which this can meet future demand for air freight in London.

Estimates of Unconstrained Freight Demand at the London Airports in 2050

- Unlike for passenger demand, there are no current published forecasts for air freight demand in the UK. Neither the Department for Transport nor the Airports Commission have produced freight forecasts in any of their recent aviation forecasting work.
- Organisations such as Boeing and Airbus to produce global freight forecasts. However, these typically present an optimistic view of the market, which is not specific to the UK. For instance, Boeing's 2012-2013 World Cargo Forecast predicts global growth of around 5.2% per annum for the next 20 years compared to 3.7% per annum recorded growth over the last 10 years.
- We have, therefore, made a conservative assumption that unconstrained air freight demand in the UK will grow broadly in line with UK GDP through to 2050. The forecasts for GDP growth have been taken from the Office for Budgetary Responsibility's latest short and long term forecasts. These see average per annum growth to 2050 of around 2.3%.
- Given the increasing globalisation of the world economy and the fact that UK trade has tended to grow faster than GDP, we believe this is likely to be a conservative methodology.
- Ultimately, this suggests total unconstrained tonnage demand across the London system in 2050 of around 4.2 million tonnes on a conservative basis.

UK GDP vs. Air Freight at London Airports (Index: 1992 = 100)



Source: ONS and CAA.

Potential Air Freight Capacity in the London System in 2050 (1)

Potential Air Freight Capacity in the London System in 2050

	No Expansion	4 Runway Hub	Heathrow Runway 3	2nd Runway at Gatwick
Total Freight Demand in Tonnes	4,221,831	4,221,831	4,221,831	4,221,831
Bellyhold Capacity				
Heathrow / 4 Runway Hub	1,724,544	3,139,644	2,601,497	1,724,544
Gatwick	127,430	124,775	124,775	465,915
Other London	20,134	19,913	19,913	19,692
Excess Tonnes after Bellyhold	2,349,723	937,499	1,475,646	2,011,680
Residual Freighter Capacity in Constrained Scenarios	240,653	n/a	286,932	286,932
Total Excess Tonnes	2,109,070	937,499	1,188,714	1,724,748
Freighter Movements Required	79,712	35,433	44,927	65,186
Available ATM Capacity	0	177,000	0	0
Accommodated within London with Freighters	0	35,433	0	0
Freight Tonnes to be Diverted Elsewhere	**2,109,070**	**0**	**1,188,714**	**1,724,544**

Source: York Aviation.

- Above, we have considered the potential air freight capacity that might exist in London under different the scenarios. In line with the structure of the market now, we have assumed that the majority of capacity will be provided via aircraft bellyhold freight. We have estimated this capacity based on the number of forecast international movements at the relevant airports in the London system multiplied by the expected average tonnage per international movement in 2050 at each airport. The latter has been derived by taking the tonnes per international movement now estimated from CAA Statistics and growing this by 0.5% per annum to 2050 to reflect increasing loads and larger aircraft. In relation to the 2nd Runway at Gatwick scenario, we have made a further adjustment to allow for the fact that we would expect the airport to attract more long haul services in such a scenario. We have assumed that that tonnage per movement in this scenario would increase significantly to be around double that observed at Gatwick in the other scenarios in 2050. This reflects the Gatwick Airport long term demand forecasts from its submissions to the Airports Commission, which suggest a doubling in the proportion of long haul traffic at the airport by 2050.

Potential Air Freight Capacity in the London System in 2050 (2)

- Within the London system, we have assumed that a hierarchy of preference will exist much as it does now. Heathrow or a 4 Runway Hub will be the first choice for the users of bellyhold freight capacity as they will offer the largest concentration of capacity via their long haul networks and this capacity will be used up first. Excess tonnage will then shift to Gatwick and then finally to other airports in the London system, most likely Stansted.
- For the purposes of this analysis, we have assumed that freighter aircraft primarily act as a means to supplement bellyhold capacity where insufficient bellyhold capacity is available. This is simplification as there are items that cannot be transported on passenger aircraft or for which freighter transport is preferable and destinations that are not served by passenger aircraft. Consequently, we have further assumed that a residual number of freighter movements will still be accommodated in London in capacity constrained scenarios at 2050, i.e. all scenarios other than the 4 Runway Hub.
- These freighter flights may use slots that are not suitable for passenger activities or may simply offer more value than some passenger leisure services and, hence, force such services out of the market. The percentage of total ATMs in the London system accounted for by these services is assumed to be equal to the percentage of pure freighter movements at Heathrow now under these constrained scenarios.
- To the extent that there remains excess tonnage that remains after these two elements of freight capacity have been considered, the scope to accommodate additional freighter aircraft movements within the London system will be dependent on the number of movements entailed and the number of available movements remaining at the airports. As stated above, it is only in the 4 Runway Hub scenario that there is any movement capacity left by 2050 and, hence, it is only in this scenario that any of the excess demand can be accommodated in London. In fact, the available ATM capacity is such all freight demand can be handled at the London airports in this scenario.
- In all the other scenarios, this demand must be satisfied elsewhere at other airports either in the UK or on the continent. By scenario, the excess demand to be accommodated elsewhere is as follows:
  - No Expansion – 2.1 million tonnes of freight or around half of total freight demand in 2050;
  - Heathrow Runway 3 – 1.2 million tonnes of freight or around 85% of the freight throughput of Heathrow now;
  - 2nd Runway at Gatwick – 1.7 million tonnes of freight.

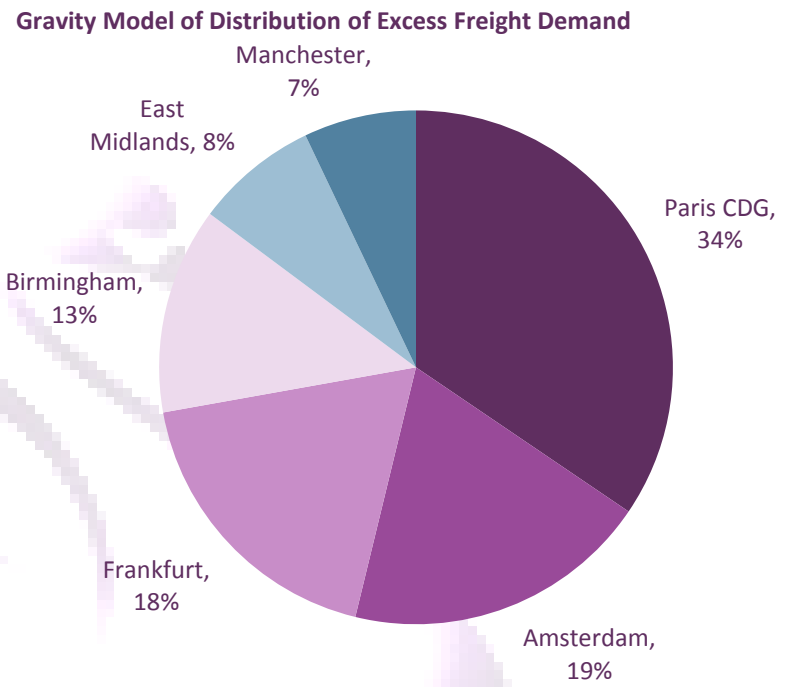
Economic Impacts of Air Freight Development Scenarios

How Will the Freight Industry React

- Our analysis of the potential freight demand and capacity within London in 2050 suggests that the air freight industry is likely to face two issues depending on the runway capacity scenario assumed:
  - if a second runway is built at Gatwick and no additional capacity is developed elsewhere, this has the potential to create a second significant geographic node for bellyhold capacity in London. The industry will need to consider how it structures its operations to make best use of this capacity. It should be noted that, while all scenarios involve some use of bellyhold capacity at airports other than Heathrow or a 4 runway hub, it is only in the 2nd Runway at Gatwick scenario that this is likely to represent any more than a business as usual position;
  - where there is significant excess demand that cannot be accommodated within London, the industry will need to examine how it can meet this demand and, in some cases, if it will choose to meet this demand.
- In terms of the first issue, there are potentially three options for companies in the sector:
  - to effectively ignore the shift in the balance of capacity available towards Gatwick and to continue to focus operations on Heathrow, particularly as it is unlikely that Gatwick will offer a significant number of relevant long haul destinations that are not served from Heathrow in any event. This is certainly a possibility for some time. However, we would expect that freight rates at Heathrow would increase to reflect this, with the result that Gatwick would become more attractive for some operators and with the consequence that ultimately bellyhold capacity at both airports would be fully utilised;
  - to split consolidation operations between the two sites. This is perhaps ultimately the most extreme option and it seems unlikely that many would follow this path as it would likely introduce significant inefficiencies in to their operations through duplication of functions. It should, however, be noted that some functions will have to be duplicated for Gatwick to be used at all, for instance transit shed facilities. So, at a less extreme level, there will be an inefficiency cost to the industry. However, within the scope of this work we have not sought to estimate this;
  - The final option is ultimately the most likely. Operators will continue to focus their operations on the main hub but will truck freight to Gatwick to use bellyhold capacity as appropriate. This will impact on the costs faced by the industry, which, in a competitive market, we would ultimately expect to be passed on to freight users. We present estimates of the impact on these costs below. It should also be recognised that transhipment between the two airports increases the chance of service failures and delays, making the option less attractive to operators and impacting ultimately on users. We have not sought to estimate this latter effect in this work and hence impacts may be conservative.
- The options in relation to the excess demand that cannot be satisfied within the London system are subtly different. Again, some companies may simply choose to step back from the London market, either withdrawing or choosing not to seek to expand with demand. This may be particularly true for major global companies with the ability to shift the emphasis of their activity. However, this will ultimately leave unsatisfied demand in and around London and potentially market space for others to step in and seek to serve the market via a different business model. This is most likely to involve trucking freight from London to other airports either in the UK or on the continent that have the necessary capacity and / or long haul passenger networks to support the required levels of demand. This will, however, come at a cost in terms of both additional trucking costs and a loss of utility to users as these avenues will need more time to ship freight, which in an industry where speed is an essential feature is clearly potentially damaging. Again, there is also the potential for increased service failures and delays via this route.
- We consider potential patterns of distribution of this excess demand below.

Gravity Model of Distribution of Excess Demand

- In considering how excess air freight demand from the London system might be served by trucking to other airports in the UK and on the continent, we have developed a basic gravity model to estimate the distribution.
- The model includes three UK airports: the national freight hub at East Midlands and the two primary regional long haul passenger gateways at Manchester and Birmingham. It also includes the three main European hub airports, which all have a significant freight presence now and are likely to grow both bellyhold and freighter capacity in to the future.
- The attraction factor within this model is forecast workload units (a workload unit is one passenger or 100kg of freight) at each airport in 2050 based on the Airports Commission traffic forecasts in its Interim Report. Passenger numbers have been adjusted to reflect the proportion of long haul passengers. Freight is assumed to grow from current levels through to 2050 in line with passenger numbers.
- The distance decay factor within the model is the road haulage cost of transporting a truck load of freight to the relevant airport from London. Freight rates have been derived from data provided by the Freight Transport Association. Distances have been derived from the fastest road route to the destination airport from Google Maps.
- This demonstrates that we would anticipate that a significant proportion of the excess demand will be trucked overseas to the major continental hub airports to take advantage of their extensive long haul networks.
- UK regional airports, despite being substantially closer to London in most cases, cannot match the level of attractiveness offered by the continental hubs and their wider global networks. Consequently, other UK airports are only expected to handle around 28% of any excess demand.



Impacts on the Wider UK Economy

- Drawing on our analysis of the potential capacity implications and operational impacts of the four runway capacity development scenarios set out, we have considered the potential impacts of each scenario on the UK economy.
- We have examined a number of potential streams of impact:
  - the impact on freight costs from additional trucking, either within London in the case of the 2nd Runway at Gatwick scenario or to other UK regional and continental airports where demand has to satisfied away from the London system;
  - the impact on users' utility from increased transit times / earlier cut-off times. As we have discussed, one of the key reasons users choose air freight as a means of transporting goods is speed and, for some parts of the market, speed and time is critical. Therefore, changes in the operating environment that affect speed of delivery or transit times will have an effect on the usefulness or usability (utility) of air freight for some users, which will represent a disbenefit to the economy;
  - the impact on long term productivity in the wider economy from constraints on air freight demand. Ultimately, rising freight costs from additional trucking and the implied rise in costs associated with lost utility to end users will result in reduced demand and impact on productivity in the wider economy, through changes in the ability to trade effectively or decisions around location and investment. This results in lower GVA in the long term;
  - the impact on the sector's economic footprint in the UK from constraints on air freight demand. As we have set out above, air freight services in themselves support significant employment and GVA through their economic footprint (their direct, indirect and induced impact on the economy). Reduced demand for air freight services will ultimately impact on the sector's ability to support this economy activity.

Impact on Freight Costs from Additional Trucking

The Impact on Freight Costs from Additional Trucking in 2050 (2014 Prices)

	No Expansion	4 Runway Hub	Heathrow Runway 3	2nd Runway at Gatwick
Costs of Trucking within London (1)	£0.0	£0.0	£0.0	£2.0
Costs of Trucking to Other UK Airports	£7.5	£0.0	£4.2	£6.2
Costs of Trucking to Overseas Airports	£34.1	£0.0	£19.2	£27.9
Total Additional Costs	£41.6	£0.0	£23.5	£36.1

(1) All scenarios involve some trucking of freight from Heathrow or a new Hub to other airports. However, in most scenarios this is assumed to be 'business as usual', much as it is now. It is only in the second runway at Gatwick scenario that the development of a significant second centre of freight activity is assumed that would result in truly additional trucking costs.

Source: York Aviation.

- Failure to provide sufficient capacity at London's main hub airport or within the London system generally to support the air freight market is likely to result in additional costs to the industry, either from the need to move freight from facilities near to the main hub airport to another airport within London or from London to a range of other airports in the UK or on the continent.
- The costs of trucking in London apply primarily in relation to the scenario whereby a second runway is built at Gatwick and no additional capacity is provided at Heathrow. Using data provided by the Freight Transport Association, we have calculated the number of truck journeys that would be required to move the freight displaced from Heathrow to Gatwick assuming typical loads per truck in the industry and also the likely costs of these journeys based on freight rates. On this basis, we estimate that building a second runway at Gatwick would result in additional costs to the industry of around £2 million per annum from moving freight within London (2014 prices). Much greater costs are, however, incurred by the need to move freight out of the London system to other UK airports or to the continent to meet demand. Again, we have calculated the number of journeys that would be need to accommodate this excess freight tonnage and the associated costs of these journeys.
- If no additional capacity is provided in London (No Expansion) the additional trucking costs are estimated to be around £41.6 million per annum in 2050. With a 2nd Runway at Gatwick, these costs reduce to a total of around £36.1 million per annum. Heathrow Runway 3 results in costs of around £23.5 million. The difference between Heathrow Runway 3 and Second Runway at Gatwick stems primarily from the need to truck freight to Gatwick in the latter scenario.
- A 4 Runway hub provides sufficient capacity such that no additional trucking is required. Hence, there are no additional costs.

Impact on Users Utility from Increased Transit Times / Earlier Cut-off Times

Impact on Users Utility from Increased Transit Times / Earlier Cut Off Times

	No Expansion	4 Runway Hub	Heathrow Runway 3	2nd Runway at Gatwick
Average Increase in Transit Times	158	0	90	136
Time Sensitive Proportion of the Market	30%	30%	30%	30%
Value of Time per Tonne (per hour)	£120.07	£120.07	£120.07	£120.07
Total Impact on Freight User Utility (£m)	**£378**	**£0**	**£213**	**£321**

Source: York Aviation.

- The need to truck freight around London or, more importantly, further afield will impose not only an additional trucking cost but also a utility cost on users that are time sensitive. Users are prepared to pay significant additional amounts for express delivery of air freight and increased transit times or earlier end of day cut off times will impact on these users as the quality of service they experience will be reduced. The value of this time is difficult to calculate and standard values are not available (as they are for passengers). We have, therefore, estimated the extent to which express freight users are willing to pay for an hour's faster delivery for express services using data published in the SDG report for DfT (see assumptions book for additional information). This suggests that value of saving an hour for a tonne of freight for time critical users is around £120.
- For the purposes of this analysis, we have assumed that the time critical portion of the market is approximately represented by the size of the express freight industry. Currently, this is stated by SDG to be around 18% of the market. However, this sector has been growing faster than general air cargo. We estimate that, by 2030 and thereafter, it will account for around 30% of the market.
- The impact on transit times is based on the weighted average of additional time required to truck freight to / from the airport at which it is shipped or received across the market as a whole. This includes freight which continues to travel via its preferred London airport, for which additional trucking time is assumed to be 0. Trucking costs for freight displaced from Heathrow to Gatwick are included.
- The results suggest that there are potentially significant impacts on freight user utility from increased transit times. No Expansion of capacity will result in a loss of user utility of around £378 million per annum. The addition of a second runway at Gatwick improves the situation but the costs are still ultimately significant at around £321 million per annum. Heathrow Runway 3 results in a loss of around £213 million per annum. Only a 4 Runway Hub, which provides sufficient capacity to avoid any additional trucking, does not result in a cost to users.

Impact on Long Term Productivity in the UK Economy (1)

Impact on Wider UK Economy from Lost UK Freight Demand

	No Expansion	4 Runway Hub	Heathrow Runway 3	2nd Runway at Gatwick
Estimated Value of Unconstrained Air Freight Market in 2050 (£m at 2014 prices)	£4,508	£4,508	£4,508	£4,508
Increase in Costs from Trucking and Lost Utility	£419	£0	£236	£358
% Impact on Costs	9.3%	0.0%	5.2%	7.9%
Price Elasticity	-0.5	-0.5	-0.5	-0.5
Lost Tonnage	-196,301	0	-110,639	-167,679
GVA Impact on the Wider Economy (£m at 2014 prices)	**-£978**	**£0**	**-£551**	**-£836**

Source: York Aviation.

- The increase in costs associated with additional trucking and the loss of utility to users will ultimately affect the level of air freight demand in and around London, which will in turn impact on economic activity as productivity will be reduced through channels such as the ability to trade being impaired or companies moving away from the area to a location with the services they need or through lost future investment.
- In previous work for Transport for London Oxford Economics has statistically estimated the link between the level of activity in the economy and a combined index of the level of business air travel and air freight. We have used this relationship to estimate a long term GVA impact of each of the scenarios . The change in the level of demand for air freight is assumed to reflect the percentage increase in total revenues from air freight in the UK caused by increased trucking costs and lost utility to users via a price elasticity relationship. The value of the unconstrained air freight market in 2050 is based on our estimate of air freight demand described above, an analysis of air freight turnover in the UK from the ONS Annual Business Survey and CAA Statistics. This assessment is also consistent with global freight rates as set out in the latest IATA Cargo eChartbook.
- The price elasticity of air freight demand is a poorly researched area. Consequently, we have had to assume an elasticity of around -0.5. This is broadly in line with available data for the price elasticity of business passenger air travel. We believe the figure to be potentially conservative but reasonable in the absence of more specific information.
- The resulting impact on freight tonnage demand in effected scenarios ranges between around 111,000 tonnes (Heathrow Runway 3) and 196,000 tonnes (No Expansion). As before, a 4 Runway Hub has sufficient capacity that the air freight market is not constrained and hence there is no loss.

Impact on Long Term Productivity in the UK Economy (2)

- The consequent impacts on GVA are again significant:
  - No Expansion results in lost GVA of around £978 million per annum by 2050;
  - Heathrow Runway 3 results in a GVA loss of around £551 million per annum by 2050;
  - 2nd Runway at Gatwick results in a GVA loss of around £836 million per annum by 2050.
- In 2013, Oxford Economics in its work for TfL estimated that the GVA loss from constrained business travel would be around £6.9 billion per annum in 2050. Considering the relative sizes of the passenger and freight markets at the London airports, this demonstrates that the impact from the impairment of freight services should be taken at least as seriously as that from passenger markets. The impacts are likely to be proportionately significant.

Impact on Air Freight's Economic 'Footprint'

GVA and Employment Impact on the Air Freight Services Sector Economic Footprint

	No Expansion	4 Runway Hub	Heathrow Runway 3	2nd Runway at Gatwick
Direct Effect				
GVA Lost (£m at 2014 prices)	£174	£0	£98	£149
Employment Lost	2,000	0	1,100	1,700
Total Economic Footprint Effect				
GVA Lost (£m at 2014 prices)	£637	£0	£359	£544
Employment Lost	6,800	0	3,800	5,800

Source: York Aviation analysis of SDG.

- Finally, we have considered the impact of reduced freight demand in the UK on the sector's economic footprint. For the purposes of this analysis, we have assumed that the loss of demand is equal to that described above in relation to the long term impact on GVA in the wider economy. In other words, we have assumed that much of the processing and consolidation of freight will be retained within the UK before freight is ultimately trucked overseas. In this regard, this may mean that the estimates are conservative in terms of the losses demonstrated. However, we believe this to be the most prudent assumption.
- Based on the previous work undertaken by SDG on the economic impact of the sector, we estimate that the impacts of constraint in the London system will be as follows:
  - No Expansion – around £637 million in GVA and 6,800 jobs;
  - 4 Runway Hub – this an unconstrained scenario and hence there are no impacts;
  - Heathrow Runway 3 - £359 million in GVA and 3,800 jobs;
  - 2nd Runway at Gatwick - £544 million in GVA and around 5,800 jobs.

Summary Comparison Between Heathrow & Gatwick Expansion

Summary Comparison Between Heathrow & Gatwick Expansion (1)

- Given the Airports Commission's decision to focus on expansion options relating solely to Heathrow or Gatwick, we have in this Appendix provided some additional analysis of the evidence presented in the main body of the report to consider the relative merits of expansion at Heathrow and Gatwick compared to the No Expansion case.
- We have projected that by 2050, all airports servicing London will have reached full capacity even if either the Gatwick or Heathrow expansions go ahead, which will have significant impact on freight efficiency and the economy. Six key comparisons were made between the Gatwick and Heathrow expansion scenarios and 'No expansion', using the analysis above. These comparisons are presented in the Table below.
- Of the three options, the Heathrow expansion provides the most significant economic benefits, in terms of cost reduction, job creation and minimization of extra costs associated with increased freight transit times. For the six key freight comparisons the Heathrow expansion is on average 43% more economically beneficial than 'No expansion' whereas Gatwick is only on average 15% more beneficial than 'No expansion'. We consider this evidence in more detail overleaf.

Comparison of 'No expansion' to London airports with Gatwick 2nd runway and Heathrow 3rd runway

Projections to 2050	No Expansion	Gatwick 2nd runway	Heathrow 3rd runway	Gatwick 2nd runway % difference	Heathrow 3rd runway % difference
Truck elsewhere (m tonnes)*	2.1	1.7	1.2	19.1%	42.9%
Cost of trucking elsewhere (£m)	41.6	36.1	23.5	13.2%	43.5%
Freight user time costs (£m)	378	321	213	15.1%	43.7%
Lost GVA to wider economy (£m)	978	836	551	14.5%	43.7%
Lost GVA to sector's economy (£m)	637	544	359	14.6%	43.6%
Jobs Lost	6,800	5,800	3,800	14.7%	44.1%

Source: York Aviation

Summary Comparison Between Heathrow & Gatwick Expansion (2)

- The freight comparisons for **six key economic measures** are projections for the year 2050 comparing Gatwick and Heathrow expansions with 'No expansion':
  - **Truck elsewhere:** Significant volumes of freight will be trucked elsewhere to cover the shortfall in air freight capacity in the region. The amount diverted is however reduced if either Gatwick or Heathrow undergo expansion (as opposed to 'No expansion'). If Gatwick is expanded then the amount trucked elsewhere is reduced by almost 20%. Under the Heathrow expansion however, this reduction is more than doubled to 43%;
  - **Cost of Trucking elsewhere:** Heathrow expansion is a saving of nearly 44%, or £18.1 million. Gatwick expansion means the cost reduction is only 13%;
  - **Freight User Time Costs:** Trucking elsewhere also incurs extra costs associated with increased transit times for goods. The 'No expansion' scenario equates to an extra time cost of £378 million. The Gatwick expansion would see this cost lowered by 15%and expansion of Heathrow would result in a lowering of nearly 44% which equates to a saving of £165 million;
  - **Knock-on reduction of Economic Gross Value Addition (GVA):** There is an impact to the wider economy measured by a reduction in Gross Value Addition (GVA) arising from supporting goods and services associated with the air freight industry. The loss to the wider economy is estimated to be £978 million which is reduced by nearly 15% if the Gatwick expansion occurs and around 44% if the Heathrow expansion takes place;
  - **Loss of job creation:** Along with a loss of GVA, there is inevitably a reduction in job creation. With 'No expansion', a total of 6,800 extra jobs would not be created. This is reduced by 1,000 with the expansion of Gatwick and by 3,000 with the expansion of Heathrow.
- Of the three options, the Heathrow expansion provides the most significant economic benefits, in terms of cost reduction, job creation and minimization of extra costs associated with increased freight transit times.

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References

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- Cargo eChartbook Q2 2014 – IATA Economics
- Impacts on the UK Economy through the Provision of International Connectivity – Oxford Economics for Transport for London (2013)
- London Airports Route Networks in 2050 – York Aviation for Transport for London (July 2013)

Assumptions Book

Bellyhold Capacity Assumptions

% International Passenger Movements by Scenario

	No Expansion	New 4 Runway Hub	Third Runway at LHR	2nd Runway at LGW
Hub	93%	90%	91%	93%
Gatwick	96%	94%	94%	91%
Other London	91%	90%	90%	89%

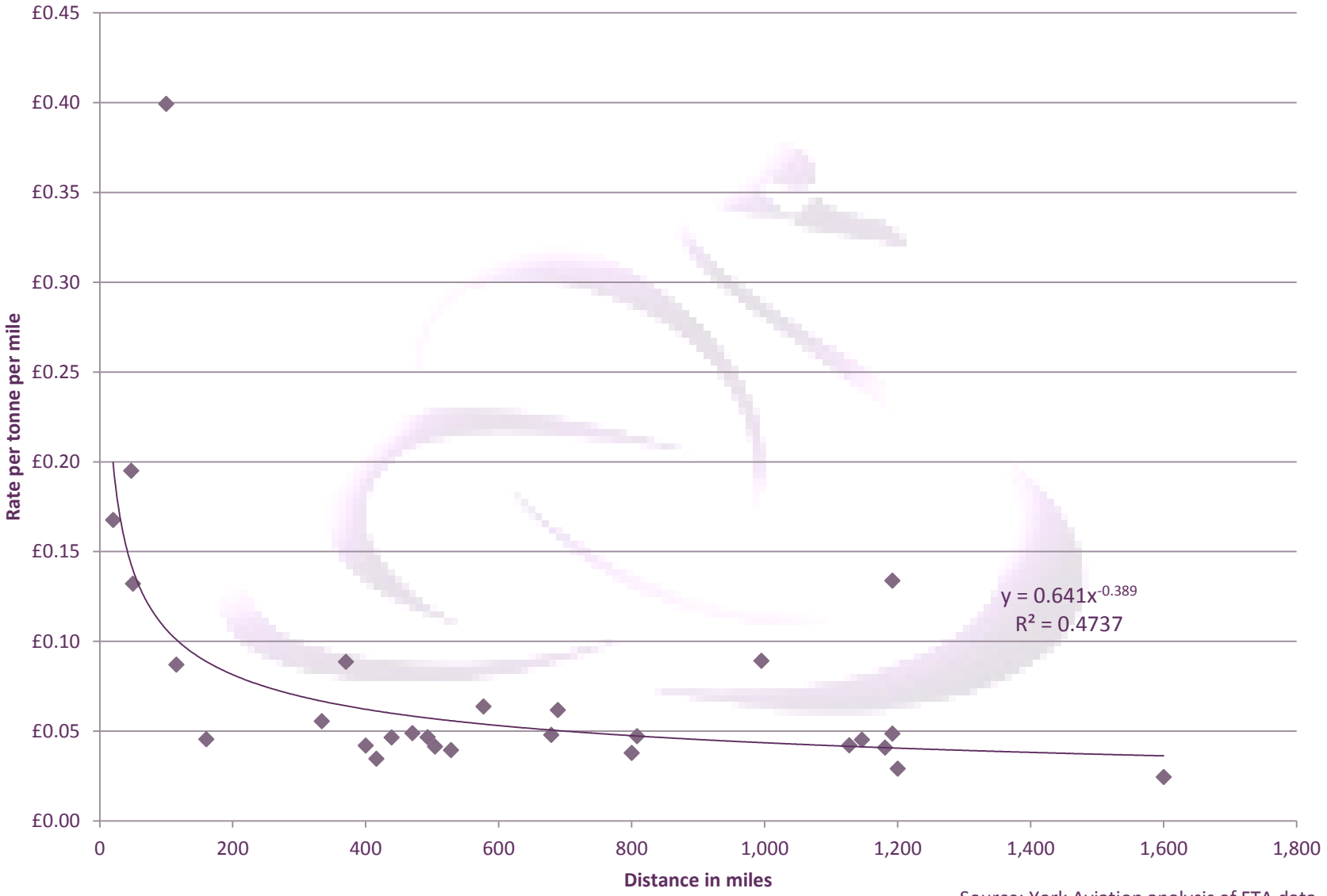
Source: York Aviation London Route Networks 2050 Model.

Freight Tonnes per ATM in 2050

	No Expansion	New 4 Runway Hub	Third Runway at LHR	2nd Runway at LGW
Hub				
Tonnes per Freighter	35.6	35.6	35.6	35.6
Tonnes per Bellyhold Movement	3.9	3.9	3.9	3.9
Gatwick				
Tonnes per Freighter	24.6	24.6	24.6	24.6
Tonnes per Bellyhold Movement	0.5	0.5	0.5	0.9
Other London				
Tonnes per Freighter	24.6	24.6	24.6	24.6
Tonnes per Bellyhold Movement	0.0	0.0	0.0	0.0
London Average				
Tonnes per Freighter	26.5	26.5	26.5	26.5
Tonnes per Bellyhold Movement	2.0	2.0	2.0	2.0

Source: York Aviation analysis of CAA Statistics.

Estimated Road Haulage Rates

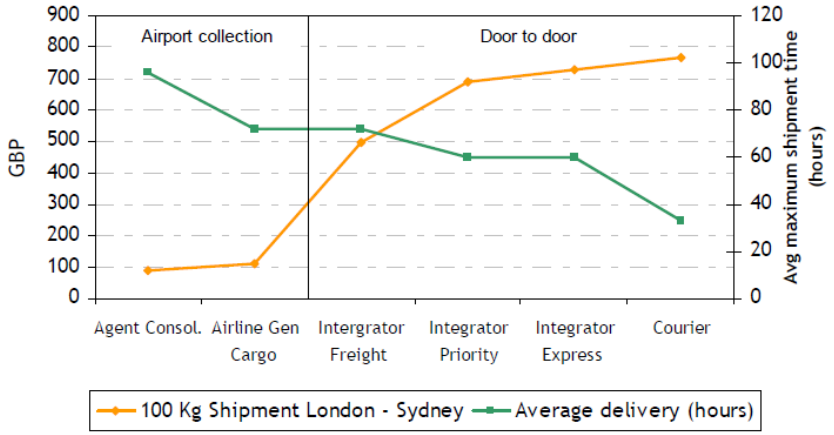


Source: York Aviation analysis of FTA data

Estimate of Value of Time per Hour per Tonne

- A value of time per hour per tonne for time sensitive air freight has been calculated based on the data collected by SDG as part of their work for DfT on Air Freight in 2010.
- The original data has been plotted as an S-curve in the chart below.
- The value of time per hour is assumed to be equal to the average additional amount that would be charged to save an hour on the delivery of a package using an express type service (Integrator Priority, Integrator Express or Courier).
- This has then been converted to a figure for a tonne by multiplying by 10.
- On this basis, the value of time per hour per tonne is around £120.07.

FIGURE 5.3 RELATIONSHIP BETWEEN PRODUCT, SERVICE PROVIDER AND PRICE



Source: Combined tariff from AMI / integrators.

Source: SDG for DfT 2010.

Cost of 100kg Package to Sydney by Delivery Time