



A Second Runway for Gatwick

Appendix

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London Traffic Report

ICF SH&E

an ICF International Company



London Traffic Report

Market Trends, Forecasts, and Implications for Airport Capacity

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1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

ICF SH&E has supported Gatwick Airport Limited (GAL) on traffic forecasting and other planning matters since 2010. Following the formation of the Airports Commission in late 2012, we were appointed to analyse the London market in the context of the Commission's criteria and to produce a number of primary and secondary forecasts of future traffic.

This report presents the latest updated forecasts provided to GAL by ICF SH&E in April 2014, and some of the most important supporting analysis which has been developed over the past 16 months.

1.2 THE LONDON MARKET FOR AVIATION

The starting point for ICF SH&E's analysis and forecasts has been a thorough examination of the London market for commercial air transport. This has involved presenting an overview of traffic and airline mix, an assessment of the role played by the main London airports and how this has evolved over time, as well as addressing a number of prominent misconceptions.

The main findings of this analysis include:

- London is the largest air travel market in the world today and is one of the world's best connected cities
- The airport system caters effectively and efficiently to a wide range of passengers and airlines
- The vast majority of London's traffic is 'origin and destination' (O&D) and does not use London's airports to connect
- The short-haul market is the most important in terms of passenger numbers and destinations
- Low Cost Carriers (LCCs) are already dominating short-haul and they are increasing their share

1.3 INDUSTRY TRENDS IMPACTING FUTURE DEMAND

There are a number of key industry trends which provide valuable indicators of the direction of development for international aviation. These cannot be ignored when thinking about long term developments. As part of our analysis of the aviation market, we have identified a number of key industry trends which are very likely to change the shape of aviation in the next decades and these have been incorporated into our long term traffic projections. Some of the key trends identified and explored include:

- Virtually all short-haul business models are converging to a Low Cost Carrier (LCC) / hybrid model
- The future will see more co-operation between traditional carriers and LCCs

- The Middle East hubs and their home airlines have huge competitive advantages in serving fast growing and mature long-haul markets
- Their continued growth will significantly impact transfer demand in London, irrespective of any capacity additions
- New technology short-haul and long-haul aircraft will impact the operating economics of serving origin and destination (O&D) and transfer markets

1.4 FUTURE DEMAND IN LONDON

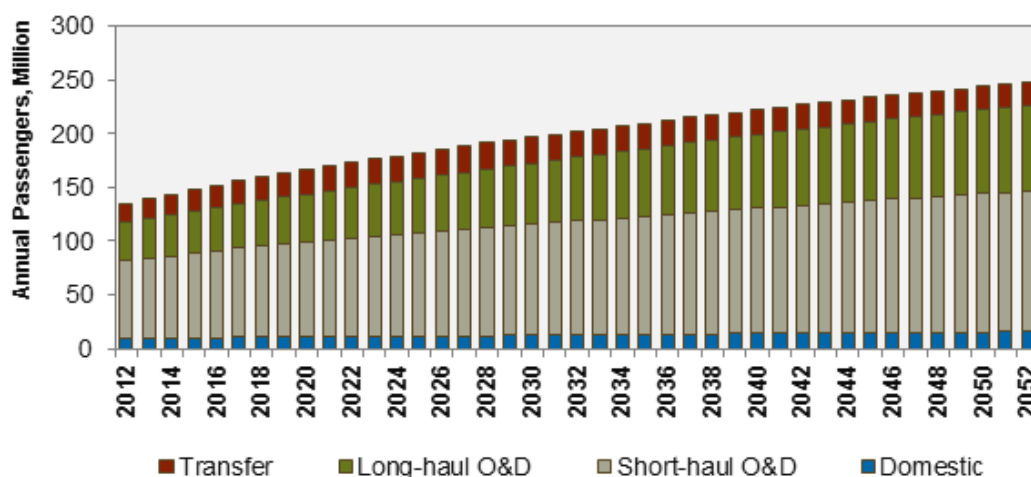
The London aviation market is by its nature closely linked to all other aviation markets in the world, and the global and regional trends affecting the industry will have a real impact on how this market develops. In preparing the long term forecasts for London, we have been mindful not only of the long term historical relationships that can be demonstrated through econometric analysis, but also the undisputed changes to airline, passenger and airport behaviour already under way.

The three most fundamental of these, which any realistic forecast of future London demand needs to recognise are:

- Short-haul demand is relatively mature but will remain the largest traffic segment for London and the UK, reflecting business, leisure and VFR¹ travel patterns
- Long-haul demand growth will be mostly driven by emerging markets, although North America will remain the UK's largest long-haul market despite its maturity
- London's geographical location means that it will become less attractive and less important as a transfer point, particularly for the emerging markets generating growth

Over the last 25 years the London market has grown at around 3% per annum whilst the forecast until 2050 is 1.6%. This still yields another 105 million passengers per year by 2050

¹ Visiting Friends & Relatives

Exhibit 1-1: Unconstrained London Passenger Forecasts, 2012 – 2052

Market	2012	2030	2050	2012-2030 CAGR	2012-2050 CAGR
Domestic	10	12	15	1.4%	1.2%
Short-haul	72	103	129	2.0%	1.5%
Long-haul	35	57	78	2.7%	2.1%
Transfer	18	24	22	1.7%	0.5%
Total	135	197	244	2.1%	1.6%

Source: ICF SH&E

Note: CAGR = Compound Annual Growth Rate

What these forecasts indicate is that demand at London airports will increase by over 60 million passengers by 2030. The majority (over half) of this additional demand will be to/from Europe and transfer demand will represent less than 15% of passengers. By 2050, a further 47 million passengers will be added, of which again over half will be in the domestic and short-haul segment, but over 20 million in long-haul. In the long term transfers are forecast to decline in significance, similar to the Airport Commission's unconstrained forecasts, reflecting market trends and London's declining role as a transfer hub for the major traffic flows of the future.

1.5 CAPACITY OPTIONS AND CONNECTIVITY OUTCOMES

The traffic forecasting model developed by ICF SH&E has been designed to simulate the likely behaviour of passengers and airlines under various capacity scenarios. The Do Minimum Case, where no additional runway capacity is added, will result in a very different level and make-up of traffic and connectivity for London than if either Heathrow or Gatwick build an additional runway.

By projecting unconstrained demand, airport capacity and realistically reflecting the likely behaviour of key stakeholders, the modelling shows the following.

- The Base Case results in over 40 million of unmet demand in the London system by 2050.

- The Gatwick scenario (2+2) will support stronger growth in short-medium haul markets than the Heathrow R3 (3+1) as it provides a better solution for the airlines serving this segment (Heathrow is likely to be too expensive and operationally inefficient for the type of low cost/hybrid operation that will dominate the short-haul market)
- London will be as well served in long-haul markets with a second runway at Gatwick as with a third runway at Heathrow. In either scenario, Heathrow will remain the primary long-haul and transfer airport, building on its core strengths, its airline customer base and first mover advantage. However, under the Gatwick scenario, a more balanced and resilient system is delivered, with those markets relying on transfers mostly operated at Heathrow, and those markets where O&D demand is sufficient, or the operators have hubs at the other end of the route, being offered at Gatwick or at both airports.
- In terms of future destinations, under the Gatwick 2+2 Scenario, 440 destination airports can be served from the London airport system by 2050 (a net addition of 39); this is 27 more than under the Heathrow R3 Scenario.
- With a second runway, Gatwick is forecast to serve over 50 new long-haul destinations. Many of the new long-haul services will be served by foreign carriers for which London is a destination, rather than a source of transfers
- Heathrow, as BA's primary hub, will continue to perform a key role in the London system's connectivity, even under the Gatwick R2 scenario, and will remain pivotal in serving US and Indian destinations for example
- Overall, more of London's demand will be satisfied by a solution with Gatwick with two runways than Heathrow with three runways

2 INTRODUCTION

2.1 ICF SH&E'S WORK WITH GATWICK AIRPORT LIMITED

ICF SH&E has supported GAL on traffic forecasting and other planning matters since 2010. Following the formation of the Airports Commission in late 2012, we were appointed to analyse the London market in the context of the Commission's criteria and to produce a number of primary and secondary forecasts of future traffic.

These forecasts cover the period to 2052 and a traffic forecasting model has been developed to simulate various capacity scenarios, showing the likely distribution and make-up of traffic at the London airports.

From the annual passenger forecasts, a number of derivative forecasts have also been produced that have been used by GAL and its other advisors in evaluating future scenarios. These derivative forecasts included busy day movement and passenger profiles, aircraft type forecasts, SID profiles², surface access demand input and on-airport employment forecasts. Furthermore, an analysis of historical and current cargo developments has been undertaken and a cargo forecast has been prepared.

This report draws together the analysis and forecasts provided to GAL by ICF SH&E over the last 16 months.

2.2 ABOUT ICF SH&E

For the past 50 years, ICF SH&E has been dedicated to serving the air transportation industry, providing its aviation and aerospace expertise to airports, airlines, governments, international agencies, manufacturers, and financial institutions. The company's core capabilities include airport strategy and development, marketing and customer service strategy and implementation, demand management; airport planning; air service marketing; and cost-benefit analysis of environmental regulations as well as airline strategy, planning, and operations; cargo studies; revenue management; appraisals, maintenance management, and asset management; safety and security audits; financial due diligence; privatization, mergers, and alliances. With a staff of 100+ professionals, ICF SH&E has offices in New York, Boston, London, Sao Paulo, Beijing, Singapore, Hong Kong, Chicago and Ann Arbor, as well as a network of associates worldwide.



Formerly known as Simat, Helliesen & Eichner, Inc. (SH&E), the firm and its staff joined ICF International in December 2007, further expanding its breadth of services, offerings, and expertise. ICF International (NASDAQ: ICFI) partners with government and commercial clients to deliver consulting services

² Standard Instrument Departure – effectively determines the aircraft's route immediately following take-off.

and technology solutions in the energy, climate change, environment, transportation, social programs, health, defence, and emergency management markets. Since 1969, ICF has been serving government at all levels, major corporations, and multilateral institutions. More than 4,500 employees serve these clients worldwide.

ICF SH&E has performed more than 8,000 assignments during its 50 year history, serving hundreds of airports, airlines, governments agencies, and the financial community in all parts of the world. This experience provides ICF SH&E professionals with a unique understanding of the challenges facing the industry and positions the firm to offer better insights and solutions than any other consulting firm.



The firm's expertise stems from its staff, its research efforts, and the quality of the firm's proprietary databases, methodologies, analytic support. In order to offer our clients the highest level of service, ICF SH&E professionals represent all segments of the aviation industry, as well as financial institutions, government organizations, and the academic community.

ICF SH&E has been involved in many major industry developments such as deregulation, distribution, privatization, and revenue management. By participating directly in many emerging trends, ICF SH&E is especially well equipped to assist its clients in adapting to a rapidly changing environment.

On a yearly basis, ICF SH&E performs over 200 projects worldwide - more projects than any other firm of its type. Committed to providing expert and impartial advice, ICF SH&E projects are both results and value driven. The company's continuous growth has been due in large part to a high level of repeat business from an established client base, testifying to a high degree of customer satisfaction.



ICF SH&E also maintains working relationships with academia, research foundations, trade associations, and other industry organizations. The firm is regularly retained by management, Boards of Directors, investors, financial institutions, and international agencies.

2.3 REPORT LIMITATIONS

This study develops a market analysis in a manner consistent with industry practices for similar work. ICF SH&E believes that the approaches and assumptions used in this analysis are reasonable; however, certain assumptions regarding future trends and forecasts may not materialise, and therefore could affect actual development and market demand.

For this review, ICF SH&E relied on publicly available data and information, including economic and aviation statistics and forecasts, as well as data provided by GAL and forecasts prepared by various independent economic forecasters. In addition, we relied extensively on IATA's PaxIS database for which ICF SH&E holds a paid-for subscription. Although we believe these sources are reliable, our opinion could vary materially should some of the information provided prove to be inaccurate or incomplete.

The opinions expressed herein are not given as an inducement or an endorsement for any financial transaction. ICF SH&E accepts no responsibility for damages, if any, that may result from decisions made or actions taken by any party, including third parties, based on this report. Any use that a third party makes of this report, its analysis, or the opinions contained therein, is the sole responsibility of that party.

The analysis and opinions presented in this report reflect ICF SH&E's reasoned views and judgment as of April 2014 based on the information available to us at the time this report was prepared.

3 THE LONDON MARKET FOR AVIATION

3.1 INTRODUCTION

The starting point for ICF SH&E's analysis and forecasts has been a thorough examination of the London market for commercial air transport. This has involved presenting an overview of traffic and airline mix, an assessment of the role played by the main London airports and how this has evolved over time, as well as addressing a number of prominent misconceptions. This chapter summarises these analyses and provides a foundation for the forecasts which follow.

3.2 LONDON IS THE LARGEST AIR TRAVEL MARKET IN THE WORLD TODAY AND IS ONE OF THE WORLD'S BEST CONNECTED CITIES

London is the largest air travel market in the world, with 140 million passengers using its airports in 2013³. The next largest markets include New York and Paris with 112 and 90 million passengers in 2013. London's origin and destination (O&D) demand alone is greater than both O&D and transfer demand at these two airport systems⁴.

London's airports serve around 400 destinations. The UK as a whole serves 375 international destinations, which is higher than any other country in the world, including the USA (the world's largest aviation market), France, Germany or the UAE (which serves around 210)⁵.

Why is London the largest aviation market in the world?

It certainly isn't the largest city by population or area (these are Shanghai and Tokyo respectively), nor is it the richest (Doha or Abu Dhabi are likely candidates for this). However, there are a number of factors which help to explain this:

- **Geography:** The UK is an island nation and as such generates more trips per capita than most comparable countries on mainland Europe
- **Tourism:** London is one of the most popular tourist destinations in the world, welcoming 15 million international visitors a year, mostly from Europe⁶
- **Business:** London is a global leader in professional and financial services, employing more than 1 million people, home to more than 100 major international corporations, generating inbound and outbound demand for air travel
- **Trade:** inward and outward investment, flow of imports and exports are centred around London, although other regions of the UK are also important

³ Source: UK CAA

⁴ Source: IATA PaxIS

⁵ Source: OAG, September 2013

⁶ Source: ONS

- **Diversity:** London has one of the most diverse populations of any city, with over 250 nationalities, generating global VFR (visiting friends and relatives) demand
- **A liberalised market:** as part of the European Union enabling relatively free movements of goods and people, and the entry of airlines to its markets
- **A vibrant and competitive airline sector :** in addition to an established and successful network carrier in the form of BA/IAG, London is served by 15 low cost carriers, 10 regional carriers, 10 charter airlines and around 100 full-service carriers, who account for approximately 70% of London's annual traffic⁷
- **Close ties and relative proximity** to the largest economy in the world, the USA (44% of all long-haul passengers at London airports are flying to/from the USA)

3.3 LONDON'S AIRPORT SYSTEM CATERS EFFICIENTLY AND EFFECTIVELY TO A WIDE RANGE OF PASSENGERS AND AIRLINES

Demand for air travel is not homogenous – passengers travel for various reasons and have different requirements. The airlines serving the London market vary greatly too, from small regional carriers to large international operations with hundreds of aircraft. The airport system, in turn, has evolved to serve these market segments, resulting in excellent connectivity.

- Heathrow accounts for over half of today's London passengers (72m from a total of 140m in 2013)
- Over 60% of passengers on business use Heathrow today
- Nevertheless, the airport is still predominantly a leisure airport (70% leisure)

Exhibit 3-1: London Airport Passengers by Purpose and Airline Type, Million 2012

	Business Passengers	Leisure Passengers	Full Service Airline Passengers	Low Cost Airline Passengers	Charter Airline Passengers	Total Annual Passengers
Heathrow	20.4	48.6	69.5	0.5	-	70.0
Gatwick	5.2	28.5	10.1	19.0	5.0	34.1
Stansted	2.6	14.7	0.1	16.8	0.6	17.5
Luton	1.5	8.0	0.1	9.0	0.4	9.6
London City	1.6	1.4	3.0	-	-	3.0
Southend	n/a	n/a	0.1	0.5	-	0.6
Total	31.2	101.2	82.9	45.9	6.1	134.9

Note: London total in survey less than airport passengers due to purpose not stated in some survey results

Source: CAA Airport Statistics, CAA Survey, 2012

Heathrow has been losing market share and absolute traffic volumes in the short-haul and domestic segments as it has increased long-haul services. The former segments have grown at the other London airports in the meantime.

⁷ Source: CAA, 2013

3.4 THE VAST MAJORITY OF LONDON'S TRAFFIC IS O&D AND DOES NOT USE LONDON AIRPORTS TO CONNECT

The overwhelming majority of London's markets are O&D markets (i.e. London is the origin or destination for passengers; they need to be in London), accounting for around 120 million airport passengers in 2013⁸

- O&D flows between Europe and London are larger than O&D flows between London and every other region of the world combined (71 million a year on international journeys, 80 million including UK domestic)
- Long-haul volumes are dominated by North America flows (12 million a year)
- Africa is comparable to the Far East (excl. China) at around 5 million and 8 million passengers a year respectively
- China today accounts for around one million passengers a year

Even at Heathrow, which presents itself as a transfer hub, around three quarters of all passengers are not transferring. Compared to other hub airports, Heathrow's transfer share is considerably lower – for example Frankfurt at 50%; see Appendix D for full details⁹.

While Heathrow is a hub for BA, it is much less of a hub for any other airline. British Airways and its oneworld alliance partners have about 35% of their passengers transferring at Heathrow. However, for all other airlines operating at Heathrow, only 10% of passengers connect. Many of these other carriers have transfer passenger feed at the other end of their routes and the availability of transfer passengers at London is not critical to the viability of their flights.

This distinction is important because it shows that already the majority of non-oneworld airlines are using Heathrow as a 'spoke' in their own networks and do not require additional 'hub' or transfer capacity. Future demand and fleet growth is much more likely to be generated from the non-UK end of these routes (the UK is a mature market, and BA a mature airline with relatively modest fleet expansion plans, in contrast with Middle Eastern and Far Eastern carriers) and as such, these long-haul routes will be supported by transfer flows at the hubs at the other end of route. Furthermore, as those thickest markets which do not require transfer support in London are moved to or grown at Gatwick, this maintains capacity at Heathrow for BA and its oneworld partners to continue to operate a successful and profitable hub focusing on London connections, primarily involving Europe and North America, where that airport's natural strength lies.

3.5 THE SHORT-HAUL MARKET IS THE LARGEST IN PASSENGER TERMS

The majority of passengers in London (and the UK) travel on short-haul journeys, in line with trade and tourism patterns (68% in 2013 for London¹⁰). This is not surprising, given that 73% of UK's inbound and 78% of outbound tourism is intra-European¹¹ and 53% of the UK's trade is with EU

⁸ Source: IATA PaxIS & BA at CAPA's Airlines in Transition Conference 2014

⁹ Source: IATA PaxIS

¹⁰ Source: UK CAA

¹¹ Source: Office for National Statistics, 2012

countries¹². Europe is not unique in this. Virtually all regions of the world have more trade and tourism intra-region, than inter-region¹³.

Reflecting this demand pattern, the pattern of destinations is also dominated by short-haul markets, outnumbering long-haul almost 3:1 at the UK level. Since 2004, 11 long-haul destinations have been added from London, compared to 48 new short-haul destinations (excluding domestic, which has declined by 7¹⁴).

Exhibit 3-2: London Airports, Passengers and Destinations by Haul, 2013 and 2004

		Short-Haul Pax (m)	Of which Domestic (m)	Long-haul Pax (m)	Total pax (m)	Short-Haul Dest	Of which Domestic	Long-haul Dest	Total Dest
2013	London	97.6	11.7	42.0	139.6	268	15	133	401
	Rest of UK	84.9	29.6	6.0	90.9	228	61	47	275
	Total	182.5	41.3	48.0	230.6	326	62	135	461
2004	London	90.6	15.8	37.9	128.4	220	22	122	342
	Rest of UK	83.8	34.9	5.1	89.0	164	61	29	193
	Total	174.4	50.7	43.0	217.4	265	63	123	388
2013 vs 2004	London	+7.1	-4.0	+4.1	+11.2	+48	-7	+11	+59
	Rest of UK	+1.1	-5.4	+0.9	+2.0	+64	-	+18	+82
	Total	+8.1	-9.4	+5.0	+13.2	+61	-1	+12	+73

Note: UK total is not sum of London and Rest of UK due to duplicated destinations

Source: CAA Airport Statistics 2013, OAG 2013

3.6 LCCs DOMINATE THE SHORT-HAUL MARKET SEGMENT

In the short-haul market discussed above, 50% of all passengers in the UK travel on low cost carriers (LCCs). This is a very significant increase from 10 years ago, when the figure was approximately 30%¹⁵.

The overwhelming majority of total market growth has been driven by LCCs, as they have introduced lower fares and opened up new markets for leisure, VFR (visiting friends and relatives) and business travel. These carriers have grown by around 9% a year, while the full service (FSC) and charter segment have declined 1% and 6% a year respectively¹⁶.

LCCs are now the dominant force in Europe and peripheral countries, and operate a significant share of all capacity to the major short-haul markets from London.

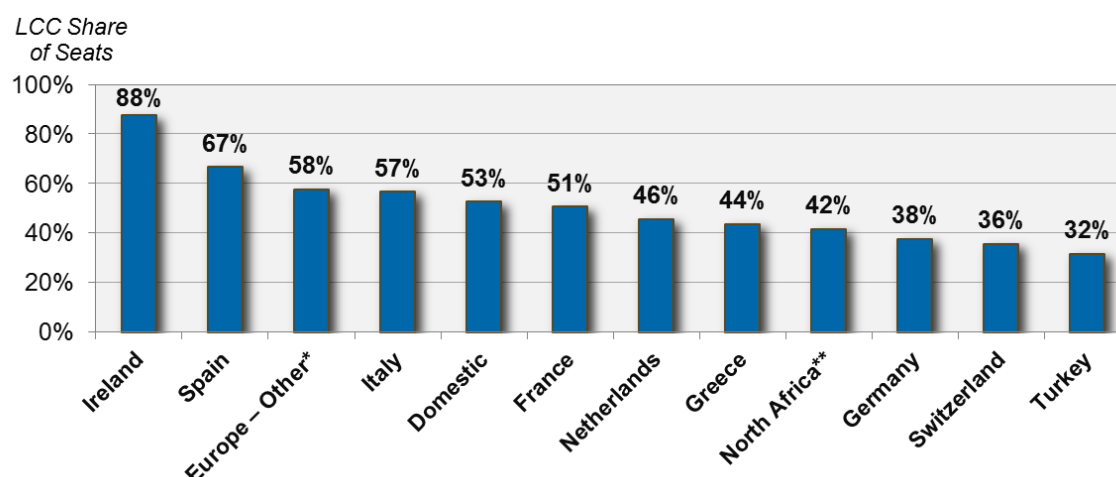
¹² Source: HMRC

¹³ Source: UNWTO

¹⁴ Partly explained by closure of e.g. Plymouth (PLH)

¹⁵ Source: UK CAA

¹⁶ Source: UK CAA

Exhibit 3-3: LCC penetration in the top short-haul markets served from London

* Europe includes Russia and the CIS. ** North Africa includes Egypt, Morocco, Tunisia, Algeria, Libya & the Canary Islands

Source: OAG, flights from LHR, LGW, STN, LTN, SEN included

As LCCs have grown their share of the short-haul market and have avoided Heathrow (due to high airport charges, high slot costs and operational challenges), the other London airports have gained share. In 2013 Heathrow had a market share of just 1% of total LCC volumes in the London market which equated to 0.7m passengers¹⁷.

Gatwick accounts for the largest share of LCC traffic in the London market with over 40% share at 20m passengers. This is ahead of Stansted in second position with 17m passengers in 2013. It is also comparable to some of the largest LCC airports in the world such as Chicago Midway (the largest base of Southwest Airlines), Barcelona (home to Vueling and a large number of European LCCs) and Jakarta (home to Lion Air and AirAsia Indonesia).

The fleet plans for the major LCCs suggest that this trend is set to continue¹⁸:

- **easyJet** have 150 A320s on order (100 of which are neos), with which it is planning seat growth of 3-5%
- **Ryanair** has 180 B737-800s on order, with a potentially large order for the B737Max also on the horizon
- **Norwegian Air Shuttle** have even more ambitious fleet plans with 100 A320Neos and 100 B737Max on order

By contrast **BA** have a relatively old fleet and the majority of the narrowbodies IAG have on order are destined for the Spanish LCC Vueling or for replacement of their current fleet. In the following section we discuss the expected evolution of the LCC trend and its likely implications for the London market.

¹⁷ Source: UK CAA

¹⁸ CAPA fleet database, airline websites

4 INDUSTRY TRENDS IMPACTING FUTURE DEMAND AND CAPACITY REQUIREMENTS

4.1 INTRODUCTION

There is a meaningful degree of uncertainty inherent in any forecast. However, there are also a number of key industry trends which provide valuable indicators of the direction of development for international aviation. These cannot be ignored when thinking about long term developments. As part of our analysis of the aviation market, we have identified a number of key industry trends which are very likely to change the shape of aviation in the next decades and these have been incorporated into our long term traffic projections. It should be recognised that further, as-yet-unforeseen developments will also impact demand and supply in coming years. However, this additional uncertainty is no reason to ignore the following trends which are already having a meaningful impact and will continue to do so, even before any additional runway capacity is added to the London system.

4.2 VIRTUALLY ALL SHORT-HAUL BUSINESS MODELS ARE CONVERGING TO A LCC/HYBRID MODEL

As the European short-haul market has matured, LCCs have increasingly been making inroads into markets traditionally the reserve of full service carriers. With young and growing fleets, exploiting growth opportunities in order to maintain high utilisation will be essential to their continued profitability and will likely drive ever more overlap with legacy, regional and charter operations.

LCCs are serving a larger range of routes than ever before – easyJet now serve routes from just 80 miles (Isle of Man-Liverpool) to over 2,500 miles (Manchester – Sharm El Sheik)¹⁹

As well as expanding geographically, LCCs are also looking to attract travellers from outside their core markets – in particular, business travellers. In order to attract these markets, LCCs have started to offer products normally associated with full service carriers:

- **Convenient Schedule.** Increasingly, LCCs are flying to primary airports with high frequency and convenient timetables. For example, easyJet fly over 90 sectors a week between Milan Malpensa and Paris CDG²⁰. Even Ryanair have started to venture into primary airports with new bases at Brussels Zaventem and Rome Fiumicino
- **Business products.** For example:
 - easyJet, Wizz Air and Vueling offer flexible tickets
 - Vueling and Wizz Air both offer vacant middle seats
- **Frequent Flyer Programmes.** Vueling allow customers to collect and redeem miles on their own service or on Iberia services

¹⁹ OAG

²⁰ OAG

- **Global Distribution.** easyJet signed GDS deals with Amadeus and Galileo. This enabled easyJet products to be sold to business travelers via Travel Management Companies. It also has the added benefit of giving them visibility on the online comparison sites. Ryanair have also announced a deal with Travelport in 2014 that will see its fares and ancillary services listed for sale via the GDS

Legacy carriers are responding in different ways to the threat from LCCs on their core markets. Most legacy carriers now offer LCC style fares (e.g. BA offer a hand luggage only fare on their short-haul routes), others are starting up LCC subsidiaries to operate their short-haul regional network (e.g. Lufthansa transferring all its short-haul routes outside Frankfurt and Munich to Germanwings, Iberia transferring its loss-making short-haul routes to Vueling and Iberia Express).

What is clear is that as LCCs and FSCs continue to converge the O&D market will become more and more competitive as differentiation between carriers becomes less distinct. In this highly competitive marketplace, keeping costs down will be paramount to achieving profitability.

4.3 THE FUTURE WILL SEE MORE CO-OPERATION BETWEEN TRADITIONAL CARRIERS AND LCCS

As LCC networks continue to grow, it will become increasingly difficult for full service carriers to ignore the potential benefits that a partnership with an LCC could provide.

Largely via its LCC operators, Gatwick now has a short-haul network that encompasses over 130 destinations in mainland Europe alone (compared to 75 from Heathrow) – this could be a valuable source of feeder traffic for a long-haul carrier. Whilst traditionally both FSCs and LCCs have been resistant to partnerships (FSCs have been wary of devaluing their product and LCCs reluctant to incur the additional costs and complexity associated with these partnerships), there is evidence that this is beginning to change:

- In 2012 SkyTeam became the first global alliance to unveil plans for a hybrid/LCC partnership platform with WestJet as its trial LCC partner
- SkyTeam and Star have also announced plans to include LCCs in some form of affiliate partnership

However, joining an alliance is certainly not a pre-requisite for co-operation, with many airlines preferring bilateral relationships (e.g. Emirates) or equity partnerships (e.g. Etihad) to global alliances. A number of LCCs around the world have already developed codeshare and interline agreements with other carriers without being a member of an alliance. Jetblue in North America is considered a pioneer of this model with agreements with American Airlines (Oneworld Alliance) as well as numerous foreign carriers including Lufthansa (Star Alliance) and Emirates (no alliance) among others.

However, even without interline agreements between the airlines, a significant number of passengers are choosing to “self-connect” at Gatwick. ICF SH&E’s analysis of traffic at Gatwick in 2012 found that almost 1 million passengers connected at the airport to or from an LCC. And this was before the launch of Gatwick Connect, the dedicated self-connection service aimed at encouraging passengers on LCCs to transfer at the airport.

Airports that offer an extensive network of profitable, short-haul LCC services, such as Gatwick, will be increasingly attractive to those long-haul carriers who wish to connect with these networks.

4.4 THE MIDDLE EASTERN HUBS AND THEIR HOME CARRIERS WILL HAVE A SIGNIFICANT IMPACT ON THE UK MARKET

Due to their significant competitive advantages and aggressive growth plans, the Middle East hubs and their home airlines will continue to exert ever greater influence on the pattern of global aviation. This will include the UK market. Therefore, it is critical to recognise the competitive positioning of Middle East carriers and hub airports when considering the future development of global and UK aviation.

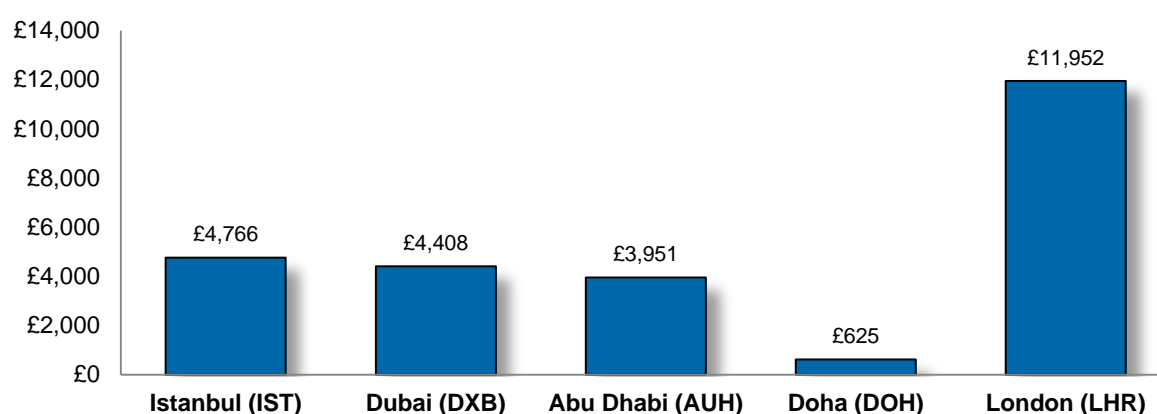
Geographic location

There are around 2 billion people within 2.5 hours' reach by air from the Middle East²¹. Furthermore, around 80% of the world's population lies within 10 hours flight of Dubai and the other hubs in the Middle East. This is a critical differentiator, especially when considering the location of future growth markets. Other hubs, in Europe, in Asia or North America, simply do not have this locational advantage.

Airport Charges

Airport charges in the Middle East are significantly lower than at Heathrow. As shown below, for a typical widebody operation the published airport charges per departure at the main Middle East hubs are less than half what they are at Heathrow.

Exhibit 4-1: Airport charges for a typical B777 at Heathrow versus Middle East hubs



Note: based on published rates, excluding any airport-specific discounts, for 297 seat B777 operating at 80% load factor

Source: Published airport charges

²¹ Source: AACO (Arab Air Carriers Association)

Designer hubs

The airports in the Middle East are all relatively young and have been designed around the needs of airlines and passengers. All of the major hubs in the region are currently rolling out unprecedented investment programmes that will add significant state of the art capacity to the region.

Dubai's Al Maktoum International Airport (DWC), which has the ambition of becoming the world's largest airport opened in October 2013. Although current capacity is merely seven million passengers the airport expects to be able to accommodate 160 million passengers once the planned five new runways are completed, around 2030. In the meantime, Dubai (DXB) is also being developed in order to cater for short term capacity requirements – a new concourse opened in 2013 for the sole use of Emirates and brought the airport capacity to 75 million passengers per annum. Depending on progress with DWC, DXB may be expanded further. Costs for DWC are estimated to be c. \$32 billion.

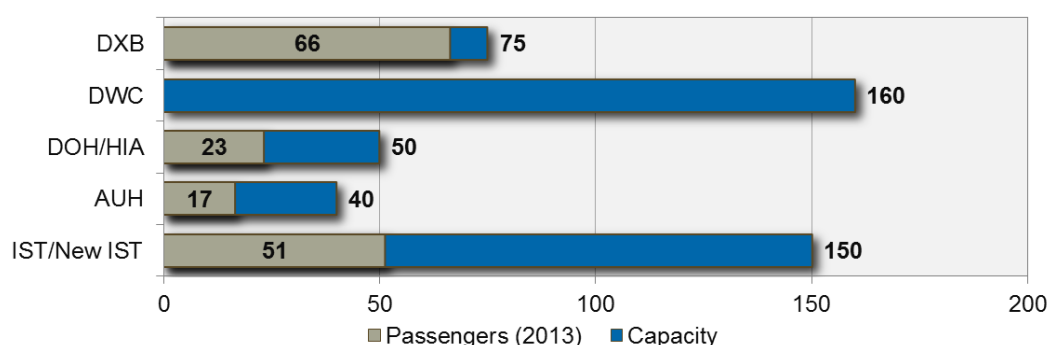
A project of similar scale is also underway in **Istanbul – İstanbul Yeni Havalimanı**. The new airport is estimated to open around 2020 and have initial capacity of 80 to 90 million passengers. The capacity will gradually increase as the airport completes the remaining three phases. If completed as planned the airport will have six runways and four terminals (total area of 1,400,000m² which compares to Heathrow's Terminal 5 of 353,020m²) and have a passenger capacity of 150 million. The Turkish Government estimate the construction costs will be \$9 billion. The BOT²² contract was recently awarded to a Turkish consortium at a price of \$29 billion.

Qatar's new Hamad International Airport (HIA) opened May 2014 with an initial capacity of 28 million passengers and could be expanded to accommodate 50 million passengers. Total construction cost is estimated at \$15 billion.

Abu Dhabi is in the process of building a new 700,000m² terminal (Midfield Terminal Complex) in between the existing two runways. This will increase total capacity from 17 million to up to 40 million at a total construction cost of \$3bn.

These capacity plans are summarised in the chart below.

Exhibit 4-2: Current passenger volumes and planned capacity at Middle East hubs, In millions



Source: Airport Press Announcements

²² BOT, Build Operate Transfer contract

Upon completion of all the planned work, there will be a combined capacity of over 450 mppa in the Middle East.

It is likely that not all of these plans will be fully realised. However, even if only some of the schemes are delivered and end up operating, the impact on the global aviation landscape will be palpable.

Fast growing and cost efficient hub carriers

All four of the Middle Eastern carriers have grown their global presence significantly since 2004, as evidenced by their increasing rank amongst global airlines. Emirates and Turkish have grown to be of comparable size (in terms of passengers) to BA. Qatar and Etihad are smaller but are growing rapidly. Etihad, celebrating only its 10th anniversary in 2013, has risen from a bottom ranking to be one of the top 25 airlines in the world.

Exhibit 4-3: Global airline rankings, based on Available Seat Kilometres (ASKs), 2004 and 2014

Year	2004	2014	Direction
Emirates	#19	#3	↑
Etihad	#161	#24	↑
Qatar	#58	#18	↑
Turkish	#43	#12	↑
AF-KLM	#4	#5	↓
BA	#6	#8	↓
Lufthansa	#8	#6	↑

Source: OAG, August schedules

Following on from a decade of strong growth, the airlines have large orders for new aircraft – mostly long-haul widebodies – suggesting that they will continue to grow rapidly into the future.

By midyear 2013 Emirates, Etihad, Qatar and Turkish had almost 800 aircraft on order. In November 2013, the Middle East carriers all made significant orders at the Dubai Air Show. As a result:

- Turkish Airlines have 269 aircraft on order and expect to double their seat capacity by 2020
- Emirates have 385 aircraft on order, and expect to be operating a fleet of 400 by 2020
- Qatar Airways have 239 aircraft on order, and are likely to be operating a fleet of around 300 by 2020
- Etihad Airways have 230 aircraft on order and are likely to operate more than 300 aircraft by 2020

In all, these four carriers now have around 1,100²³ aircraft on their order books, much of which will be used for growth. According to press releases from the airlines, the four airlines are likely to have a combined operational fleet of at least 1,200 by 2020, compared to about 600 today. If passenger numbers were to grow by the same ratio these airlines would be carrying over 200 million passengers by 2020. By contrast, British Airways's orderbook of 58 units, mostly for replacement, is likely to result in a similar fleet size in 2020 to what it operates currently (c. 270). In other words, each one of the four Middle Eastern airlines could overtake BA in terms of fleet size by 2020.

All carriers have signalled their intention to continue their expansion into mainland China once slots are made available. The US is also being targeted by the Middle East carriers as they seek to gain share in the large North American markets to Asia and Africa.

In addition to growing rapidly these airlines operate highly cost effective business models, mainly a result of young and fuel efficient aircraft and low airport charges. Unit costs are low and operating margins are high²⁴:

- **Average EBITDAR margin:** 17.6% (vs 8.7% for IAG, AF-KLM and Lufthansa)
- **Average cost / ASK:** 6.7 \$, cent (vs 10.5 \$, cent for IAG, AF-KLM and Lufthansa)
- **Fleet age:** 5-6 years (vs > 10 years for IAG, AF-KLM and Lufthansa)

It is, and will remain, extremely challenging for European airlines to compete with these emerging heavyweights of the aviation world.

The Middle East hubs have already won share on key transfer markets to Asia

There are now far fewer hubs in Europe than previously and the last few years have seen the emergence of Dubai as an alternative hub for east-bound traffic from Europe. More recently Abu Dhabi, Doha and Istanbul have begun to pursue similar strategies in each case supported by very strong home based carriers with dramatic fleet expansion plans.

Between them, Dubai, Doha, Abu Dhabi and Istanbul Ataturk airports handled nearly 140m passengers in 2012 compared to just 37m in 2002 (a 10-year CAGR of 15%). In 2013 the four airports handled 157m passengers – a growth of over 13% compared to 2012.²⁵

At each of the airports, the double digit growth over the last 10 years has been primarily driven by the dominant home carrier pursuing an aggressive growth plan. The airlines – Emirates at Dubai, Qatar at Doha, Etihad at Abu Dhabi and Turkish at Istanbul Ataturk – have developed their home airports into global hubs that rely heavily on transfer passengers. Their ability to attract transfer passengers has come about in part due to their geographic location between Europe and Asia, but also due to the extensive networks that the airlines have developed (both from organic growth and from strategic partnerships and, in the case of Turkish (Star) and Qatar (Oneworld), membership of global alliances).

²³ ACAS March 2014 (firm orders and options)

²⁴ EBITDAR margins: Emirates (19.5%), THY (17.6%) and Etihad (15.7%). Average unit cost calculated on an EBITDAR level; Emirates (6.5\$, cent), THY (7.1 \$, cent) and Etihad (6.6\$, cent). Fleet age: Emirates (6.0 years), THY (6.6 years) and Etihad (5.5 years). Source: company annual reports.

²⁵ Source: Airport websites

Their growth in size, combined with a strong reputation for product and competitive pricing has led to a shift in share from Europe to the Middle East for connecting traffic flows.

Exhibit 4-4: Market share of Middle East carriers by market, 2006 to 2012

Traffic Flow	Total Passengers			Share via Middle East		
	2006	2012	CAGR	2006	2012	Var
Europe-Far East (exc. China)	8.7m	11.5m	4.8%	6%	18%	+12%
UK-Far East (exc. China)	2.7m	2.9m	1.1%	14%	18%	+4%
Europe- China	2.4m	3.5m	6.9%	2%	10%	+8%
UK-China	0.4m	0.6m	6.6%	2%	13%	+11%
N America-Indian Sub-continent	1.4m	2.8m	12.0%	3%	26%	+24%
Europe-Australasia & Oceania	1.0m	1.5m	6.5%	14%	36%	+22%
UK-Australasia & Oceania	1.1m	1.1m	-0.2%	21%	31%	+10%
Total	17.7m	23.9m	5.1%	12%	30%	+18%

Source: PaxIS, direct and connecting passengers

These market share gains have been mainly at the expense of European hubs. Middle East carriers have gained share from all the major European hubs, not just Heathrow, indicating that this is not simply a capacity issue.

For example, for passengers flying between Europe and the Far East, the percent flying via European hubs has decreased from 37% in 2006 to 26% in 2012²⁶. These airports are far from being slot constrained. For example Frankfurt currently operates at 460k ATMS with capacity for 700k whilst Paris (CDG) operates 500k ATMS with capacity for at least 700k.

Middle East carriers are also increasingly competing on local UK and London markets

In addition to winning transfer share, Middle Eastern carriers have also gained significant share on the UK local markets. With their large Asian-centric networks, connecting via their hubs can sometimes be the only (or at least the best) way of getting to secondary Asian markets from the UK. Their low cost base also means that they can compete aggressively on price with the higher cost UK-based airlines.

As well as serving London, the Middle Eastern carriers have also launched multiple services to the UK's regional airports. Services connecting the Middle East to Manchester, Birmingham, Glasgow, Edinburgh and Newcastle have increased from 56 per week in 2006 to over 100 in 2013²⁷. During this time, the share of passengers travelling to Asia from these regional airports via the Middle East hubs has increased from 25% in 2006 to nearly 50% in 2012²⁸ illustrating how successful they have been at winning share even in competition against a domestic alternative (BA).

This also shows a willingness for these carriers to enter regional airports and will help to ensure that the UK regions will retain a one-stop connectivity to the world without having to rely on BA via

²⁶ IATA PaxIS²⁷ OAG, September schedules²⁸ IATA PaxIS

Heathrow (currently not an option from Birmingham), and will only serve to cement their position in the local UK market place over the coming years of capacity constraints within the London airport system.



4.5 NEW TECHNOLOGY WILL ENABLE MORE POINT TO POINT ROUTES TO BECOME FINANCIALLY VIABLE

Over time new technology has helped to shape the aviation market from improving safety levels to the introduction of more efficient aircraft types. These developments have been introduced over time as new aircraft and engine technologies became available and this development in aircraft technology will continue to shape the industry by enabling new markets to be served or business models to develop.

New technology short-haul aircraft will further extend reach of LCCs

Both Airbus and Boeing have new narrowbody aircraft coming into service in the next 5 years.

Exhibit 4-5: Overview of next generation narrowbody aircraft

		Main Specifications	Orders	Entry into service
Short -Haul	Airbus A320neo 	<ul style="list-style-type: none"> • Max range: 3,300 nm/6,150 km • 15% improved fuel burn* • Seats: 100-220 seats 	<ul style="list-style-type: none"> • 2,452 orders since its launch in 2010 • Future operators will include: <ul style="list-style-type: none"> • easyJet (100 ordered) • Norwegian (100 ordered) 	2015/2016
	Boeing 737 Max 	<ul style="list-style-type: none"> • Max range: 3,500 nm/6,482 km • 13% improved fuel burn* • Seats: 120-190 seats 	<ul style="list-style-type: none"> • 1,567 orders since its launch in 2011 • Future operators will include: <ul style="list-style-type: none"> • Norwegian (100 ordered) • Turkish airlines (50 ordered) 	2017

Note: *compared to current competitor or similar-sized airplanes

Source: Airbus, Boeing, Flightglobal, CAPA Aviation



Improved range. Both the neo and the Max boast an improved range of approximately 500nm. However, with all of Europe and North Africa already within range of the current line of narrowbodies (from London) the additional range is unlikely to impact London routes significantly.

Improved fuel efficiency. More important for LCCs (and other short-haul operators) is the improved fuel efficiencies of these new narrowbody aircraft. The lower unit costs will make more routes financially viable, bringing more thin routes into scope for LCCs.

New technology long-haul aircraft will be able to bypass hubs and make many more long-haul routes economically viable

The A350 and the Boeing 787 Dreamliner are brand new “clean-sheet” designs, notable for their long range and relatively small size.

Exhibit 4-6: Overview of next generation widebody aircraft

		Main Specifications	Orders	Entry into service
Long - Haul	Airbus A350 	<ul style="list-style-type: none"> • Max range: 8,250 nm/15,300 km • 25% improved fuel burn* • Seats: 270-350 seats 	<ul style="list-style-type: none"> • 509 orders since its launch in 2010 • Future operators will include: <ul style="list-style-type: none"> • British Airways (18 ordered) • Emirates (70 ordered) 	Sept 2014
	Boeing 787 	<ul style="list-style-type: none"> • Max range: 8,500 nm/15,750 km • 20% improved fuel burn* • Seats: 210-330 seats 	<ul style="list-style-type: none"> • 982 orders since its launch in 2005 • Operators include: <ul style="list-style-type: none"> • Virgin Atlantic (16 ordered) • British Airways (4 delivered, 20 to be delivered) • Norwegian (8 ordered) • TUI (4 in service, 9 ordered) 	2011

Note: *compared to current competitor or similar-sized airplanes

Source: Airbus, Boeing, Flightglobal, CAPA Aviation

The introduction of new generation aircraft is expected to make a strong impact on the future airlines' networks and their business models. In particular, we expect that the new widebody aircraft will make previously unattractive routes economically viable. Since operating costs for available seat-mile (CASM) could be as much as 20-30% lower than comparable aircrafts (according to manufacturer's data) and their aircraft size is smaller but can reach just as far or further, airlines now might need 80-100 fewer passengers per flight to make a route profitable. This could potentially open up new markets to be served with fewer connections and potentially bypassing traditional hubs.

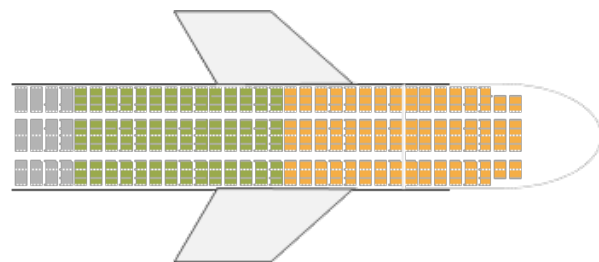
Mexico Example:

Flights to Mexico are an often quoted example of services relying on transfer passengers today, however with new technologies and market growth this dependence will greatly reduce.

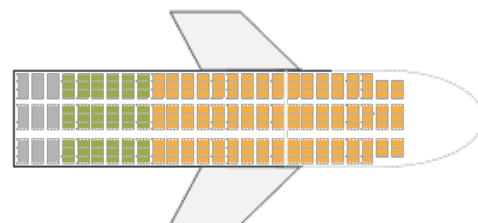
Today BA flies a Boeing 747 with nearly 340 seats whilst averaging around 300 passengers per flight. Of this demand approximately half does not connect at Heathrow, it is either local traffic or connects in Mexico itself.

Swapping this service to a modern aircraft results in a much lower threshold of transfer demand required to fill the aircraft to the same levels as before. In this example just 50 connecting passengers would be required instead of 150 on the larger aircraft operated today whilst in the future larger local markets will reduce the dependence on transfers further.

Today a 747 with 340 seats may operate with around 150 connecting passengers



A smaller next generation aircraft with around 230 seats only requires 50 connecting passengers. In the future this would decrease further given strong local market growth forecasts



Empty Seats Connecting Demand Local Demand

The strong economics of these aircraft have made them popular choices among low cost carriers looking to expand into long-haul markets. For example:

Exhibit 4-7: Low cost carriers flying long-haul, by region

Region	Airline	A/c Type	Route example
Europe	Norwegian	B787	LGW-FLL, LGW-LAX, LGW-JFK
Australia	JetStar	A330 (B787 on order)	SYD-HNL, AKL-SIN, BKK-MEL
Asia	Air Asia X	A330 (A350 on order)	KUL-SYD, JED-KUL
Asia	Scoot	B777 (B787 on order)	SIN-SYD

Source: Airline Websites

Norwegian's recently announced 787 services from Gatwick to New York (JFK), Los Angeles (LAX), and Fort Lauderdale (FLL) demonstrate the potential for long-haul LCCs. The selection of Gatwick as a core airport in Norwegian's global network is equally significant. Norwegian's new transatlantic services underscore its commitment to add long-haul services from Gatwick to markets around the world.

This also demonstrates Gatwick's inherent ability to deliver significant long-haul nonstop connectivity, both now and in the future. A second Gatwick runway would open the door to Norwegian, and airlines like Norwegian, to bring new and innovative air services to London's passengers. Additional Gatwick capacity would attract new competitors, new service products, and cutting edge nonstop airline development for London.

Norwegian also increased its Gatwick short-haul network which provides evidence of Norwegian's ability to build transfer traffic at Gatwick in support of its long-haul flights. In Scandinavia, Norwegian has already established short-haul operations at Oslo, Stockholm, and Copenhagen airports which are scheduled to connect online passengers to the airline's long-haul services.

5 FUTURE DEMAND IN LONDON

5.1 INTRODUCTION

The London aviation market is by its nature closely linked to all other aviation markets in the world, and the characteristics and trends described in the previous sections will have a real impact on how this market develops. In preparing the long term forecasts for London, we have been mindful not only of the long term historical relationships that can be demonstrated through econometric analysis, but also the undisputed changes to airline, passenger and airport behaviour already under way.

The three most fundamental of these, which any realistic forecast of future London demand needs to recognise are:

- Short-haul demand is relatively mature but will remain the largest traffic segment for London and the UK, reflecting business, leisure and VFR travel patterns
- Long-haul demand growth rates will be greatest from to/from the emerging markets, although North America will remain the UK's largest long-haul market despite its maturity
- London's geographical location means that it will become less attractive and less important as a transfer point, particularly for the emerging markets generating growth

5.2 OVERVIEW OF FORECASTING APPROACH

The traffic forecast model from which the following results have been derived was developed by ICF SH&E during November 2012, and refined and updated during 2013 and early 2014. The purpose of developing a standalone model has been to:

- Provide an independent view of long term demand in London, reflecting known and expected trends on both the demand and supply side
- To enable the simulation of various airport capacity options, particularly at Heathrow and Gatwick and estimate their likely impact on the distribution of passengers across the London system
- To inform the provision of derivative forecasts for Gatwick, such as busy hour movements and passengers, aircraft type forecasts for noise and emissions and on-airport employment forecasts.

The model is not intended to replicate the DfT's national air passenger demand and allocation models, and in fact was developed to focus on the areas where this model is known to be relatively weak: for example the behaviour of commercially motivated airlines operating different business models and the impact of competition across airports in the London system. In particular, the scenarios reflect Gatwick's vision of a future that is meaningfully different from patterns of the past.

As such, although historical information does play a meaningful role in the model, much more of the attention and the insight provided by ICF SH&E is focused on an evaluation of likely future scenarios.

The starting point for the London level forecasts has been a segmentation of the total market into two broad categories, which are each comprised of more specific markets (36 segments in total). Group one, the largest segment, is the London O&D segment, which accounts for over 85% of airport passengers. These are passengers using London airports because their journey starts or ends in London.

The second group, transfer demand, includes passengers that fly through London on their way from their true origin to their true destination. They are further segmented according to their main flows. In total, they accounted for 14% of total London airport passengers, or around 20 million in 2013.

London Demand (O&D)

The London O&D forecasts are based on econometric relationships between passenger volumes in each segment and the relevant real GDP profile, reflecting also the broad share of passengers who originate in the UK versus those who originate in the ‘other end’ country, as for this latter group the UK GDP is going to be a less influential driver.

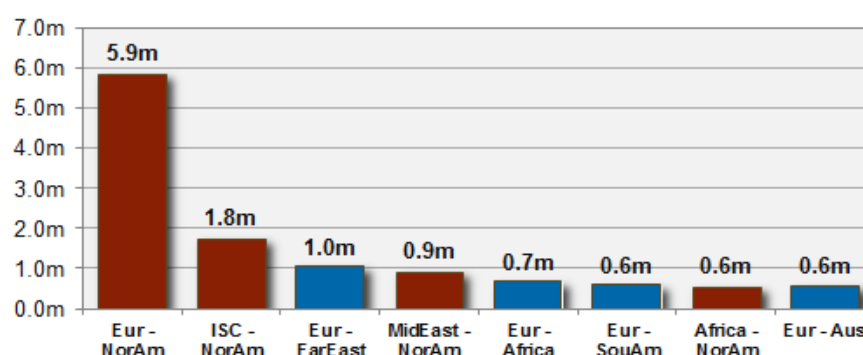
Transfer Demand

The approach to forecasting London transfer demand has been to consider the markets which could credibly connect in London (e.g. *not* North America to South America, or Japan to Australia), and then to forecast both the growth in total demand in these markets and then London’s share.

London’s dominance in the Europe- North America market is due to a combination of geographical and historical reasons. The UK is the first European landfall²⁹ when arriving from the U.S. This makes all major airports in North America a natural ‘spoke’ on a London or other European hub. As London is furthest West it has an advantage over other hubs at Frankfurt, Paris, Madrid or Amsterdam. Over half of BA’s non-EU flying today connects Heathrow with North America.

This is shown by the current pattern of transfers at Heathrow.

Exhibit 5-1: Size of International to International Transfer Markets at Heathrow



Source: IATA PaxIS (12 months to March 2013), ICF SH&E Analysis

²⁹ overflying Shannon now that aircraft have the range

However, it has been widely shown that the centre of gravity for global economic activity continues to shift eastwards. It is important to recognise that the new geographic centre of growth makes the UK the *furthest* western European point – turning future Heathrow and ALL of Europe into a natural spoke on Middle East hubs. A ‘spoke’ is primarily an origin / destination market. It may have some local connect markets but it is primarily an O&D market served by a nonstop hub route.

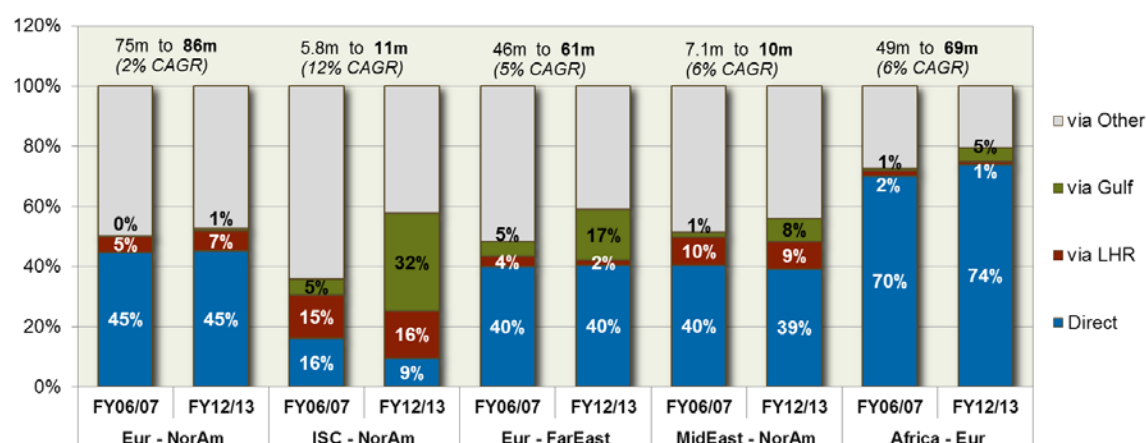
London will be redefined geographically as a far western origin/destination market for travel to/from China/Asia. This will be a significant future air travel pattern change which will impact London, the UK and Europe.

The share of passengers travelling via the Gulf hubs (consisting Dubai, Abu Dhabi, Doha and Istanbul, and shown in green below) has already increased considerably on all markets except Europe to North America over the last six years.

One of the most dramatic increases in share for the Gulf hubs has been on the Indian sub-continent (ISC) to North America flow. There is very little direct capacity, and Heathrow is ideally located to act as a connection point between North America and the ISC (the distance penalty on JFK-LHR-DEL is only 4% - i.e. it is only 4% longer than flying direct). Despite being less optimally positioned (the distance penalty on JFK-DXB-LHR is 12% for example), the Gulf hubs have increased from just 5% in FY06/07 to 32% in FY12/13 – more than twice Heathrow’s share.

Heathrow’s share of the Europe to Far East market has remained constant, but small, reflecting its poor location for all but Irish passengers. By contrast the Gulf hubs’ share has more than tripled owing to its ideal location in the intersection between Europe and Asia. Unsurprisingly, the Gulf carriers have also seen significant gains in the share of passengers travelling on the Middle East to North America market, with 47% travelling direct or via a Gulf hub in FY12/13, up from 41% in FY06/07. Notably, this market size has grown at a CAGR of 6% over the same period. Heathrow enjoys a significant share of this market, at 10%, and has thus far been able to maintain this since FY06/07, no doubt relying on its strong connectivity to the two regions and its location. However with Middle Eastern carriers increasing capacity to the USA, it is likely that the share of passengers travelling direct will increase; at the expense of Heathrow.

Exhibit 5-2: Heathrow and Gulf Connections on Top London I-to-I Flows

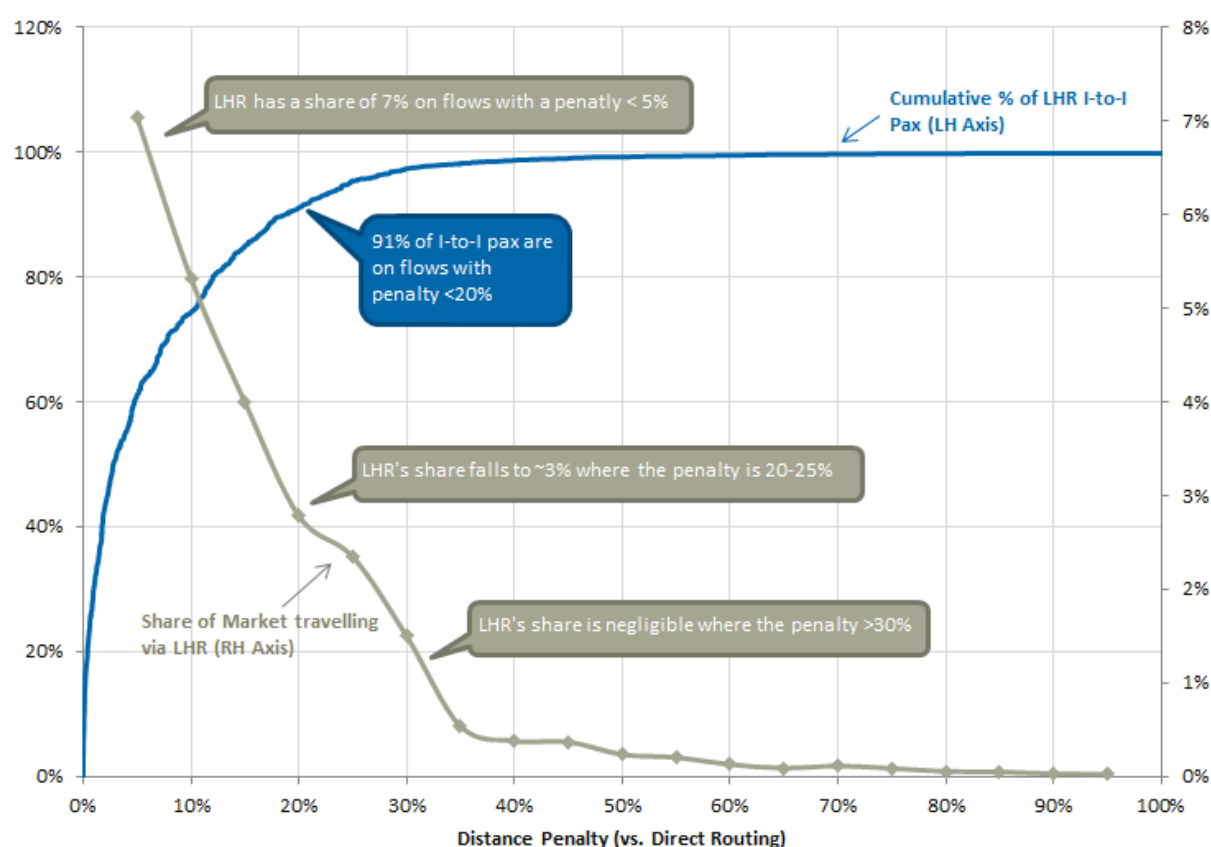


Source: IATA PaxIS, ICF SH&E Analysis

The power to price competitively and a strong purpose-built connecting hub mean that the Middle Eastern hub carriers are able to compete for passengers even on itineraries where they are not ideally located. Almost a quarter of International to International (I-to-I) passengers are making a detour of more than 20% relative to a direct routing.

By contrast, there are very few passengers connecting through Heathrow on itineraries where the distance penalty is meaningful: only 8% of Heathrow's I-to-I passengers are on routes with a distance penalty of 20% or higher. This suggests Heathrow's ability to attract I-to-I passengers will remain limited to routes to/from North America (where it is well positioned) – a mature market, and an increasingly competitive one.

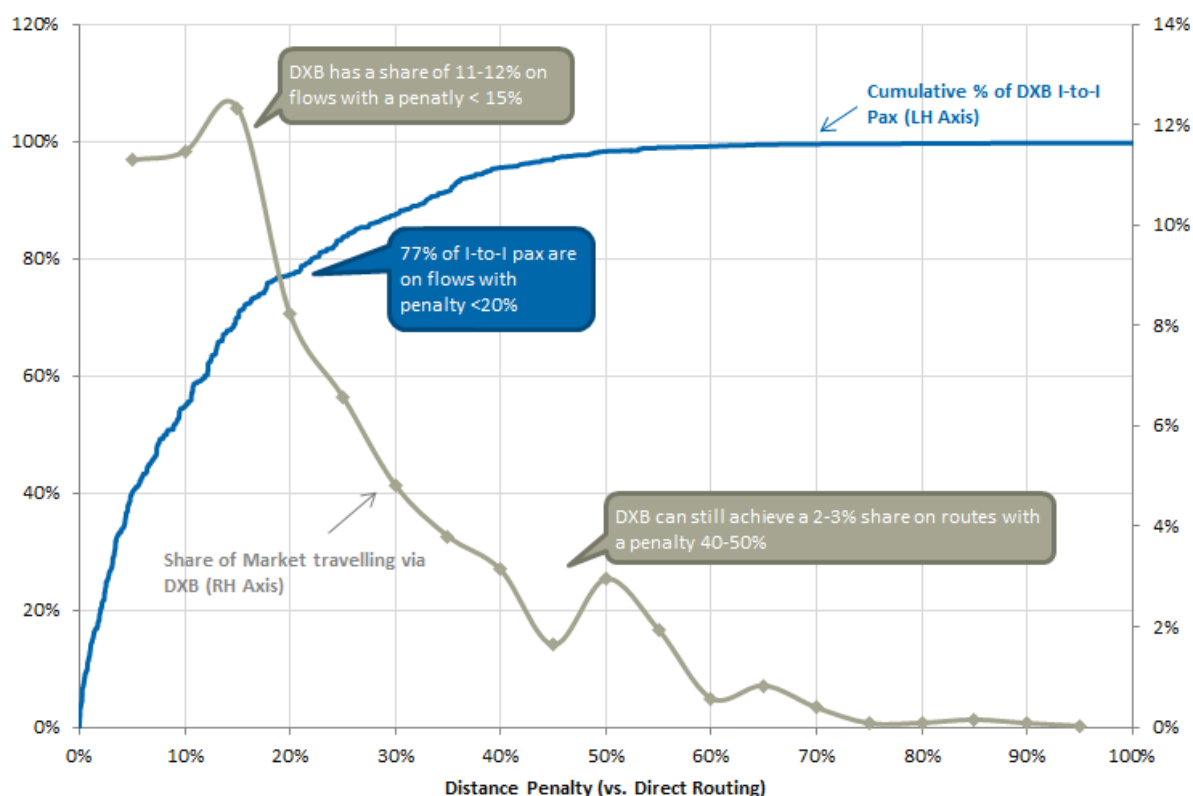
Exhibit 5-3: Heathrow I-to-I Passengers as a function of Distance Penalty (Heathrow Markets³⁰)



Source: IATA PaxIS, ICF SH&E Analysis

³⁰ I-to-I Markets with at least 1 passenger travelling via Heathrow in FY12/13

Exhibit 5-4: Dubai I-to-I Passengers as a function of Distance Penalty (Heathrow Markets)



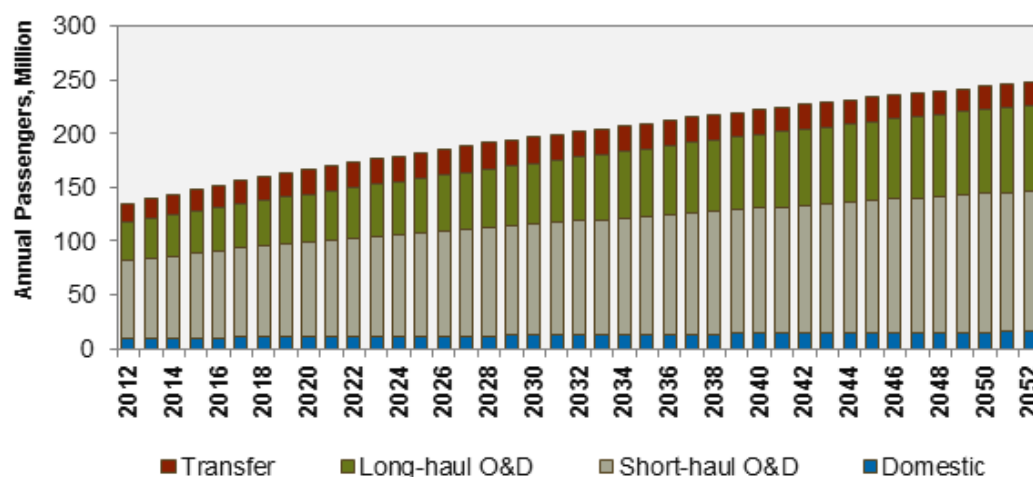
Source: IATA PaxIS, ICF SH&E Analysis

These trends are important to recognise and to reflect in future traffic projections as they have such important implications for the type of capacity and demand that London airports are likely to need to cater to in coming decades.

5.3 SUMMARY LEVEL UNCONSTRAINED FORECASTS FOR LONDON

The total unconstrained passenger forecasts are summarised below. As previously described, they are driven by the underlying economic outlook and relative market maturity of each O&D market, whether they are those which terminate in London or those which use London as a transfer point. In addition, for these transfer markets, the likely trend of more direct flights and more competition from alternative hubs has been reflected, which explains the transfer forecast declines in the second half of the forecast period.

Over the last 25 years the London market has grown at around 3% per annum whilst the forecast until 2050 is 1.6%. This still yields another 105 million passengers per year by 2050

Exhibit 5-5: Unconstrained London Passenger Forecasts, 2012 – 2052

Market	2012	2030	2050	2012-2030 CAGR	2012-2050 CAGR
Domestic	10	12	15	1.4%	1.2%
Short-haul	72	103	129	2.0%	1.5%
Long-haul	35	57	78	2.7%	2.1%
Transfer	18	24	22	1.7%	0.5%
Total	135	197	244	2.1%	1.6%

Source: ICF SH&E

Note: CAGR = Compound Annual Growth Rate

What these forecasts indicate is that demand at London airports will increase by over 60 million passengers by 2030. The majority (over half) of this additional demand will be to/from Europe and transfer demand will represent less than 10% of the incremental passengers. In the near term transfer flows will be buoyed by rapid growth in markets that do not have direct services but over time London's share will continue to decline. By 2050, a further 47 million passengers will be added, of which again over half will be in the domestic and short-haul segment, but over 20 million in long-haul. Transfers are forecast to decline (to just 9% of total demand in 2050), similarly to the AC's unconstrained forecasts, reflecting market trends and London's declining role as a transfer hub for the major traffic flows of the future.

Each of the main segments and a comparison to the DfT's and/or the AC's forecasts is discussed in more detail below.

5.4 FUTURE DEMAND WILL CONTINUE TO BE DOMINATED BY SHORT-HAUL O&D TRAFFIC

As already shown previously, 68% of the UK air travel demand is in the short-haul market. This reflects where people travel to and originate from for business, for leisure and for visiting friends and relatives. Although this market segment is significantly more mature than many of the long-haul emerging markets, its sheer size and continued importance for the UK means that it is the short-haul market which will continue to drive most of the volume growth in the London area.

By 2030 it is projected that short-haul O&D (including UK domestic) will account for 116³¹ million passengers a year, up from 82 million in 2012, an increase of 34m passengers. By 2050, this figure is forecast to reach over 140 million, an additional 28m passengers.

Exhibit 5-6: London Short-haul Market Forecast, Passengers, Million

London to:	2012	2030	2050	2012-2030 CAGR	2012-2050 CAGR
Europe	72	103	129	2.0%	1.5%
UK	10	12	15	1.4%	1.2%
Total short-haul	82	116	144	1.9%	1.5%

Note: Totals may not sum due to rounding

Source: ICF SH&E

This is in line with the DfT's unconstrained forecasts, which suggest a short-haul O&D demand of 118 million by 2030³² and the AC's unconstrained forecasts, which indicate 116m by 2030. By 2050, the AC forecast 162 million short-haul O&D passengers a year respectively, which reflects less maturity in the latter years and some differences in the countries which comprise short-haul versus long-haul.

5.5 EMERGING MARKETS WILL GENERATE HALF OF ALL LONG-HAUL DEMAND GROWTH

The emerging markets of the Far East and Latin America and Africa are still relatively immature and will generate much of the long-haul demand growth in coming decades. Certainly growth rates to/from the UK will be much higher than between the UK and for example the US. However, most of the emerging markets also have their trade and tourism with their intra-regional partners so even though their populations may be large and their middle class growing rapidly, the volume of demand to/from the UK will continue to be smaller than the UK's established partners.

For example, the demand between London and Central and South America will be around one quarter of the demand to/from North America and less than 5% of demand to/from Europe even with growth rates over 5% a year for the next 20 years.

³¹ ICF SH&E London O&D forecasts, includes UK domestic and European demand.

³² DfT, January 2013

Exhibit 5-7: London Long-haul Market Forecast, Passengers, Million

London to:	2012	2030	2050	2012-2030 CAGR	2012-2050 CAGR
North America (inc. Caribbean)	14	18	22	1.3%	1.2%
Far East & Australasia (exc. China)	7	11	15	2.7%	2.3%
Middle East & Africa	9	14	20	2.6%	2.1%
Indian Sub-continent	3	6	8	3.4%	2.7%
Central & South America	1	4	6	6.6%	4.3%
China	1	4	6	8.8%	5.3%
Total long-haul	35	57	78	2.7%	2.1%

Source: ICF SH&E

Nevertheless, it may be seen that the fastest growth will be in markets to and from the emerging economies, not the large, established markets.

An alternative way of considering the long-haul forecasts above is to segment the total long-haul market into broad groups based on whether they are classed ‘emerging’ markets. For consistency with the work of the AC and its consultants, we have considered emerging markets to be BRICS, CIVETS and Next11 countries. By removing short-haul countries (Turkey and Russia) and duplicates, this yields fifteen countries which we group in the *Emerging* long-haul category. All other long-haul markets fall into the *Established* group.

Exhibit 5-8: London Long-haul Market Forecast, Passengers, Million

London to:	2012	2030	2050	2012-2030 CAGR	2012-2050 CAGR
Established long-haul markets	27	40	52	2.1%	1.7%
Emerging long-haul markets	8	17	26	4.4%	3.2%
Total long-haul	35	57	78	2.7%	2.1%

Source: ICF SH&E

In line with economic projections and relative levels of aviation development, the emerging long-haul markets are forecast to grow far more rapidly than the established ones, almost quadrupling in size in the next four decades (compared to a less than doubling for the established group). As a result, their relative importance will also rise, increasing from 22% of total long-haul demand to 37%. Nevertheless, despite this impressive growth rate, of the 45m additional long-haul passengers a year forecast between 2012 and 2052, just under half (22m) will be from these emerging markets, with the rest (23m) in the established group.

The DfT and the AC’s forecasts do not break out passengers by region or country at the airport level. However, the AC’s December 2013 forecasts show total London long-haul O&D demand (unconstrained) to grow at 2.3% to 2050, from a base of 29m in 2011 to 45m by 2030 and 72m by 2050. This is very similar to ICF SH&E’s unconstrained forecasts for this segment, with the small

absolute volume difference likely attributable to the different definitions of long-haul versus short-haul.

5.6 LONDON'S GEOGRAPHICAL LOCATION MEANS THAT IT WILL BECOME LESS ATTRACTIVE AND LESS IMPORTANT AS A TRANSFER POINT

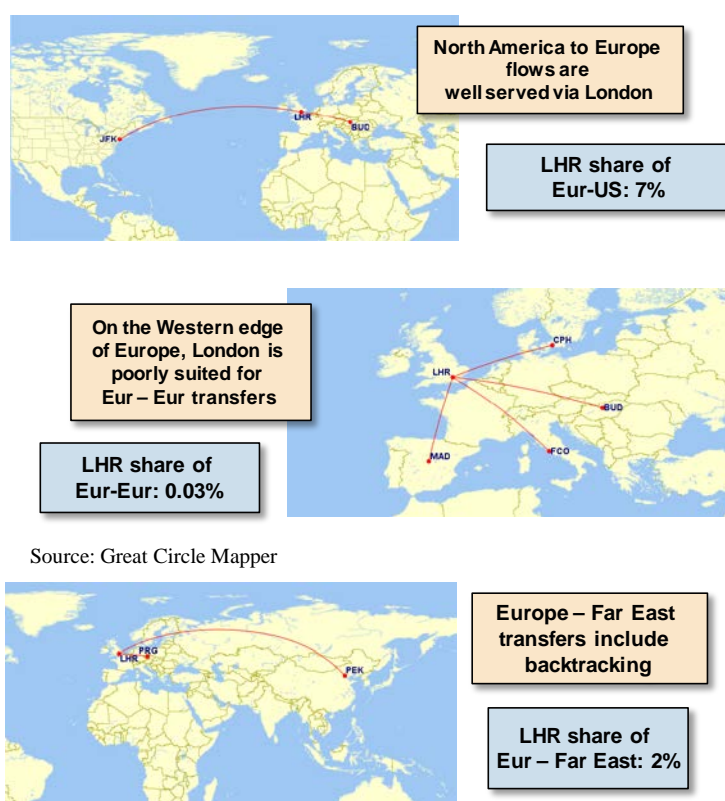
Of the 16 million or so passengers a year who connect at London airports, over 65% are going to/from North America³³. London is well located geographically to serve this market, has strong cultural and economic ties and the best transatlantic services on offer (New York alone has 30 daily flights from Heathrow; Paris is the next best served European airport, but with only 12 daily flights)³⁴. These markets are large but now mature. London will likely retain its dominance for US-Europe connections but new aircraft types and the proliferation of direct services will continue to reduce the proportion of passengers who need to transfer between their origin and destination

Future growth in demand will be in the emerging markets of Asia and Latin America, and eventually Africa. London's geographic location is a major disadvantage for trying to connect these markets to each other or to the mature markets of Europe and North America. Virtually any point in Europe or the Middle East is better located for these flows than London due to the latter's location on the far West of Europe.

According to Boeing's latest Global Forecasts, the fastest growing markets between 2012 and 2030 will be within South Asia, Southeast Asia to/from South Asia and Africa to/from the Middle East. In absolute volume terms, the largest markets will be within Asia Pacific, within North America and within China. All of these markets will be served predominantly by direct services and via regional hubs.

The largest hubs of the future will be in the Middle East – these countries have the geographic location and the carriers to serve virtually all points in the world with one connection. New aircraft types will only reinforce this.

As a result, irrespective of capacity constraints in the London system, the total volume of transfer passengers wishing to connect over London will rise and then decline. Markets which are today too 'thin' to support direct services will



³³ IATA PaxIS

³⁴ OAG

grow over time and acquire direct services, and furthermore the markets which will continue to rely to a significant degree on transfers will find that hubs and hub carriers in the Middle East and Asia are far better positioned to serve them.

Exhibit 5-9: London Transfer Demand Forecast, Passengers, Million

Transfers over London	2012	2030	2050	2012-2030 CAGR	2012-2050 CAGR
Domestic to International	5	6	6	1.7%	0.7%
International to International	13	18	16	1.6%	0.4%
Total Transfers	18	24	22	1.7%	0.5%

Note: Totals may not sum due to rounding

Source: ICF SH&E

This forecast demand trend is consistent with the AC's own unconstrained forecasts, which show demand for international to international transfers in London to rise from 20m in 2011 until around 2030 and decline thereafter, reaching 28m by 2050, a CAGR of 0.8%. A similar pattern is seen for domestic to international transfers, with a rise until 2030 and a decline thereafter. The difference in starting and thus ending volumes are partly due to different data sources, with the AC using CAA survey data and ICF SH&E using IATA PaxIS data, and partly due to a greater shift of market share to other hubs and direct services on these transfer flows, as supported by the industry trend analysis presented in the previous section.

6 CAPACITY OPTIONS AND CONNECTIVITY OUTCOMES

6.1 INTRODUCTION

The traffic forecasting model developed by ICF SH&E is designed to simulate the likely behaviour of passengers and airlines under various capacity scenarios. The Do Minimum Case, where no additional runway capacity is added, will result in a very different level and make-up of traffic and connectivity for London than if either Heathrow or Gatwick build an additional runway.

The purpose of the modelling presented in this section is to describe and quantify the expected benefit in traffic and connectivity terms of the two main options on the AC's shortlist – a second runway at Gatwick and a third runway at Heathrow.

6.2 DETERMINANTS OF FUTURE TRAFFIC AT THE LONDON AIRPORTS

Traffic at individual London airports in coming years will be determined by a number of factors. One of the key variables will be total passenger demand for travel to/from/via London. This has already been described and presented in the previous section.

Other factors will also play an important role and will vary according to where additional capacity is added. Some of the key considerations in the following scenario analyses include:

Capacity

In a market where unconstrained demand exceeds supply, actual traffic will in large part be driven by where, when and how much additional capacity is added. For example, if Gatwick builds another runway, its share of the London system will eventually increase. Wherever capacity is added, the years preceding the opening of the new runway will involve a period of active business development aimed at attracting new services and at enticing existing service to move from other, more congested airports. This will result in a step-change in traffic over years immediately following the opening of new capacity, although it will take a number of years for airlines to increase their capacity to match the unconstrained demand.

Attractiveness to airlines and passengers

Airlines will operate to airports where they expect to maximize the profitability of their operations. This decision will be based on both cost and revenue factors and will vary according to airline operating model. For example, some passengers will be willing and able to pay higher fares to fly from airports which they consider more attractive, either for reasons of location or air service. Similarly, a low cost carrier will typically be prepared to pay less for airport charges than a full service network carrier, since the former's unit revenues will be much lower and airport charges account for a larger share of their operating costs. When a new runway is built, its costs have to be recovered through higher airport charges, making the airport with the new capacity more expensive relative to the competition previously. Both Gatwick and Heathrow are expected to turn away some traffic when their airport charges are increased. However, in a capacity constrained world where not

all airports are considered equal for all passenger and airline types, some segments will be less affected by this increase than others.

Traffic Profile

The size of an airport and the airlines using it will also influence the future traffic profile. Heathrow, for example, is home to British Airways, the UK's only major network carrier. Network airlines operate by serving both local and connecting traffic flows via their home hub, and they typically have a higher proportion of transfer passengers on their services.

The majority of the transfer flows at Heathrow involve BA. Other carriers use Heathrow largely for its access to the London market.³⁵ Gatwick does not expect BA to move or to split its main hub from Heathrow and we would agree that this is a reasonable baseline position, given the airline's public statements regarding its strategy. Neither is any one of the global alliances expected to move wholesale from Heathrow to Gatwick. This is considered possible, but not necessary, for satisfying the demand in the London market for both O&D and transfer traffic. This is reflected in the scenario analysis.

It should be noted that BA has a sizeable Gatwick operation today where transfers already play a role and the Gatwick market is one that BA have recently chosen to grow. In the future it is likely that transfers will continue to play a key role in their network development across the London airports.

6.3 OVERVIEW OF SCENARIOS

The scenarios under consideration set the main forecast constraints.

The **Do Minimum** Case sees the maximum use of existing airport capacity (within current and expected limits), with no runways added in the South East.

The Gatwick Option (2+2) included in this report is the wide-spaced, mixed mode option included in the Airport Commission's Interim report, with the opening date of 2025 and an ultimate annual ATM capacity of 560,000.

The Heathrow Option (3+1) included for comparison is based on a third independent runway, opening in 2030, with an annual ATM cap of 670,000. The capacities proposed by the two shortlisted project sponsors (740,000 and 700,000), while potentially operationally feasible, are not considered realistic on environmental grounds. As such a limit of 90% of the higher option has been assumed for illustrative purposes.

Given the uncertainty around the likely capacity limit imposed on any third runway at Heathrow, two additional sensitivities have been modelled, one with a more restrictive ATM cap, and one which allows the full stated 740,000 annual movements suggested by Heathrow Airport Limited. These have been included to illustrate the likely impact on the overall London system of varying this capacity assumption, holding all other factors constant.

³⁵ Source: ICF SH&E analysis of IATA PaxIS data, 2012

Exhibit 6-1: Summary of Capacity Scenarios Modelled

Option	Description	Year of new runway opening	Annual ATM capacity	New Airport Charges per Passenger
Do Minimum	No new runways in South East	N/A	LGW – 300k LHR – 480k	
Gatwick R2 (2+2)	Wide spaced mixed mode runway added at Gatwick; no other runways built	2025	LGW – 560k LHR – 480k	LGW – £13.50
Heathrow R3 (3+1)	Third independent runway added at Heathrow, no other runways built	2030	LGW – 300k LHR – 670k	LHR – £35
<i>Heathrow R3 (3+1 min)</i>	<i>Third independent runway added at Heathrow, no other runways built</i>	<i>2030</i>	<i>LGW – 300k LHR – 605k</i>	<i>LHR – £35</i>
<i>Heathrow R3 (3+1 max)</i>	<i>Third independent runway added at Heathrow, no other runways built</i>	<i>2030</i>	<i>LGW – 300k LHR – 740k</i>	<i>LHR – £35</i>

Source: GAL, ICF SH&E

6.4 AIRPORT LEVEL FORECASTS

The unconstrained demand forecast for the London market is assigned to the various airports that serve the London system. However, to produce a realistic set of outputs it is vital that each airport's capacity is considered, as well as the likely behaviour of airlines and passengers under various scenarios.

This element of the forecasts has captured current and future capacity constraints considered significant in the London market. In addition, assumptions of the trends in average aircraft size, runway utilisation levels and the mix of long/short-haul volumes have been developed at an airport level. Heathrow illustrates the importance of this: although the airport is effectively operating at its movement limit there is still significant scope for growth through larger aircraft and a switch from short-haul to long-haul markets. We believe these assumptions provide a reasonable and realistic view of future passenger and movement caps.

The unconstrained demand is assigned to individual airports for allocation on a market basis from a baseline of 2012. This demand is readily allocated to the airport when excess capacity exists. However, when there is insufficient supply to meet forecast demand, spill at an airport level is predicted.

Exhibit 6-2: London Demand Model Overview

Source: ICF SH&E

Typically some markets are assumed to spill more readily than others. We have already seen long-haul flying squeeze out some domestic and short-haul markets at Heathrow, driving a change in mix.

Spill of this unconstrained demand is still retained largely within the London system; other airports are able to compete for this traffic assuming their own capacity constraints are not breached.

Constrained forecast outputs are created at an airport level, and a London system level. Various market segments are split out by airport.

6.5 FORECAST RESULTS**Do Minimum Case – No new runways in the South East**

The Do Minimum Case assumes that no new runway capacity is added during the forecast period. Heathrow is already virtually full year-round, and Gatwick is approaching capacity in the summer peak; additional growth at these airports will come mostly from larger aircraft carrying more passengers. By 2025 Gatwick could accommodate another ten million passengers, benefiting from both underlying market growth and traffic that is spilt from Heathrow. Beyond 2025 however, its growth will be very limited, with its single runway not expected to handle more than 50 million passengers by 2050.

The share of long-haul traffic at Gatwick will increase significantly, from around 18% today to over 30%, as this rapidly growing market segment looks for access to the London market. At the same time, Heathrow's share of long-haul traffic will also increase, from around 52% today to over 62% by 2050, as short-haul services are squeezed out and the airlines make the most efficient possible use of the limited slot capacity available. Other London airports will pick up some of the short-haul demand that cannot be accommodated at Heathrow or Gatwick.

All London airports will also be used as intensively as airline business models and passenger demand will support. However by 2050 traffic will be significantly constrained, with around 50 million passengers who would have used the airports not being accommodated. These passengers are likely to use other airports in the UK or overseas, other modes of transport, or not make trips at all.

Gatwick Second Runway (Wide Spaced, Mixed Mode Option) – 2+2

In the Gatwick scenario, a second runway is delivered and opened by 2025, just as the London system begins to require this capacity.

In this scenario, the two runways can be operated independently and are assumed to be operated in mixed mode, reaching 560,000 ATMs per year at full maturity (less than double the 300k ATM limit assumed for its current single runway).

Average airport charges increasing from £10 to £13.50 may deter some of the price sensitive LCC segment (who could potentially move to STN or LTN). However, due to pent-up demand, even lost short-haul traffic is likely to be replaced by other carriers, and the second runway is likely to prove very attractive to long-haul carriers looking to access the London O&D market.

As the airport grows, the large volumes of short-haul traffic will naturally generate connecting opportunities but these are not central to the business model and are not reliant on an alliance move.

Under this scenario, Gatwick grows to around 95m pax by 2050, comprising 59m short-haul (including 6m Domestic), 28m long-haul and 8m transfers. Heathrow remains the dominant transfer hub, with 44m long-haul passengers and 13m transfers by 2050.

All of London's forecast demand is satisfied until at least the late 2040s.

Heathrow hird Runway (Total Annual ATM cap of 670k) – 3+1

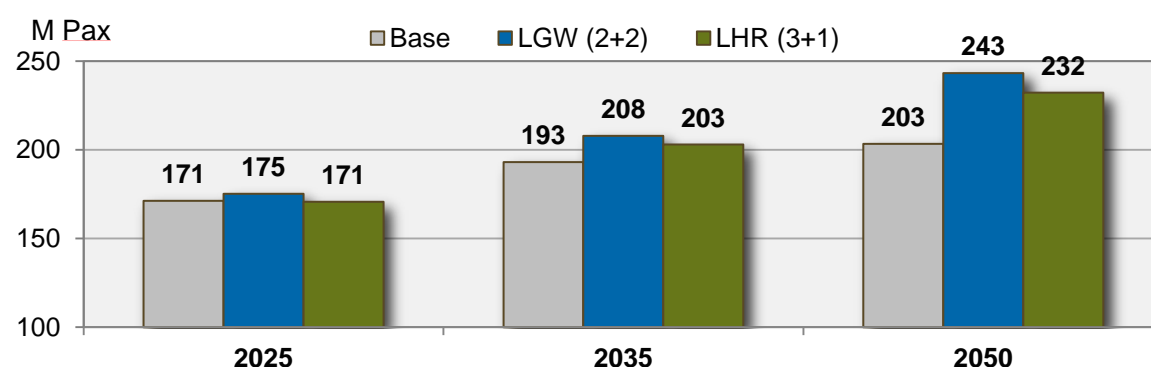
Due to the later opening of the runway than in the Gatwick scenarios, the gap between capacity and unconstrained demand is larger in this scenario. When the runway opens, it is expected to capture a meaningful share of unmet demand and also to attract some of the traffic, particularly long-haul, which was operating at Gatwick.

However, due to the higher costs of delivery, average airport charges are likely to rise from £20 to around £35 per passenger. This is likely to have a significant deterrent impact, particularly on short-haul airlines as their route economics (mostly based on the LCC/hybrid model) are not supportive of such high charges. As a result, short-haul traffic will be deterred from Heathrow, going to Gatwick and the other London Airports. By 2050 Heathrow's share of the London short-haul market is forecast to decline to 27%, from 38% today.

Gatwick does lose long-haul traffic compared to the Do Minimum Case, but will remain closer to capacity given its role in serving the much larger short-haul London demand segment.

Under the Heathrow option, less of London's unconstrained demand is satisfied since Heathrow is too expensive for significant market segments and the other airports are unable to satisfy all of the demand resulting in greater spill from the short-haul market segment

The three capacity scenario options are summarised in the following chart and table. The chart shows the total number of passengers in the London system, whose demand will be satisfied in each scenario. The table below provides additional airport and segment level detail for Heathrow, Gatwick and London as a whole. The other London airports represent the difference between the Heathrow and Gatwick and the Total London figures.

Exhibit 6-3: Forecast Total London Passengers by Scenario, Million

Option	2025 (Dom/SH/LH/Total)	2035 (Dom/SH/LH/Total)	2050 (Dom/SH/LH/Total)
Do Minimum	LGW: 4/ 30/ 11/ 45 LHR: 5/ 29/ 42/ 76 LON: 14/ 102/ 55/ 171	LGW: 4/ 29/ 13/ 47 LHR: 5/ 29/ 47/ 80 LON: 15/ 114/ 63/ 193	LGW: 4/ 29/ 17/ 50 LHR: 4/ 28/ 52/ 84 LON: 15/ 115/ 74/ 203
Gatwick (2+2)	LGW: 5/ 36/ 13/ 55 LHR: 5/ 29/ 42/ 76 LON: 14/ 104/ 57/ 175	LGW: 7/ 45/ 23/ 75 LHR: 5/ 29/ 47/ 80 LON: 16/ 120/ 72/ 208	LGW: 8/ 54/ 33/ 95 LHR: 4/ 28/ 52/ 84 LON: 18/ 138/ 87/ 243
Heathrow (3+1)	LGW: 4/ 30/ 10/ 45 LHR: 5/ 29/ 42/ 76 LON: 14/ 102/ 54/ 171	LGW: 5/ 33/ 9/ 47 LHR: 5/ 32/ 61/ 98 LON: 16/ 116/ 72/ 203	LGW: 5/ 35/ 10/ 50 LHR: 5/ 36/ 72/ 114 LON: 17/ 130/ 85/ 232

Source: ICF SH&E

The two Heathrow sensitivity options show that under the smallest capacity version (limit of 605k ATMs) per year, the airport fills to its full capacity, reaching 108m annual passengers. The maximum size Heathrow option however, doesn't quite get full due to the likely price impact on airlines and passengers for whom the assumed £35 per passenger is considered prohibitively high. All long-haul demand in the London system is still satisfied in this scenario, but not all short-haul demand is, since it is not well served at Heathrow and the cheaper alternative airports are full.

6.6 IMPLICATIONS OF THE FORECASTS

The scenarios presented above reflect the likely behaviour of airlines and passengers, given overall demand patterns, the evolution of business models in coming years and the choices available in each case to maximise profit or personal benefit. These results support the following conclusions.

Gatwick is better placed to accommodate LCC demand than Heathrow

While airline strategies will continue to evolve with time, the advent of LCCs in Europe has irrevocably changed the market place. With ambitious growth plans, heavy competition and a customer base used to low fares, the fundamentals of the Low Cost Carrier model will remain ever important:

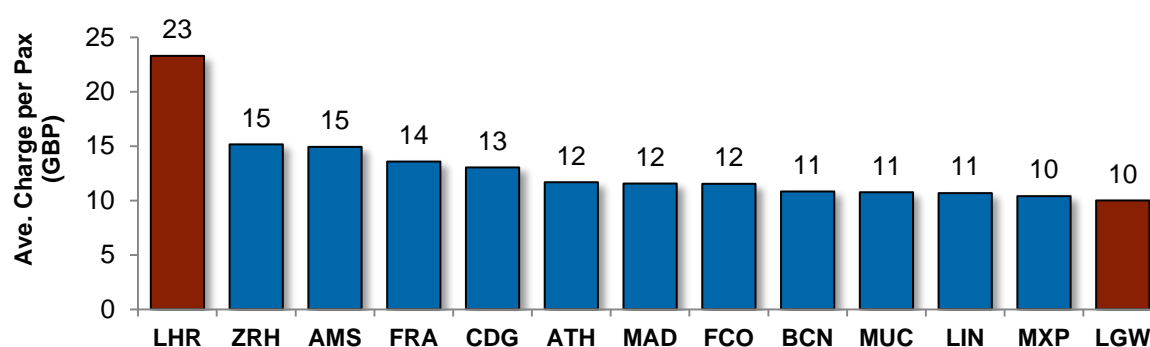
- Low costs
- High load factors
- High aircraft utilisation

Airports that wish to accommodate airlines operating to these principles will need to be competitively priced and have the capability to offer quick and efficient turnarounds.

Heathrow is and will be much more expensive than Gatwick

Heathrow is one of the most expensive airports in Europe, with airport charges more than double what they are at Gatwick. In the example below we show the cost of a turnaround at Heathrow, Gatwick and a number of other major European airports, using a typical short-haul aircraft, an A319.

Exhibit 6-4: Airport Charges per passenger at Major European Airports, Typical short-haul operation



Note: Assumed Aircraft: A319, Load Factor: 80%, turnaround considered

Source: airportcharges.com May 2014

Future growth in the short-haul market is likely to be dominated by low cost carriers and hybrid carriers, who are either legacy or charter airlines moving towards the high efficiency, low unit cost model of the LCCs.

If Gatwick adds a second runway in 2025, it is very likely to attract short-haul traffic from the following segments: 1) traffic from its natural catchment, comprising business, leisure and VFR

traffic, served by full service, charter and LCC carriers, 2) traffic from Heathrow's natural catchment, who cannot use Heathrow due to being squeezed out in favour of long-haul, 3) traffic from Stansted and Luton, where those airlines who would have preferred to have grown at Gatwick used these alternatives during the period when Gatwick was operating at full capacity.

Under the Heathrow scenarios, this will not be the case. Already, Heathrow is already ill-suited to serving the low cost segment due to its operational limitations and prohibitively high airport fees. In the future, this is likely to be further exacerbated, making the airport even more unattractive to LCCs than it is today. Nevertheless, some short-haul traffic will still be satisfied at the airports, primarily comprising BA and its partners feeding the oneworld hub. Heathrow will be better suited to long-haul than short-haul demand due to 1) fees, 2) operational efficiencies and 3) the continuing trade-off arising from capacity constraints. Heathrow is highly unlikely to attract significant short-haul traffic from Gatwick, Stansted or Luton, even with a third runway, for these reasons.

London will be as well served in long-haul and transfer markets with a second runway at Gatwick as with a third runway at Heathrow

Heathrow's key role in serving the long-haul and transfer segments is not questioned or challenged. In all scenarios, Heathrow remains the largest centre for these segments, building on its strengths and its first mover advantage. However, as already discussed and demonstrated, only a minority of future demand will rely on the type of hub capacity that Heathrow excels at in certain markets today (see section 3.4), and for reasons of cost and comparable attractiveness to the O&D segments, Gatwick can play a more effective role in serving the needs of the entire London market.

Gatwick is considered attractive to long-haul by 2025 due to the trends already discussed, including: 1) growth in emerging markets and their carriers wishing to serve the London O&D market supported by their non-London hubs, 2) a large base of short-haul routes and passengers, to provide feed to long-haul services, 3) emergence of long-haul low cost airlines who will wish to serve the London market with competitive airport costs. Although Gatwick is not expected to capture significant long-haul traffic from Heathrow's natural markets (due to inertia and the BA hub), most incremental growth demand will find the airport competitive.

When Heathrow is the airport to add another runway, its dominance in the long-haul segment intensifies. With Gatwick full, Heathrow is the only viable choice for long-haul services and as such, the new runway captures the majority of pent-up and incremental long-haul demand. It is also likely that some long-haul services, such as some of the Middle East and Asian carriers, may be consolidated at Heathrow and thus Gatwick would lose long-haul market share and traffic volumes. It is however, highly unlikely that all long-haul traffic would disappear, as low cost business models and those with a history of successful service such as BA and Virgin's leisure operations are very unlikely to move to a significantly more expensive airport. Furthermore, incremental growth in long-haul in these segments is unlikely to use Heathrow.

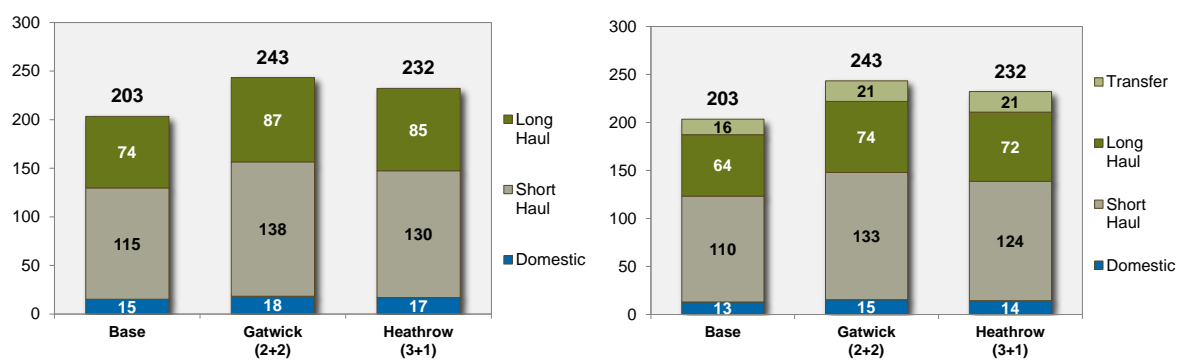
At the London level, the total volume of long-haul and transfer traffic that is satisfied under each of the scenarios is effectively the same.

Overall Gatwick with two runways will result in a better served London market than a Heathrow with three runways

The combined impact of the incremental capacity added and the relative attractiveness of the two proposals to future demand segments means Gatwick's proposed solution is preferable from a system perspective, as it satisfies more of the total demand in the system than Heathrow.

The two charts illustrate the same passengers, but the one on the left has the transfer passengers shown as 'onboard' passengers – i.e. what kind of flight they are on when touching a London airport – while the one on the right keeps this segment separate. Even when separated out, the Gatwick option compares favourably, with connections at Gatwick supplementing those at Heathrow (the latter remains the main transfer airport, even when LGW R2 is added).

Exhibit 6-5: Total London passengers by airport by scenario, 2050, Million



Source: ICF SH&E

6.7 CONNECTIVITY IMPLICATIONS: DESTINATION MODELLING

In order to further illustrate and support the forecasts above, in April 2014 we have expanded the ICF SH&E forecasting model to enable the translation of regional results to illustrative destinations.

Modelling Methodology

For every destination served directly and indirectly from the London airport system, demand and service data was collated in order to establish a base year of

- Local Demand (including how much travelled direct, where passengers were connecting)
- Transfer Demand (beyond 1st destination)
- Transfer Demand (over London)
- Current Service (frequency per week)

Each demand component has been projected to the 2024 (i.e. the year just before any new runway is added), 2035 and 2050 spot years using the ICF SH&E unconstrained forecasts for the relevant region or country.

The growth in ATMs at each airport under the 3 scenarios – Do Minimum, 2+2 and 3+1 – was derived from the constrained airport level forecasts. This defines the additional capacity that needs to be allocated between new and existing services. Lastly, additional services are determined by a combination of the demand projections, airline behaviour of home versus away-based carriers, industry trends and analysis of the destination catchment.

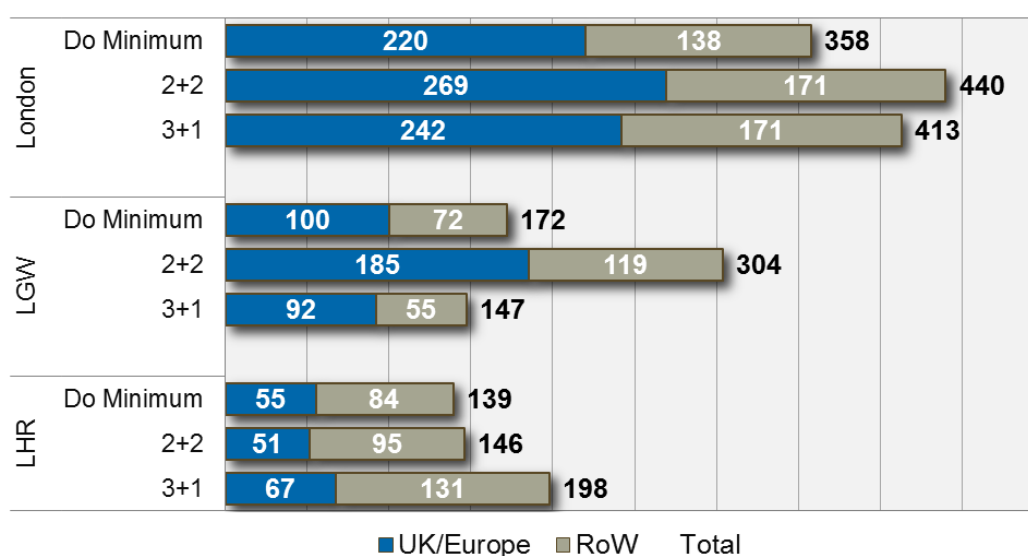
Modelling Results

The main findings of the destination analysis are the following:

- Under the 2+2 Scenario, 440 destination airports can be served from the London airport system by 2050; this is 27 more than under the 3+1 Scenario and 39 more than today. In the Do Minimum scenario the number of destinations decreases from 401 today to 358 by 2050
- With a second runway, Gatwick is forecast to serve 55 new long-haul destination airports. Many of the new long-haul services will be served by foreign carriers for which London is a destination, rather than a source of transfers
- Heathrow, as BA's primary hub, will continue to perform a key role in the London system's connectivity, even under the 2+2 scenario, and will remain pivotal in serving US and Indian destinations
- The 2+2 scenario delivers a more balanced and competitive option – by 2050 the number of competed long-haul routes (with at least five weekly flights from both Heathrow and Gatwick) will increase from just 3 to 38. Under the 3+1 scenario, only 8 long-haul routes will be competed, with the vast majority of long-haul routes being served from Heathrow only

The 2+2 Option results in the greatest numbers of destinations served from London

Exhibit 6-6: Forecast unique destination airports served by London airports, 2050



RoW, Rest of World

Source: ICF SH&E

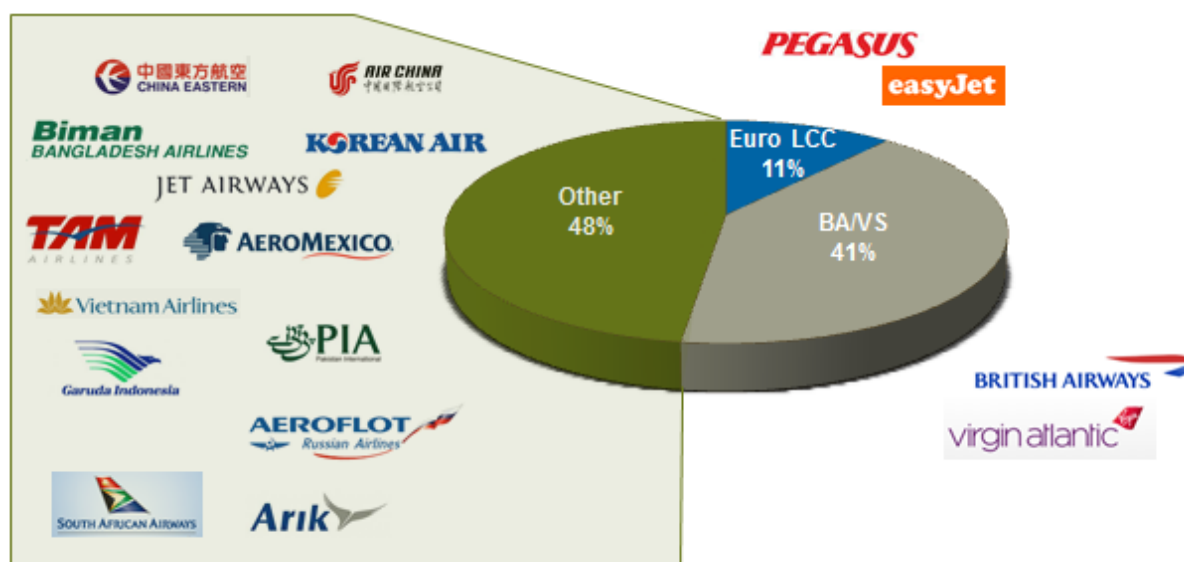
Exhibit 6-6 shows the results of the destination modelling for the three scenarios – Do Minimum, 2+2 and 3+1. Under the Do Minimum case, the London system loses 43 destination airports between 2013 and 2050 as airlines concentrate scarce capacity on thick routes at the expense of thinner, marginal routes. Whilst the number of destinations served from the London system increases in both the 2+2 scenario and the 3+1 scenario, the 2+2 scenario serves a greater number of destinations in 2050 than in 3+1. This differential is primarily driven by the fact that Heathrow's high airport charges will limit growth in short haul destinations. This un-met short haul demand will result in passengers being spilt to Gatwick and to the other London airports, which, by 2050 are also nearing capacity. This lack of system capacity results in the loss of some European destinations.

The graph also illustrates the different way in which the destinations are served under each scenario. Under 3+1, Heathrow remains the dominant gateway for long haul destinations while Gatwick and the other London airports are increasingly short-haul focussed. By contrast, under 2+2, Gatwick's extra-European network is allowed to expand significantly, resulting in a more balanced spread of long haul routes between Heathrow and Gatwick with many routes served from both airports.

The 2+2 Option meets all of London's projected connectivity needs

Under 2+2, 89 new routes are added from Gatwick by 2050, of which 55 are to long haul destinations. This significant increase in the network of extra-European destinations served from Gatwick is driven by foreign carriers for which the hub functionality of Heathrow is of little importance. The nature of these destinations, many of which are in the developing world, is also reflective of the changing balance of the world's economy. Many of these emerging markets which will be driving future growth in long-haul demand already have burgeoning aviation markets of their own, which are more than capable of delivering connectivity to a prime business and tourism market such as London. In fact, the chart below illustrates the important role that foreign airlines are *already* playing in connecting London to emerging markets.

Exhibit 6-7: Current seat capacity to emerging markets by airline grouping

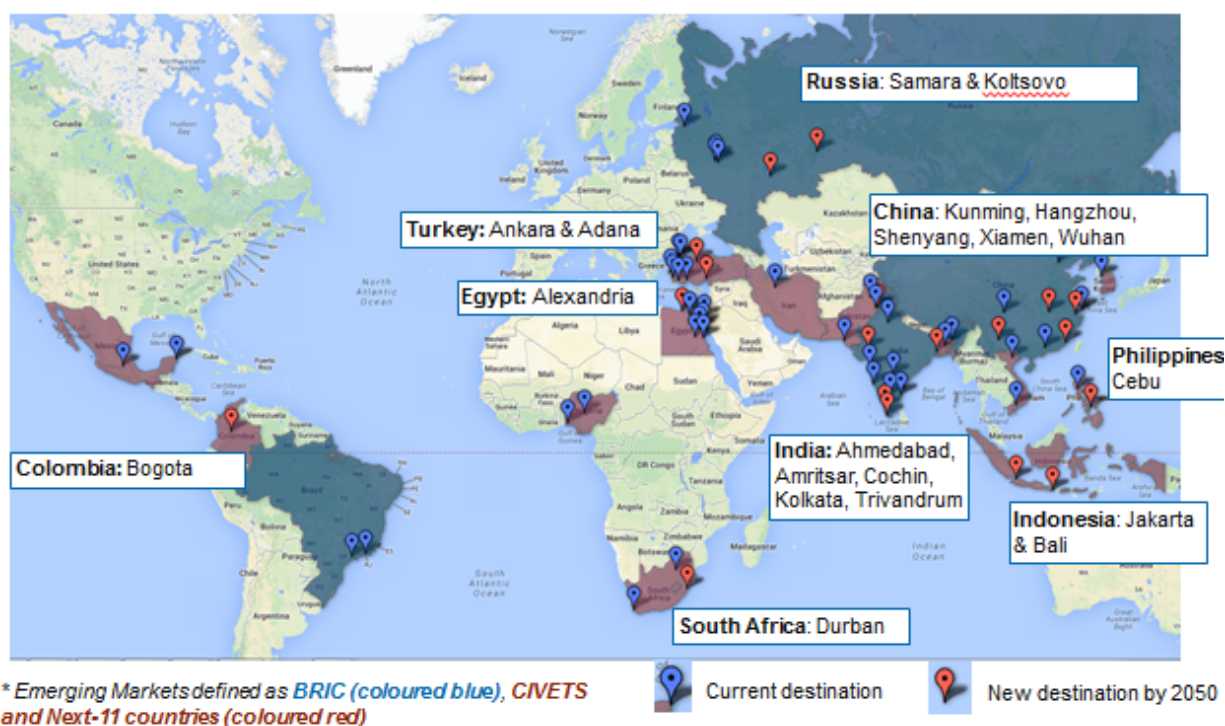


Source: OAG Schedules, April 2014

While foreign carriers are well positioned to connect their hubs to London via Gatwick, there are some markets for which Heathrow will still be the primary gateway to London. Its dominance on North American routes is expected to remain. Indian routes, for which a significant component connects onto North American routes, will also be overwhelmingly served via Heathrow. Finally, secondary destinations in emerging markets are unlikely to be served from the away-based carrier who will tend to route all its international traffic through one or two primary hub airports. Therefore connectivity to these destinations will be reliant on home-based carriers. The additional capacity at Gatwick helps to alleviate pressure at Heathrow, and between 2013 and 2050 a number of new routes are added from Heathrow to North America, India and China.

The net result is that by 2050 there will be a total of 39 more destinations served from the London system than in 2013, 20 of which are new routes to emerging markets (BRIC, CIVETS and Next-11 countries). Both Heathrow and Gatwick contribute to this improvement in connectivity.

Exhibit 6-8: Current and new destinations (by 2050) to emerging markets under the 2+2 Scenario



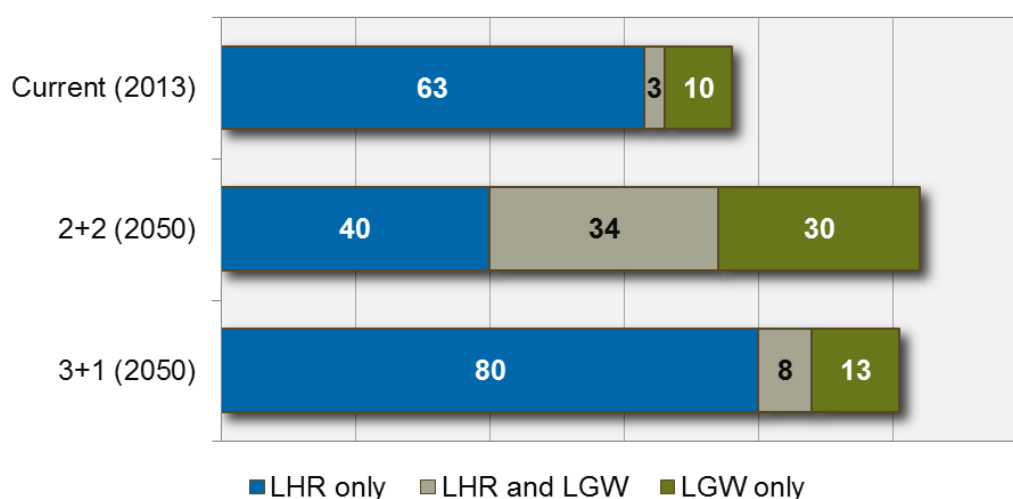
Source: ICF SH&E

As well as improving its long haul route network, 2+2 also results in an increase in the number of destinations served in Europe. Gatwick-based carriers like easyJet with expansive fleet plans, will be able to broaden their short haul network under 2+2 – in particular adding new destinations to Eastern Europe where it currently has a relatively low profile compared to the likes of Ryanair.

The 2+2 Option results in more competed routes between Heathrow and Gatwick

The growing significance of Gatwick in providing long haul connectivity not only contributes to improving the connectivity of the London system as a whole, but results in a more even balance of long haul routes between Gatwick and Heathrow. This can be demonstrated by the number of long haul routes that are served by at least 5 flights per week (each way) from each airport, as shown below.

Exhibit 6-9: Contested long haul routes under 2+2 and 3+1 Scenarios (*Routes served with a minimum of 5 weekly services only*)



Source: ICF SH&E

Currently there are only 3 long haul routes that are served at frequency from both Heathrow and Gatwick. Under 2+2, Gatwick's long haul network increases considerably. Much of this growth will be on routes that are already served from the London system, as Gatwick attracts services to key long haul gateways such as New York, Beijing, Singapore, Tokyo, and Hong Kong. The result of this is an increase in the number of contested long haul routes from just three today to 34.

By contrast, adding capacity to Heathrow will maintain the status quo whereby most long haul routes are served just from Heathrow, and route competition will be limited to intra-airport competition between airlines.

Finally, it should be noted, that as with the unconstrained forecasts, the destination modelling prepared by the AC for its Interim Report, which shows the likely difference in the number of destinations served across a concentrated versus a dispersed system, is similar to the ICF SH&E analysis presented here.

The better outcome under the 2+2 option reflects the additional focus on the likely airline and market developments and one which we consider to be more in line with aviation industry trends.

7 CARGO FORECASTS FOR GATWICK

7.1 SUMMARY

In addition to the passenger forecasts prepared as part of Gatwick's submission to the Airports Commission ICF SH&E has produced high level cargo forecasts. These forecasts provide estimates of annual tonnage at Gatwick for the same time horizon assuming the introduction of a second runway in 2025.

In the future the air cargo market in the UK will continue to be dominated by belly hold capacity on passenger services as it is today. Current global trends and market supply support this long term view and this dominance is greatest on markets outside the European Union where the capacity offered by passenger services is most significant.

Gatwick tonnages are forecast to increase significantly driven by the increasing levels of passenger service to long haul destinations which will continue to account for the majority the UK's total cargo market. Total tonnage increases significantly from 101k tonnes in 2012 to 450k tonnes in 2030 and over 1,000k tonnes by 2050. These tonnages will provide the UK with significantly increased levels of air cargo capacity compared to today.

7.2 BACKGROUND

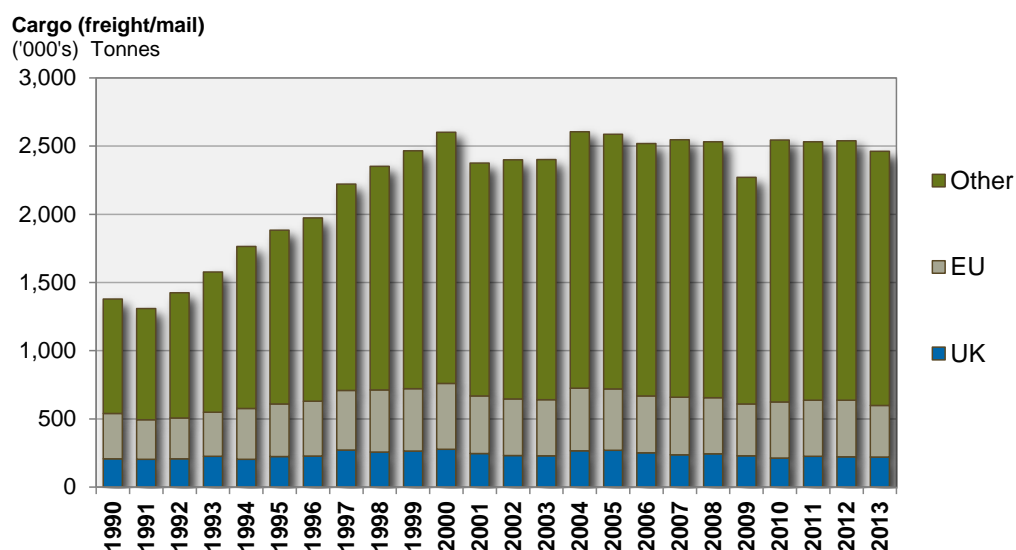
Air Freight is key to the UK's freight industry

Air freight continues to play a key role in the UK freight industry and wider UK economy. Today air freight provides just 0.4% of tonnage but 32% by value for non EU imports³⁶ to the UK. Examples of industries making use of air freight are: machinery & transport equipment, manufactured goods and chemicals & related products. This usage is driven by their requirements to transport goods quickly over large distances whilst doing this securely and efficiently.

UK Cargo Market is still behind 2000 levels

The UK cargo market has been relatively static in the last decade and in 2013 total cargo volumes reached 2.5m tonnes which is still 5% below the peak seen in 2000. Non EU traffic dominates accounting for 76% of total volumes rising to nearly 90% for the London airports. Globally the freight market has performed poorly when compared to the passenger market as carriers have sought to reduce their capacity in this market owing to poor financial returns.

³⁶ HMRC

Exhibit 7-1: UK cargo market by region (1990-2013)

Source: CAA Statistics, ICF SH&E Analysis

Air Freight losing market share to ocean freight

On a global level air trade represents just 1.7% of containerized trade weight and this has been in decline over the last decade or so having lost more than 1% point³⁷. Growth in ocean trade currently far exceeds expansion in air trade. Driving this trend has been a number of factors

- Industries that are relevant for air trade (e.g. high tech, fashion) have seen slow growth over the past decade compared to industries that are less relevant for air trade
- Modal shift has seen goods that used to be carried by air migrating to sea
- Over this time frame, freight's share of global airline revenues has been in decline falling from 12.4% in 2003 and estimated to fall to under 9% in 2013³⁸.

Air Freight dominated by belly capacity

The UK air freight market is dominated by belly capacity which accounted for nearly 70% of total demand in 2013. The proportion rises to 85% for volumes transported to/from non EU markets and has grown 10% points in the last 10 years.

³⁷ IATA World Cargo Symposium, 2014³⁸ IATA 2013 Freight Report

Exhibit 7-2: UK cargo market by mode (2013)

Cargo/Belly Hold	UK	EU	Other	Total
Cargo Aircraft	96%	84%	15%	33%
Passenger Aircraft	4%	16%	85%	67%
Total (thousand Tonnes)	220	379	1,863	2,462

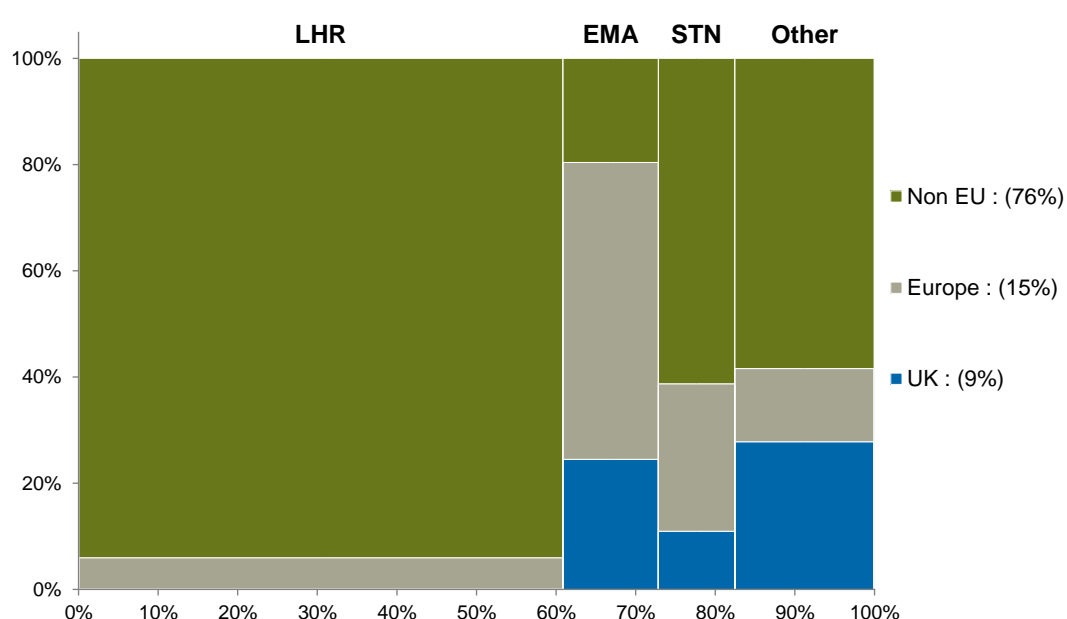
Source: CAA Statistics, ICF SH&E Analysis

This trend is being reflected on a global basis as carriers reduce their exposure to freighter operations whilst new generation passenger aircraft provide increased cargo carrying capabilities. For example the Boeing 777-300ER carries about 18% more cargo volume than the 747-400. So not only are airlines growing frequencies and thus belly space, replacing a 747-400 with a 777-300ER leads to a significant increase in cargo capacity too. This will continue to be the case as next generation aircraft such as the Boeing 787 provide 20-30% more capacity than today's equivalent³⁹.

Passenger services ensure Heathrow's Freight dominance

Heathrow dominates the UK freight market accounting for over 60% of total tonnages in 2013 or 1.5m tonnes. East Midlands and Stansted airport are the next largest accounting for 22% between them though their share of the UK and European freight market is much more significant at 55%.

For markets outside of the European Union, Heathrow's share rises to 76% with 98% of these volumes being provided by passenger services carrying belly cargo.

Exhibit 7-3: UK Cargo Market Breakdown (2013)

Heathrow (LHR), East Midlands (EMA), Stansted (STN)

Source: CAA Statistics, ICF SH&E Analysis

³⁹ Boeing - Boeing 787-800 compared to Boeing 767-300

Traffic Distribution Rules (TDR) played a role

The majority of the UK's dedicated freighter operations take place away from Gatwick and Heathrow at East Midlands and Stansted and the lack of service can in part be attributed to the TDRs in place relating to cargo operators. TDRs prevented these forms of air traffic from operating at the airports during the periods of peak congestion. The purpose of this was to ensure priority was given to passenger services.

Gatwick can cater for the future Cargo Market

Today Gatwick's cargo volumes are around 100k tonnes having previously reached over 300k in 2000. This decline was driven by the consolidation of US services to Heathrow in 2007 following the advent of Open Skies, as a result Gatwick's services to the US declined and so did the resulting cargo volumes. Comparisons show that on a route basis similar freight volumes were realized at Gatwick before the switch of this passenger capacity to Heathrow.

Exhibit 7-4: Freight per ATM, Tonnes (2013, unless stated)

Airline	Heathrow	Gatwick	Note
Emirates	12.0	14.6	2013
Air China	15.1	10.5	2013
Vietnam Airlines	0.0	7.5	2013
Continental	5.7	7.0	LGW 2007, LHR 2008
Delta	3.4	3.8	LGW 2007, LHR 2008
Non Europe Total	7.7	3.4	2013

Source: CAA Traffic Statistics, ICF SH&E Analysis

Whilst Gatwick's freight volumes are lower than that of Heathrow they are much more comparable on a like for like market basis. For example, services to Dubai provide greater cargo uplift on a per movement basis at Gatwick than at Heathrow whilst other Asian markets served by Gatwick also generate significant volumes. It should be noted that Gatwick has a higher proportion of flights to markets with limited freight activity, such as the Caribbean of Florida which explains the lower uplift on markets outside Europe.

7.3 GATWICK CARGO FORECASTS

Approach

Following the preparation of the passenger forecasts for the London market ATM outputs were produced on a market basis to enable future estimates of cargo tonnages to be produced. A bottom up approach was used considering the supply side and future cargo assumptions taking into account historic performance and future trends and technologies expected to play a role.

Exhibit 7-5: Approach to Cargo Forecast



Source: ICF SH&E Analysis

Market Assumptions

Various assumptions were made to provide realistic inputs into the model and related to a combination of market and supply based inputs:

- **Markets:** The forecasts capture a higher proportion and volume of flying to long haul markets where cargo volumes are typically strong. Cargo capacity is typically utilised by passenger airlines to provide further contribution to the profitability of a service
- **Aircraft:** To serve the markets in the forecasts wide-body aircraft are required with cargo capacities typically in line with or greater than today's fleets (e.g. Boeing 787s and A350s both offer an increase in cargo capabilities when compared to today's fleet equivalents)
- **Performance:** Tonnages are forecast to remain highest on similar markets to today, for example Asian routes generate some of the highest cargo volumes per flight today

Outputs

The resulting cargo forecasts for Gatwick are shown in Exhibit 7.6. In summary Gatwick's cargo volumes are forecast to grow to over 1,000k tonnes by 2050. Whilst this is more than a nine fold increase over the time frame whilst passenger volumes more than double the increase in long haul connectivity and hence cargo supply drive this result. As a result over 90% of the future cargo volumes are to/from markets outside Europe.

Exhibit 7-6: Gatwick Cargo Forecast (thousand tonnes)

	2007	2012	2030	2040	2050
Gatwick R2	175	101	520	840	1,070

Source: CAA Traffic Statistics, ICF SH&E Analysis

Over the course of the forecast Gatwick's cargo per movement is increasing driven by the long haul market segment which is assumed to grow from around 4 tonnes today to 7 tonnes by 2040. This compares to the current demand profile at Heathrow today which averages 8 tonnes per long haul movement.

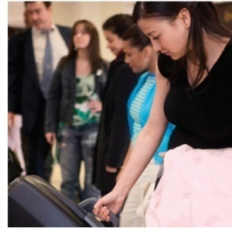
Exhibit 7-7: Cargo tonnage per Long Haul movement

	2012	2040(F)
Gatwick (2+2)	4	7
Heathrow	8	n/a

Long Haul excludes Europe

Source: CAA Traffic Statistics, ICF SH&E Analysis

Overall Gatwick is able to provide a significant role in ensuring future UK air freight connectivity to markets around the world.



Appendix A: **Forecast Updates**

8 FORECAST UPDATE

8.1 BACKGROUND

The traffic forecasts prepared for Gatwick's 2013 submission were prepared over the course of several months commencing in late 2012. In light of changes to market conditions, along with further work examining the future nature of London's demand the forecasts used by Gatwick Airport were updated in March 2014. This is consistent with best practice for long term forecasts providing an annual update when new outputs are required to reflect the latest market conditions and information available.

These updates have primarily focused on updates to the unconstrained forecasts prepared for the London market along with updated assumptions relating to capacity. These factors and their implications are discussed in the following sections in further detail. This approach is consistent with the adjustments made by the Airports Commission to the previously used DfT model.

8.2 SUMMARY OF UPDATE

Economic Assumptions

The annual passenger forecasts for the London aviation market have been updated to reflect the latest assumptions relating to GDP forecasts on a regional basis. These forecasts reflect a more positive outlook at least in the short-medium term. For example the UK's short term outlook has improved from that forecast in late 2012 as well as the recent trends in the London air passenger market performing ahead of previous expectations.

Overseas Hubs and London Transfers

Further work has been undertaken relating to the expected market shares of non-London hubs and the share of passengers travelling direct on journeys relevant to the London aviation market. This analysis produces a further reduction in the significance of transfers in the London aviation market.

Capacity & Demand Profile

Following on from further work relating to Gatwick's future runway capacity and demand profile the annual throughput assumed to be achievable has now been defined as 560k ATMs. Today, Gatwick is a seasonal airport where movements are significantly higher on a busy day compared to the average day. As Gatwick's traffic volumes grow the underlying market mix will naturally become less seasonal becoming more reflective of the total London market seen today. Higher volumes of year round long haul traffic will drive more efficient use of slots (reducing seasonality) as well as an increase in the average passengers per movement.

8.3 IMPACT OF UPDATE

Comparing the latest forecasts highlights their similarity in terms of total passengers in the London market which has increased in the short to medium term but in the longer term returning to levels previously forecast reflecting maturity and the underlying market mix.

Exhibit 8-1: Comparison of Unconstrained Forecasts

Forecast	Demand	Today	2030	2050
Latest	London O&D	117	172	222
	Total	135	197	244
Previous	London O&D	117	164	211
	Total	135	193	244

Source: ICF SH&E Forecasts

The growth in the local O&D markets as a result of the updated GDP forecasts has provided greater volumes which have been offset somewhat by the reduction in overall transfer volumes.

Breaking these numbers down further highlights the underlying mix of the markets as short haul demand remains by far the largest demand segment at around 60% of total demand. Transfer demand declines to under 10% of the unconstrained forecast having remained broadly stable at around 13% before.

As a result of the market and capacity assumptions Gatwick grows to 95m passengers by 2050 when the airport is assumed to be operating at capacity. Previously the forecasts met a lower binding capacity limit later on which explains the growth in Gatwick volumes.

8.4 SECONDARY FORECASTS

In addition to the annual forecasts, SH&E were asked to produce a series of secondary forecasts to support GAL's submission to the Airports Commission. These forecasts provided additional detail required by GAL relating to measures such as noise, safety & environment outputs.

Following the updates to the assumptions around the levels and nature of unconstrained demand along with Gatwick's future capacity limits the outputs resulting from the secondary forecasting have been reviewed for their suitability given the increased levels of annual demand.

The evolution of Gatwick's future traffic mix will result in a more consistent year round demand profile, this reflects patterns seen in several demand segments today such as long haul traffic and a short haul demand profile more in line with the total London market today.

For example, today a busy day has over 25% more movements than average and this ratio is forecast to decline to around 14% by 2040. For comparison this is still more seasonal than an airport such as Heathrow today reflecting that Gatwick's profile will be more in line with the total London market in future years.

Exhibit 8-2: ATM Busy Day Ratio*

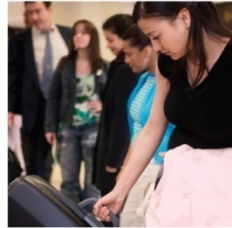
Forecast	2012	2030	2040	2050
Latest	1.26	1.16	1.14	1.08
Previous	1.26	1.24	1.21	1.16

*Busy Day Ratio defined as how much busier the busy day is compared to an average day

Gatwick typically define their 'busy day' as the 3rd Friday in August

Source: ICF SH&E Forecasts

This work has concluded that any update to the previous secondary forecasts would result in only minor adjustments and that the outputs were suitable for the secondary analysis for the latest annual forecasts.



Appendix B: **Forecast Comparison**

9 FORECAST COMPARISON

9.1 INTRODUCTION

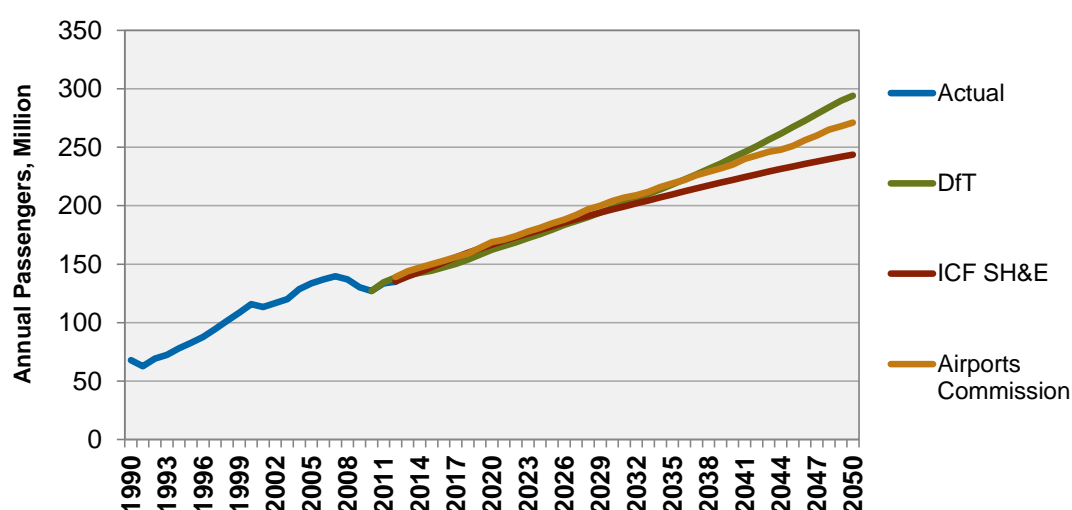
The forecasts prepared for GAL enable greater visibility of the London market for strategic and master planning purposes providing detailed airport outputs that have been used to support Gatwick's submission to the Airports Commission. These forecasts have focused around the nature of future aviation demand in the London market along with estimations of future capacity requirements.

A detailed overview of the forecasts prepared by ICF SH&E is provided in the main body of this report and the purpose of this section is to compare the high level London outputs with those the DfT and Airports Commission have produced.

9.2 COMPARISON

In the period until 2035 the available forecasts are broadly comparable at a high level. Total London demand is forecast to grow towards 200m annual passengers around 2030 implying an annual growth rate around 2% across all the forecasts. By this year the difference in forecasts is under 4%.

Exhibit 9-1: Comparison of Forecasts



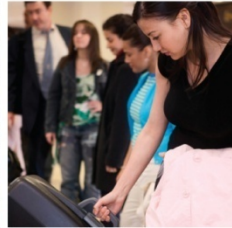
Source: DfT 2013, Airports Commission (Central Carbon traded) 2014, ICF SH&E Forecasts

Beyond 2035 the difference between the forecasts starts to widen to over 10% variance. Driving this divergence is the underlying growth rates which are increasing in absolute terms on an annual basis in the Airports Commission forecasts whilst this rate of growth is decreasing in the forecasts prepared for Gatwick. It is understood that greater levels of maturity have been assumed in the longer term which explain this.

There is some difference in the baseline owing to the various sources of data available and years used though the main industry growth trends are consistent between the forecasts. Examples of this include:

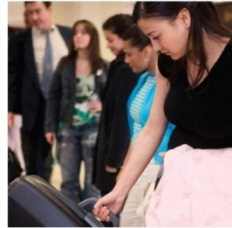
- Short haul demand remains by far the largest demand segment and provides the greatest growth in demand to the London market
- The long haul markets have typically higher growth rates reflective of the current levels of market maturity to the various world regions
- Transfer passengers decline in significance in the London market and beyond 2030 are forecast to decline in absolute numbers as well as share of total London passengers

Further detailed comparisons have been examined at a constrained level (for a Do Nothing Case) and similar conclusions around the timing and scale of runway capacity required have been reached to the Airports Commission.



Appendix C: **Glossary of Terms**

2+2	Scenario when new runway constructed at Gatwick (R2)
3+1	Scenario when new runway constructed at Heathrow (R3)
AC	Airports Commission
ASK/ASM	Available Seat Kilometres (seats x distance flown)
ATM	Air Traffic Movement
Belly cargo	Cargo that is carried by passenger services in the belly hold of these passenger aircraft
BRIC	Brazil, Russia, India, China
CAGR	Compound Average Growth Rate
CIVETS	Colombia, Indonesia, Vietnam, Egypt, Turkey, South Africa
DfT	Department for Transport
Do Minimum	Scenario considering no new runways in the South East
D-to-I	Domestic to International Transfers (e.g. Edinburgh - London - Delhi)
Elasticity	Is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price
FSC	Full Service Carriers
FY	Financial Year. In this report, this refers to the 12 months from April - March
GDP	Gross Domestic Product
GDS	Global Distribution System
Hub Airport	Primary base for an airline, characterised by waves of arrivals and departures designed to facilitate connections between the airline's services
IATA PaxIS	A IATA database containing ticket coupon data relating to O&D passengers and fares paid which is collected through the IATA BSP (Billing & settlement plan)
I-to-I	International to International Transfers (e.g. New York - London - Delhi)
LCC	Low Cost Carriers
LGW	London Gatwick
LHR	London Heathrow
Load Factor	Number of Passengers / Number of Seats
Long-haul	In relation to the London market, short haul destinations refer to extra-European destinations
mppa	million passengers per annum
Next 11	Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, the Philippines, Turkey, South Korea, and Vietnam
O&D	Origin & Destination
OAG	Provider of database of airline's past and future schedules
Pax	Passengers
Short-haul	In relation to the London market, short haul destinations refer to Europe
TDR	Traffic Distribution Rule
Transfer	Transfer passengers
Utilisation	The average number of block hours flown per aircraft per day
VFR	Visting Friends and Relatives, a subset of leisure demand



Appendix D: **Supplemental Information**

Exhibit 9-2: Transfer passengers as a percentage of total passengers for major hub airports

City	Airport(s)	Total	Transfer %
London	LHR,LGW, LTN,STN,LCY,SEN	140	14%
New York	JFK, EWR, LGA	110	21%
Tokyo	NRT, HND	103	18%
Paris	CDG, ORY	86	25%
Chicago	ORD, MDW	78	48%
Dubai	DXB	61	47%
Los Angeles	LAX	61	24%
Frankfurt	FRA	56	50%
Amsterdam	AMS	47	39%
Atlanta	ATL	91	69%
Beijing	PEK	86	6%
Moscow	DME,SVO, VKO	61	20%
Istanbul	IST,SAW	58	37%
Dallas	DFW	57	59%
Singapore	SIN	53	24%
Madrid	MAD	44	31%
Sydney	SYD	39	16%

Source: IATA PaxIS, FY2012/13