



Delivering improved airport capacity

The cost and impact of the Airports
Commission's shortlisted options

Peter Hind
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February 2015



Foreword from the ITC Project Chairman

The ITC, the UK's independent transport think tank, believes that aviation is crucial for UK connectivity and growth. We therefore commissioned a series of research reports, submitted to the Government's Airports Commission. This new report, authored by Peter Hind of RDC Aviation, considers some of the key financial and commercial challenges facing their shortlisted options.

The report confirms that the aviation industry's prime business models - hub and spoke, and lower-cost point to point - have both developed strongly globally and are both likely to flourish in the future. They have different strengths and generally suit different markets: point to point typically for shorter and 'thicker' routes, and hub and spoke for longer distances relying on aggregation of customers (and freight). UK connectivity needs both. The report confirms our earlier finding that a strengthened hub is most likely to encourage new direct routes between the UK and global destinations.

The report discusses the cost and pricing issues for airlines, airports and investors. Based on the Commission's estimates (which the promoters consider unnecessarily high), the shortlisted schemes would all require substantial new capital investment and lead to significantly higher charges. The report highlights the major issues that the Commission needs to address to reach robust conclusions. For Gatwick, low cost airlines represent a high proportion of customers. Higher airport charges would affect them more than network airlines, since charges represent a larger proportion of overall costs; their customers are also more price-sensitive and these airlines would have more alternative options should they judge the final charges too high. If these risks were to materialise on a significant scale the commercial viability of the investment could be at risk. For Heathrow, the report suggests the challenge is more around the sheer scale of the investment and its eventual charges compared with other European hubs - although it suggests airlines using this model are generally less price-sensitive than the low cost operators. These issues - costs, airport charges, commercial viability and consequential return on investment - will ultimately determine which options are more or less viable and deliverable.

The ITC suggested previously that if Heathrow were to be expanded, the case for Gatwick's prices remaining subject to regulation would be weak. The analysis in this report strengthens that conclusion.

Environmental issues are also crucial and highly sensitive. The ITC previously suggested noise was the biggest single obstacle to any expansion. The report suggests that the noise and environmental challenges should not be insurmountable, given the marked improvements in aircraft technology and the opportunities to improve flight paths, access heights, noise mitigation and compensation measures. We need a sensible balance between the legitimate concerns of those near any airport and the wider strategic needs of London and the UK.

I commend this research to the Commission. But the most important challenge is for the Government of the day to act on the Commission's recommendation - whatever it is - so that the long-standing impasse on improving UK connectivity is finally resolved.

Dr Stephen Hickey
Chairman of the Aviation working group
Independent Transport Commission





Delivering Improved Airport Capacity

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Executive Summary

This study forms part of a series of papers that the ITC is commissioning in response to the Airports Commission consultation documents. In this report, we examine the cost estimates put forward by the scheme promoters compared to those of the Commission and examine how these might change the outlook for passenger forecasts and air connectivity for the country.

The Commission has proposed a number of future demand scenarios which it has applied to the proposed expansion schemes at Heathrow and Gatwick and we see merits in this flexible approach. We also find that, while the argument has often been positioned as a choice between the low-cost and hub-and-spoke business models, there is no compelling evidence to suggest either will replace the other. The last two-decades have seen low-cost carriers provide very strong connectivity in the short-haul point-to-point markets of Europe, the Middle East and Asia while hub carriers from bases in Turkey and the Middle East have developed extensive route networks using the hub-and-spoke model. Thus, our long-term view of the aviation industry is one in which low-cost and hub-and-spoke exist side-by-side, with the bulk of long-haul routes being operated by network airlines supplemented by limited long-haul low-cost services.

This is because we believe that long-haul will almost always require some level of passenger (and freight) aggregation which is best achieved by operating a route network serving a mix of direct and connecting passenger flows. Our analysis suggests that there is scope for long-haul low-cost, but it is more likely that the evolution of this model will follow that of its short-haul counterpart in starting on very thick, city-to-city destinations such as London to New York; followed by key leisure destinations – Caribbean, Florida, Indian Ocean islands; then follow the same pattern from regional airports. This will bring competition, but it will not bring new connectivity for the UK.

Our study shows that Heathrow attracts airlines serving key business destinations and consequently has a higher proportion of business travellers, particularly within the inbound business market, as we explored in our previous report. Multiple studies suggest that long-haul international business travellers display the least elastic behaviour when it comes to changes in the cost of travel. Gatwick has a more leisure-focussed passenger base. It is a more seasonal airport and the growth in its route network in recent years has been characterised by European leisure destinations and that there has been little new business connectivity generated by new routes at Gatwick in the last decade.

The Commission forecasts show that, in all cases, expansion of Heathrow will lead to the same or a greater number of passengers using the London system. It also suggests a greater number of destinations will be offered from the London airports with an expanded Heathrow. Our findings support this. We have taken the Commission forecasts as the basis for our elasticity modelling, in which we show how increases in charges might suppress future demand. Based on the profile of passengers in the Commission forecasts for Heathrow and Gatwick, and using industry-standard elasticity of demand for different passenger types, the results show that the Heathrow traffic base is more resilient to price increases than Gatwick.

The estimates of the Commission are that user charges at Gatwick may have to double to cover the cost of expansion and at Heathrow increase by 50% from current levels. In the case of Gatwick this would mean taking substantial multipliers of its current debt levels, requiring an



additional £14b of debt compared to £1.5b today. We see evidence that borrowing of this size can be achieved, though note observations of independent commentators in highlighting that the level of financing required is significantly more than the airport has today. This brings market uncertainty. The Commission analysis shows charges at an expanded Gatwick would be close to those at Heathrow and significantly higher than those at Stansted and Luton, both of which compete with Gatwick for short-haul low-cost passengers.

Heathrow already has a substantial level of debt, £11.7b, and is forecast to require an additional £27b (the mid-point of the two schemes), a much lower multiple of current debt than Gatwick but almost double in absolute terms. This would raise the balance sheet at Heathrow to similar levels as Network Rail and financing would be at the highest end of infrastructure projects in the UK. We have found evidence to show that financing on this scale would be possible, but also examples of where it has been highly challenging. Charges would rise by around 50% compared to today, putting Heathrow at the top of international peers and with clear distance between it and the rest of the London airports.

We have examined a report by Frontier Economics that suggests the lack of runway slot availability within the London system leads to higher air fares for UK passengers, and agree with these findings. Whilst the airport charges are regulated at Gatwick and Heathrow, airline ticket prices are not. As in any market, when demand outstrips supply, prices rise. We see evidence that this could happen with fares at Gatwick in the summer peak, and year-round at Heathrow, leading to super-profits for the airline operators at those airports. This may infer that once new capacity is fed into the system, ticket prices will remain stable even if charges are increased.

Finally, our limited resources mean we are unable to re-model any of the noise and environment impacts from the shortlisted schemes. We recognise that this is a highly contentious area requiring thorough analysis and difficult choices.

I. Background

- 1.1** This paper has been commissioned by the Independent Transport Commission (ITC), Britain's leading research charity focussed on transport, land-use and planning issues, and written by the independent consultancy firm RDC Aviation Ltd (RDC). RDC is a UK-based consultancy and software business with expertise in network planning and long-term demand forecasting for airport, airline and investor clients across the world.
- 1.2** Following its previous studies¹, the ITC concluded that improved long-haul air connectivity is more likely to arise through the hub model, and that the UK needs a minimum of a three-runway hub to meet future demand projections. Since publication of the last of those reports, we see nothing that changes these conclusions as to how future connectivity will be maximised, though we understand there are differences of opinion here, with some seeing a long-haul low-cost model being a key driver of inter-continental growth.
- 1.3** In this report, we build on the previous work by reviewing the options for expansion at Heathrow and Gatwick airports, shortlisted by the Airports Commission; look at the cost analysis of each scheme as proposed by the promoters and the Commission; and model how the costs for each scheme might change the level of demand, and connectivity, for London and the UK.
- 1.4** The complexity and depth of analysis required to produce new passenger demand and infrastructure build-cost forecasts is beyond our resources, so in writing this report we have made use of the extensive work undertaken by the Airports Commission, looked at stakeholder responses to that work and considered the views of the scheme sponsors. In using the Airports Commission's figures we recognise that the scheme promoters have challenged the cost calculations and analysis presented in the Commission's consultation document. It has not been possible, due to resource limitations, to subject these calculations to an independent critique. As a result, to maintain a fair and equal analytical platform, we have taken the work of the Commission to be our baseline².

1 'Flying into the Future: Key issues for assessing Britain's aviation infrastructure needs', 'The Optimal Size of a UK Hub Airport' and 'Surface Connectivity: assessing the merits of the Airports Commission options for UK Aviation.'

2 We acknowledge that Gatwick Airport disputes the methodology used by the Commission in modelling traffic allocation between the London airports. However, for comparative and impartiality purposes we have used the Commission's figures.

2. Understanding the Options

- 2.1** The five major London airports, Heathrow, Gatwick, Stansted, Luton and London City, make up the largest air travel market in the world by most measures. In 2013, the London system offered almost 176m seats to global markets.
- 2.2** The Airports Commission (AC) identified three shortlisted schemes for the new runway development. Two are at Heathrow (Heathrow New North Runway by Heathrow Airport Limited and Heathrow Extended Runway by Heathrow Hub Limited) and one is at Gatwick proposed by Gatwick Airport.

The Commission's Core Scenarios

- 2.3** The Airports Commission's five 'future airline industry' scenarios are outlined in the Consultation Document and are based on five future scenarios that were analysed to come to a conclusion for the shortlisted proposals. The purpose of the scenarios are to highlight the forecasting risk in the aviation industry and give a fair framework for appraising the options. Instead of reflecting historical trends or focusing on a 'central' scenario they have provided a broad range of different outcomes.

Table 1: Airports Commission core scenarios

1. Assessment of need	The scenario is consistent with the forecasts underpinning the Commission's assessment of need. Future demand is primarily determined by central data projections (for example GDP and global oil prices).
2. Global growth	This scenario sees higher global growth in demand for air travel in the future, coupled with lower operating costs.
3. Relative decline of Europe	There is higher relative growth of passenger demand in emerging economies in the future, compared to growth in the developed world.
4. Low-cost is king	High levels of global growth in demand see the low-cost carriers strengthening their position in the short-haul market and successfully capturing a substantial share of the long-haul market.
5. Global fragmentation	This scenario sees lower global growth and economies closing themselves off by adopting more interventionist national policies.

Source: Airports Commission

Case 1: Assessment of need

This is the baseline forecast used in the Airports Commission's Consultation Document published in November 2014, it is broken down into four core forecasts as follows:

- a) Carbon traded – capacity unconstrained

In this scenario the aviation industry operates under the Emissions Trading System (ETS), the model assumes that the UK will function under EU ETS up to 2020 and

then under the global carbon market from 2020 onwards. There are no constraints on airport capacity or a cap on gross emissions from the sector. This shows how demand would evolve if there were no restrictions on emissions or capacity.

b) Carbon traded, capacity constrained

Again the industry is under the ETS but the assumption is that there is no capacity expansion and the UK airport capacity remains unchanged throughout the forecast.

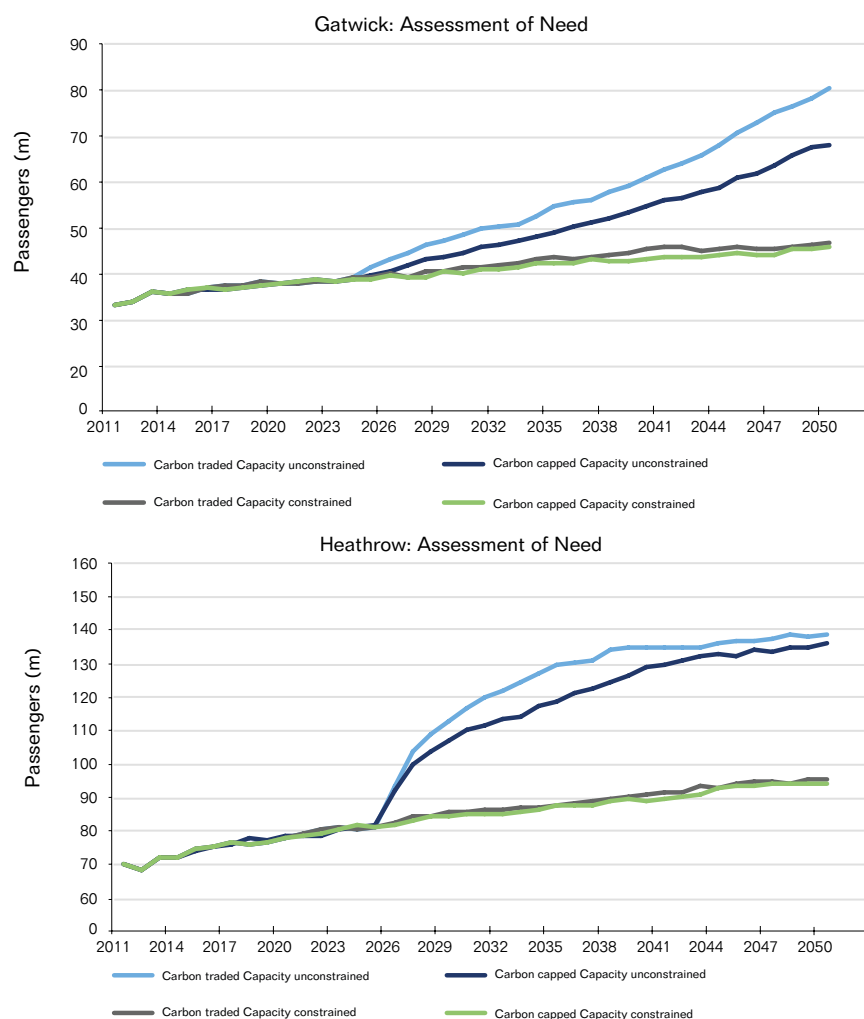
c) Carbon capped, capacity unconstrained

There are no limitations on capacity, however the carbon level is consistent with Climate Change Act 2008 – emissions to be reduced to 2005 levels by 2050. In order to induce the emissions to the target level, the model raises the carbon price included in fares to induce the emission forecasted market equilibrium to 2005 levels by 2050.

d) Carbon capped, capacity constrained

This scenario is a combination of 0% growth in UK airport capacity and emissions' target of 2005 levels by 2050. This assists the Commission in analysing what would happen if no further development happened in UK airports and further policies were introduced leading to aviation emissions returning to their 2005 levels by 2050.

Figure 1: Airports Commission Interim Report Forecasts

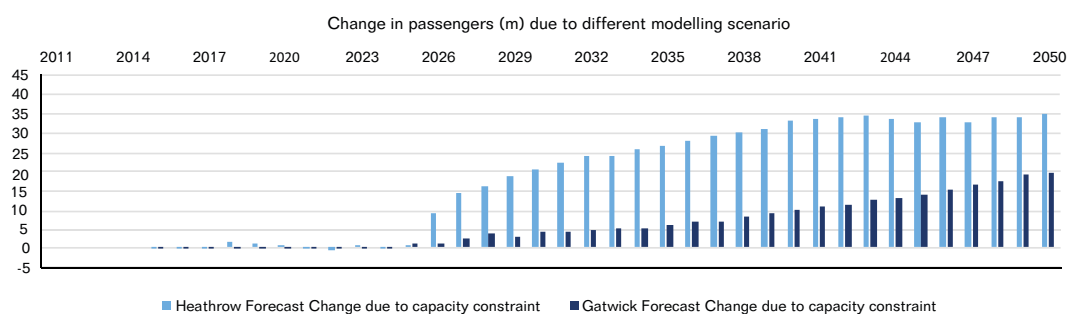


Source: Airports Commission

In 2011, the forecast base year, Heathrow has already exceeded capacity whereas Gatwick was operating at 93% of runway usage.

Focussing on the major impacts on future growth, as shown in **Figure 1**, we see how Heathrow's passenger growth is impacted significantly more by whether or not capacity remains at its current rate through to 2050, whereas Gatwick's growth is more sensitive to how CO2 is modelled in the forecast.

Figure 2: Illustration of Capacity Impacts on Forecasts at Heathrow and Gatwick



Source: Airports Commission Forecasts: AoN Carbon Capped, AoN Carbon Traded 20-Jan-15

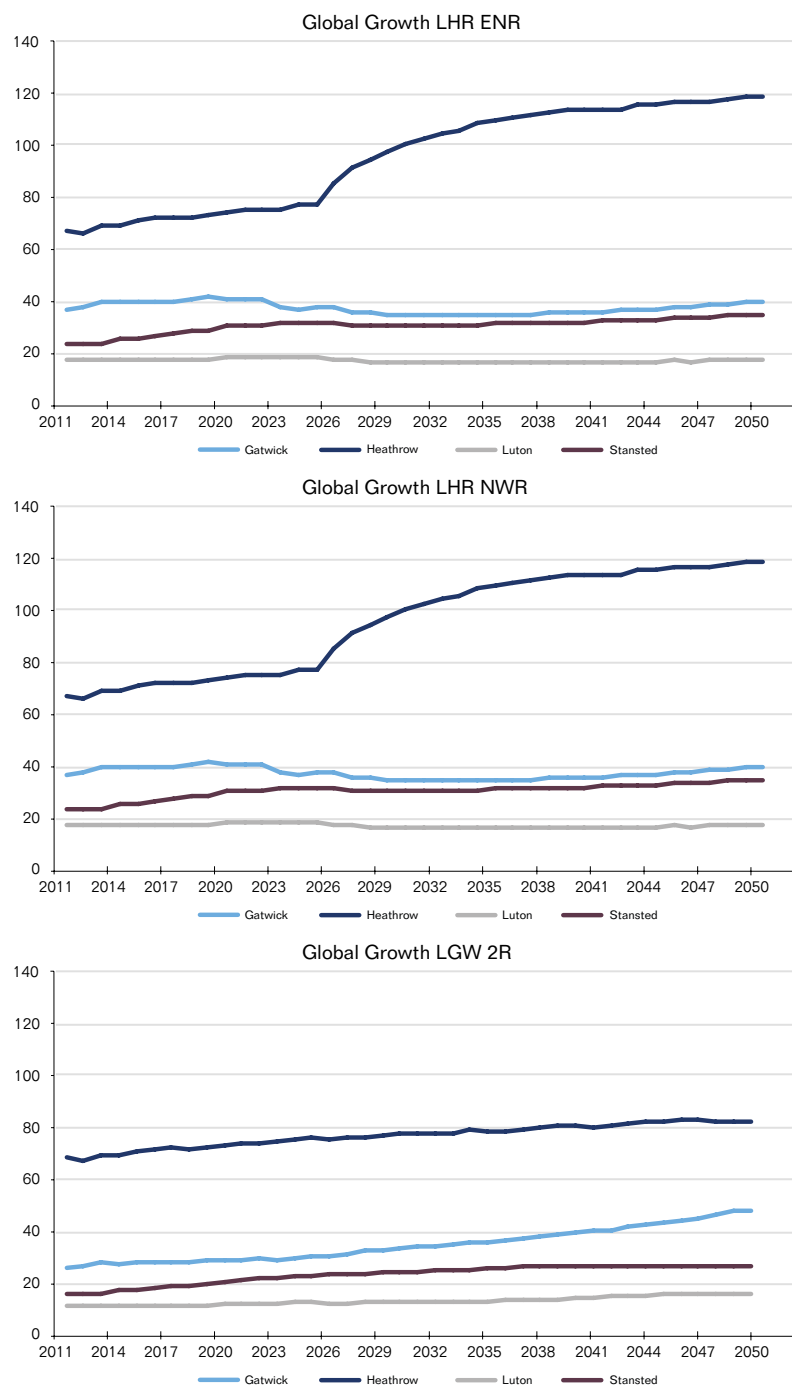
Note: Heathrow forecast is an average of both schemes

The graph above shows the difference in passengers between carbon capped capacity unconstrained and capacity constrained for Heathrow and Gatwick, with Heathrow showing a larger impact when additional capacity is added to the airport.

Case 2: Global Growth

This scenario is based on the hub-to-hub business model with greater international transfer passengers and the impact, for example, of the expansion of Dubai and other Middle East hubs on the industry. Newly industrialised countries (NICs) and less developed countries (LDCs) are assigned GDP growth of 2% per annum. In this scenario the carbon emissions constraint lies within the carbon traded and carbon capping range at 70% of the 2005 level by 2050. The forecasts under this scenario by the Airports Commission shows that the Heathrow North West Runway, looking at the more conservative forecast, carbon capped, would result in the greatest percentage increase of 98% in annual passengers and absolute rise in passengers.

Figure 3: Global Growth Forecast Scenarios



Source: Airports Commission, Global Growth Carbon Capped

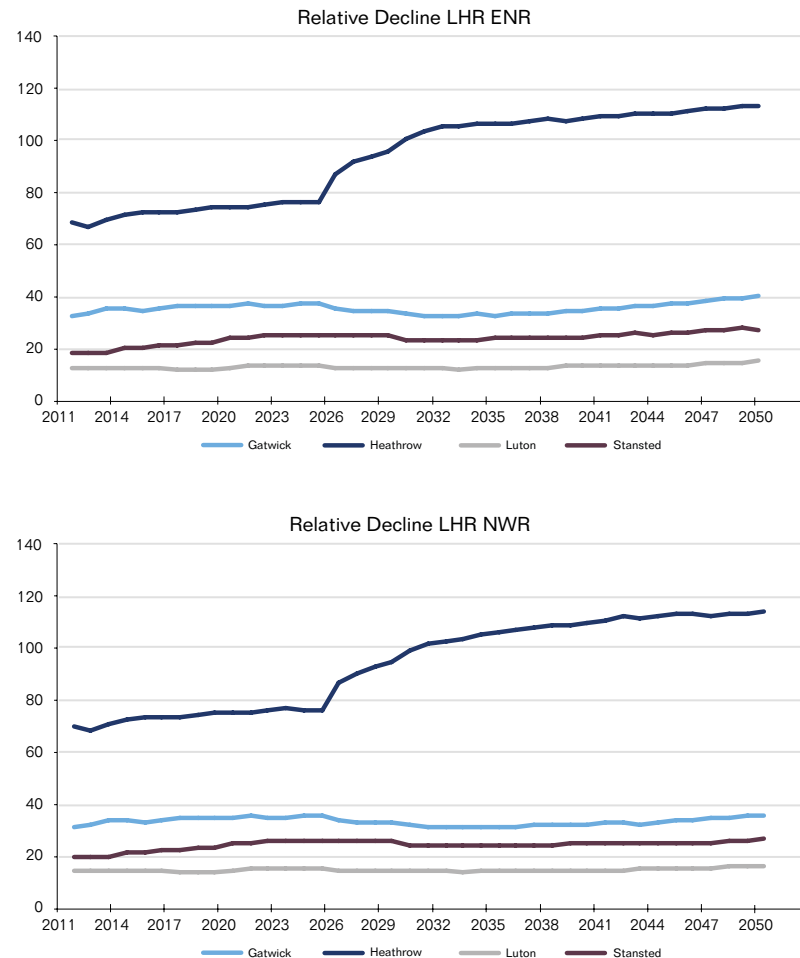
Case 3: Relative Decline in Europe

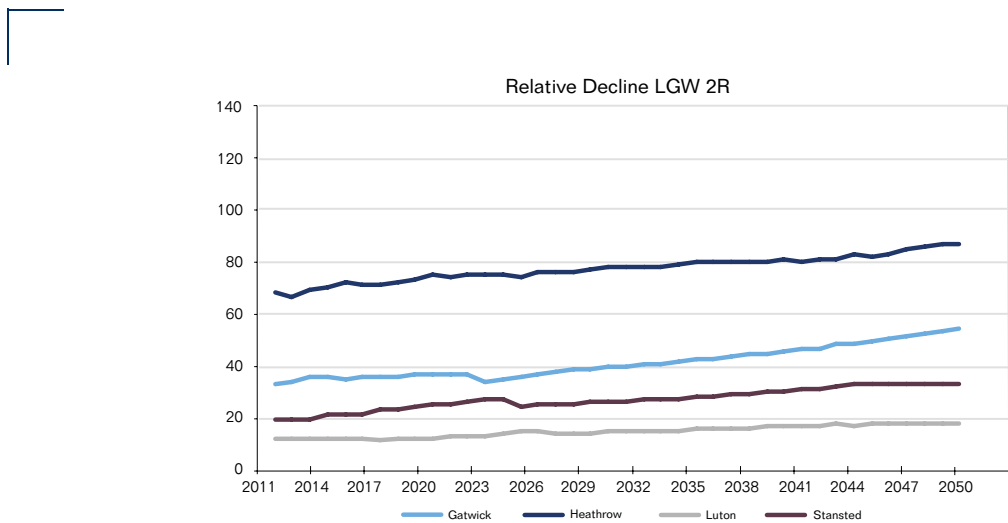
This scenario sees declining passenger flows in and through Europe which leads to the consolidation of European hub capacity, and in the Airports Commission's scenario they have assumed activity would be focussed on one European hub for modelling purposes, Amsterdam. International transfer passengers gravitate towards Amsterdam Schiphol and Dubai. The impact on the UK has been modelled and is expected to be limited as capacity constraints have resulted in little international

transfer traffic in the UK compared to the 'assessment of needs' scenario, the baseline. As in scenario 2, NICs and LDCs are assumed to have higher GDP growth rates. The carbon capped scenario shows emissions to be reduced to 2005 levels by 2050. Heathrow Airport NW Runway would provide a greater change in number of passengers, and produce the biggest percentage change.

We would propose that within this scenario, for the Airports Commission to get a more representative view, a sensitivity should be run whereby the assumption is that London Heathrow becomes Europe's largest hub. The Commission has not outlined specific pull factors that would cause Amsterdam to be Europe's hub. If 'relative decline in Europe' scenario was to materialise it is realistic to consider what the impact would be on both Heathrow and Gatwick compared to the AC forecasts under their current assumptions if Heathrow fulfilled the European hub role.

Figure 4: Relative Decline in Europe Forecast Scenarios





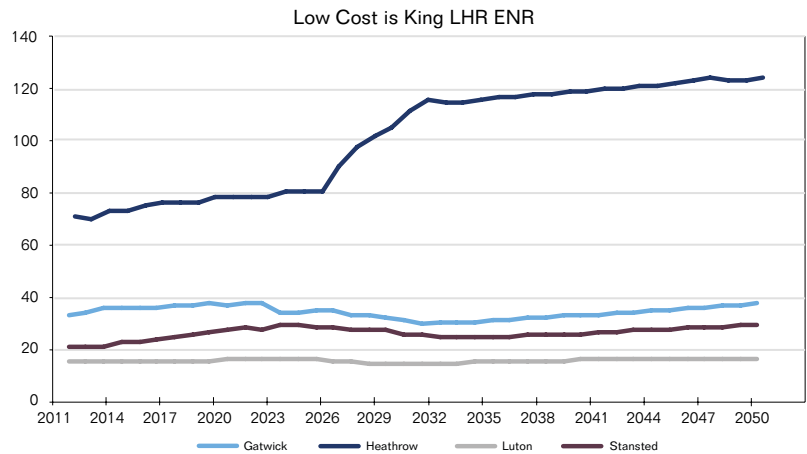
Source: Airports Commission, Relative Decline of Europe Carbon Capped

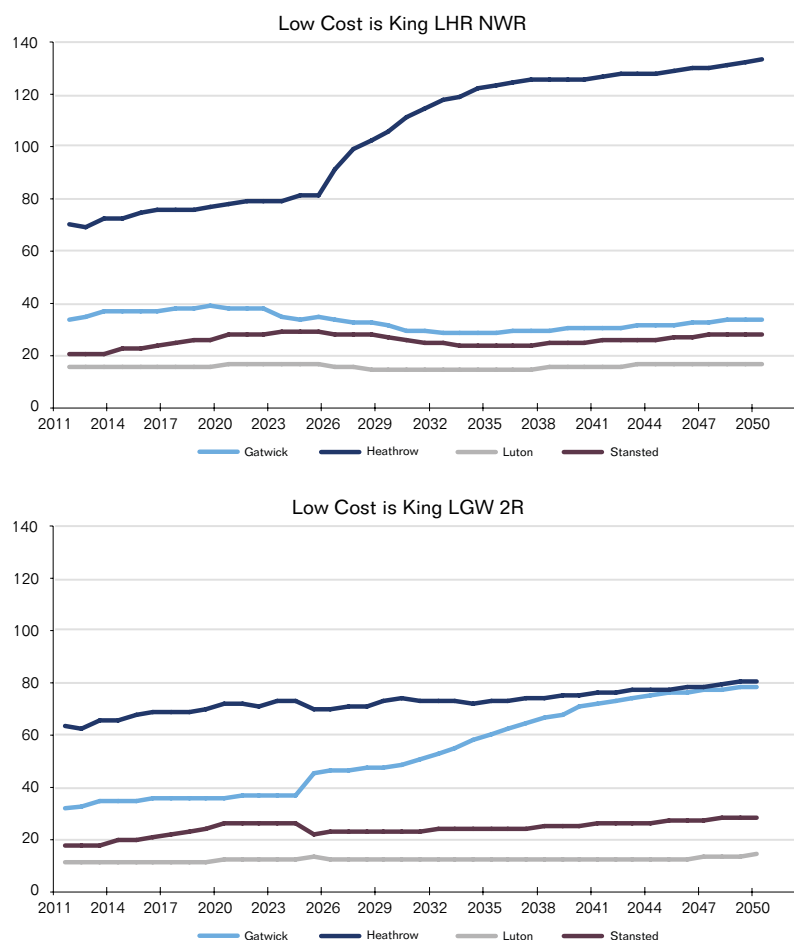
Case 4: Low-Cost is King

In this scenario it is assumed that there is a predominance in the point-to-point business model. Consequently, low-cost and charter carriers increase market share to capture over half of the market. From the baseline forecast they have a combined market share of 38% in 2040, which rises to 52% in this scenario. CO2 emissions are modelled as being fully capped. This scenario reduces the UK's runway utilisation slightly, compared to baseline forecast, there would be 25% lower international–international transfer passengers. Although Heathrow Airport North West Runway development will have the largest increase in absolute passenger numbers, Gatwick sees approximately 150% increase from 2011 to 2050. This follows the scenario's logic where the reduction in the dominance of the hub and spoke business model leads to Heathrow becoming less significant while Gatwick grows its current low-cost carrier network and attracts new entrants.

The end result of this scenario, when applied to each runway case, is that any of the schemes deliver a similar number of passengers by 2050, although it seems surprising that traffic at Stansted remains static given its current low-cost airline focus.

Figure 5: Low-Cost is King Forecast Scenarios



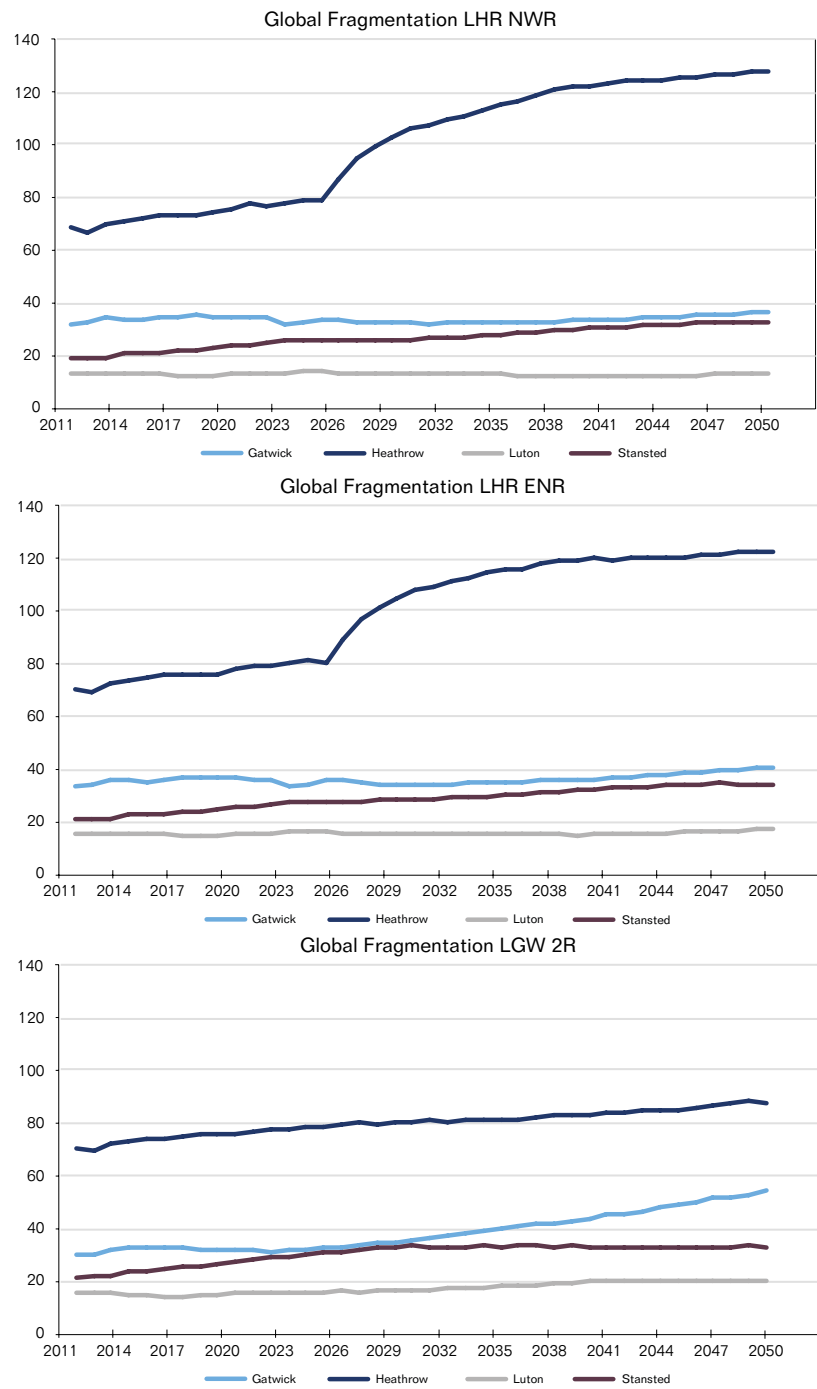


Source: Airports Commission, *Low-cost is King Carbon Capped*

Case 5: Global Stagnation and Fragmentation

This scenario outlines the reversal of globalisation where economies become more insular resulting in lower GDP growth. For the UK the assumed GDP is 0.5% lower than used in baseline forecasts and for other countries it is lowered by 1%. As GDP growth is positively correlated with passenger demand growth, there is lower capacity usage relative to baseline forecasts. However, Heathrow has an increase in international transfer passengers due to a lower fare premium calculated based on the level of congestion. As total demand has been reduced this pricing mechanism can attract more price sensitive international transfer passengers. Carbon emissions are under the carbon trading regime. Although there is lower growth in the overall aviation market Heathrow's North West Runway still grows by the greatest percentage in this scenario. This could be due to airlines synergising and using the most efficient operational model of hub to hub as volumes of passenger travelling from individual countries are insufficient to operate dedicated point to point scheduled flight.

Figure 6: Relative Decline in Europe Forecast Scenarios



Source: Airports Commission, Relative Decline of Europe Carbon Capped

Relating the Forecast Scenarios to Runway Case

2.4 The scenarios suggested by the Commission cover the most likely possible future outcomes for the industry, though we expect a combination of these to prevail in the long term. Table 2 overleaf summarises our views on the four main cases alongside how we feel these fit in relation to the two airports.

Table 2: Assessment of the Airports Commission scenarios

	GLOBAL GROWTH	RELATIVE DECLINE IN EUROPE	LOW-COST IS KING	GLOBAL FRAGMENTATION
POTENTIAL FUTURE OUTCOME	Heathrow already operates as a relatively successful hub, albeit constrained by lack of runway slots. In the event development of the industry is dominated by hub-to-hub operations, the most efficient use of new resources would be to further develop UK hub capacity.	If Europe becomes a single-hub system, there are two outcomes. One is that the hub for Europe is Heathrow; the other is that the hub is in mainland Europe and both Heathrow and Gatwick have the potential to develop point-to-point networks.	This scenario would see a diminished role for hub operations and increases in the number of point-to-point routes, on both short and long-haul.	In this model, an increasingly insular industry probably favours the hub model, particularly if there is a degree of re-regulation. Any increase in the efficiency of airlines' business models would narrow the gap between low-cost and network carriers, and the overall demand for thinner secondary routes diminishes without feed traffic.
CONCLUSION	Heathrow, as the airport hosting a hub network, would be the logical choice. Competition would arise from a second Gatwick runway – it would need to capture a hub carrier to maximise the benefits.	With a third runway, Heathrow would be well placed to act as Europe's hub for east-to-west traffic flows. If the UK did not host the hub, either airport would benefit. Cost is a major factor in this case.	Gatwick is the obvious runway location choice though competition will intensify from other London airports.	Heathrow would be the more logical location for additional capacity though the increase in user charges may be a strong deterrent to growth.
LIKELIHOOD	We expect the Assessment of Need basis combined with Global Growth and an element of Low-cost is King to characterise the future industry. We see some scope for long-haul low-cost offering alternatives to the network airlines on major markets; challenging charter airlines to key leisure destinations; and involving limited self-interlining. However we do not foresee this business model putting an end to hub-and-spoke, nor do we see it bringing significant additional connectivity to key business destinations, beyond that already offered.			

Overview of the Commission's Cost Estimates

2.5 The capital expenditure cost considered by the Airports Commission for its assessment are based on Scheme Cost, Core Cost and Asset Replacement Cost.

- **Scheme Cost** – the cost attributed to the new runway development
- **Core Cost** – underlying investment required irrespective of the new runway development
- **Asset Replacement Cost** – the ongoing cost of replacing current asset and the new asset

2.6 Additionally the Airports Commission also considered the surface access cost that is required to support the development of the schemes. The costs are assessed within the period of 2014-2050.

Table 3: Cost Assessment 2014-2050

2014-2050 Cumulative Total (£m 2014 price)	Gatwick Airport	Heathrow New Runway	Heathrow Extended Runway
Scheme Cost	£7,387	£18,583	£13,539
Core Capex Cost	£3,224	£13,069	£13,069
Asset Replacement	£4,408	£16,784	£16,535
Surface Access	£787	£5,728	£6,282
Total cost	£15,806	£54,164	£49,425
Scheme as % of total Cost	47%	34%	27%

Source: Airports Commission, Assessment of Need Scenario, Carbon Capped

- 2.7** The Commission's Cost Estimates include allowance for risk and mitigated optimism bias, in general accordance with the HM Treasury's "Green Book - Appraisal and Evaluation in Central Government." The exact quantum is hard to break down but the inclusion of these leads to the Airports Commission's cost estimates being over 20% higher than the estimates provided by the scheme promoters. We asked each of them for their comments on the cost estimates and subsequent charges arising from their own and the Airports Commission figures. All are confident in the deliverability of their own proposals within the cost calculations stipulated in their submissions and observed that use of the standard public sector project methodology, with the introduction of an optimism bias, leads to increased cost estimates. Whether this is the correct approach for private sector financed investments is disputed, as the market will ultimately determine its appetite for risk. The Airports Commission has incorporated both risk and optimism bias in its scheme and user-cost calculations for all three shortlisted propositions on exactly the same basis, without differentiated risk profiles, construction programmes or efficiency measures; nor has it taken into account experience in delivery of very significant, complex infrastructure projects such as Heathrow Terminal 5 and the new Queen's Terminal.³
- 2.8** Additionally, to assess the level of airport charges and funding required, the Airports Commission developed its projections of non-aeronautical revenue and operating expenditure throughout the assessed period of 2014-2050.

Table 4: Assessment of non-aeronautical income 2014-2050

2014-2050 Cumulative Total (£m 2014 price)	Gatwick Airport	Heathrow New Runway	Heathrow Extended Runway
Non-Aero Revenue	£12,296	£43,589	£43,049
Operating Expenditure	£14,521	£49,884	£49,631

Source: Airports Commission, Assessment of Need Scenario, Carbon Capped

³ The scheme promoters have noted that by having a standard markup without any adjustment for differences in factors such as risk, deliverability, and planning, the Airports Commission estimates are open to challenge since each of the three proposals have a different profile. These aspects could have been reflected in the CAPEC add-ons.

3. The Commission Options: Impacts on Financing

- 3.1** Three bodies have commented on the impacts of the prospective runway expansions on financing. The Airports Commission itself has scaled the estimated scale of borrowings and balance sheet inflation which would be required to implement the changes (based on their figures); these need to be set against the current scale of Gatwick and Heathrow:

Table 5: Additional Finance Requirements

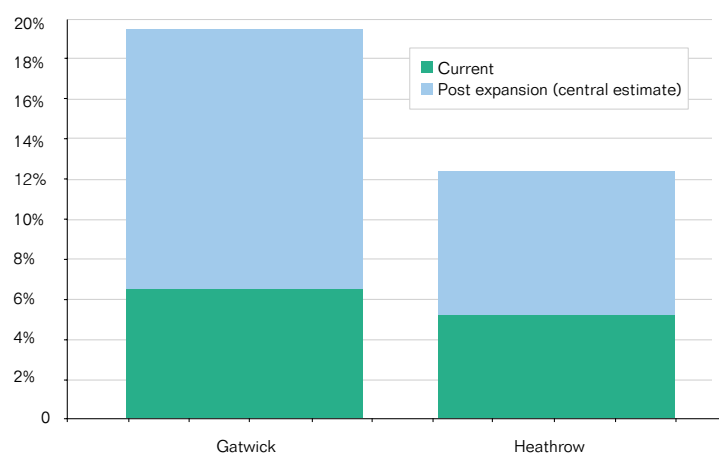
	Today*		Additional**	
	Equity	Debt	Equity	Debt
Gatwick	£0.34b	£1.5b	£3.7b	£14.3b
Heathrow (runway extension)	£2.7b	£11.7b	£5.1b	£24.9b
Heathrow (new runway)	£2.7b	£11.7b	£8.4b	£29.9b

Sources: *PwC report dated November 2014 for the Airports Commission

**Airports Commission consultation document dated November 2014

- 3.2** They point out that raising this level of finance would be challenging for all schemes (in the case of Gatwick, borrowing is likely to be “significantly larger than the company’s financing to date”, and in the case of Heathrow that this would put it “at the highest end of the range of financing for infrastructure projects in the UK”). They observe that this needs to be seen in the context of aeronautical charges that would be rising significantly which would have to be seen in a competitive environment. They make clear that the competitive environment in the context of Heathrow’s charges will be global – implicitly for Gatwick where fees, after expansion, would be comparable to those of Heathrow’s, the competition would be within the London system. The risk for Gatwick, with its current focus on low-cost airlines, would be loss of airline traffic to other London airports. The risk for Heathrow, with its emphasis on long-haul and alliance member carriers, is losing traffic to overseas hubs
- 3.3** PwC produced a report for the Airports Commission (No 13) in which they observed that airports have had difficulties (based on case studies in The Netherlands and Spain – as well as Manchester and Stansted) in pricing up to their regulated price caps. They raise the threat of demand risk referring to those costs as a proportion of the ticket price and single out Gatwick as being particularly at risk because it “currently caters for more low-cost traffic (which might be assumed to be relatively price sensitive) and is currently in less of a state of excess demand than is Heathrow”.
- 3.4** PwC goes on to point out that aeronautical charges are currently 6.8% and 5.1% of the average fare at Gatwick and Stansted respectively. Moody’s have separately highlighted the competitive similarities between Gatwick and Stansted and the commercial risk for the former if its charges rose significantly due to expansion.

Figure 7: Airport Charges as a Proportion of Average Fare (Moody's)



This exhibit compares the proportion of an average fare represented by aeronautical charges at Heathrow and Gatwick

Source: Moody's calculations using PwC and Airports Commission data

- 3.5** They go on to comment that “we think the wholesale moves from Heathrow to Gatwick by [other than BA] full service scheduled airlines are unlikely”. In summary, they assume the proposals from the Airports Commission are credit neutral for Heathrow, credit negative for Gatwick Airport Limited and positive for Stansted. The reason for it being positive for Stansted is because it would be the natural place to “exert additional competitive pressure on an expanded and more expensive Gatwick”.
- 3.6** Both Heathrow and Gatwick are owned by infrastructure funds; Gatwick, in particular, is owned predominantly by a closed end fund – in other words it has to have sold on its investment significantly before the expansion is undertaken. Both, therefore, have to access the financial markets in order to finance any expansion; such markets have a history of very large projects in the infrastructure sector.
- 3.7** When BAA built Terminal 5 it negotiated a 0.5% capital return premium for five years across the totality of its capital base (not just the T5 investment); this was for an investment of around £5b on the back of a balance sheet of £12b.
- 3.8** The owners of Thames Water (a £12b business) decided it could not fund the new relief sewer called Thames Tideway, and an independent company has been set up to commission around £3b of expenditure. In part, this may be because that project required deep tunnelling, regarded with some suspicion by financiers, despite the relative success of Crossrail and HS1.
- 3.9** Neither of the above two examples contained any real long term volume risk (we have to pay our water bills and airlines feel they have to fly into Heathrow which was “full”). Financiers often take a very cautious approach to such risks and these will be only exacerbated by “issues” such as the future of aviation in a world which is becoming increasingly concerned about the environment – aviation is the only significant human activity (apart, possibly, from animal husbandry) for which there is no currently known technical solution to eliminating man-made greenhouse gas emissions. Indeed the volume risk has been in part accommodated into the regulatory structure for NATS which was so impaired by 9/11 and its impact upon trans-Atlantic



traffic on which it so heavily depends. But CAA can do this for the regulated aspect of NATS⁴ which is a true monopoly – airlines have to buy its services (even if it adds marginally more to flying; there is no alternative); that is not true for airports where alternatives exist, including those across the channel (CDG and Schiphol) charging about half what Gatwick and Heathrow might prospectively charge after their expansion.

- 3.10** Clearly Gatwick and Heathrow have continued with their own associations of cost and construction. In particular, the current owners of Gatwick have commented that the new runway will be built and that its charges would not rise to above £15, citing a probable range of £12-£15.
- 3.11** These are very difficult issues and we would urge the Airports Commission to consider, in addition to the impact on the economy and destination mix, the very real “challenges” (to use their own words) in financing these expensive options.

The Commission's Estimate of Changes in Airport Charges

- 3.12** A review of the composition of passenger charges associated with each of the three shortlisted options for runway expansion underpins our understanding of how these charges will impact passenger demand and airline operations.
- 3.13** The AC estimate of aeronautical charges is based on cash flow modelling. The level of aeronautical charges during this period of major capex is set such that the total revenue (including non-aeronautical revenue) meets all operating costs, asset replacement and financing costs. During each phase of major capex, at the point where aeronautical charge increase and peaks, the charge is held constant at the escalated price in real terms until the next phase of major capex programme.
- 3.14** Further refinement is then undertaken, where the profile of the aeronautical charges are sized through an iterative process to provide the minimum level of aeronautical charges that meets the required return to equity over the assessment period (blended cash nominal return (pre-shareholder tax) of 10% for Gatwick and 9% for Heathrow).

Airport Charges

- 3.15** The Airports Commission's consultation document outlines what the current charges are at each airport and what their model forecasts for future charges would be if the runway development proceeds.
- 3.16** The per-passenger aeronautical charges are expressed in 2014 (real) prices (implying yearly nominal charges increasing in line with inflation). It is worth noting that while the per-passenger charges are expressed based on total passenger throughput at the airport (total revenue / total passengers), in practical terms, the airports would probably structure their charges in one of two ways. One is to use privately negotiated contracts, specific to each airline customer. These may be based around the volume of passengers carried from the airport and contain various incentives

and commitments. They are therefore often expressed as a value (£) per departing passenger, thus a figure quoted as £9 per passenger is achieved by levying an £18 charge to each departing passenger and no charge for arriving. This is more likely to be the approach adopted at Gatwick, which already uses a “contracts and commitments” approach to its airline clients.

- 3.17** The second is through publishing a set of airport “user charges” which are common to all airlines using the airports. Income is derived in two ways, one being a set of per-passenger charges levied on departing passengers, and the other being a ‘landing charge’ which is generally a cost per ton of aircraft on landing. Airlines typically pass on the passenger charge element to the passenger as an above-ticket cost and absorb the landing charge into their operating costs.

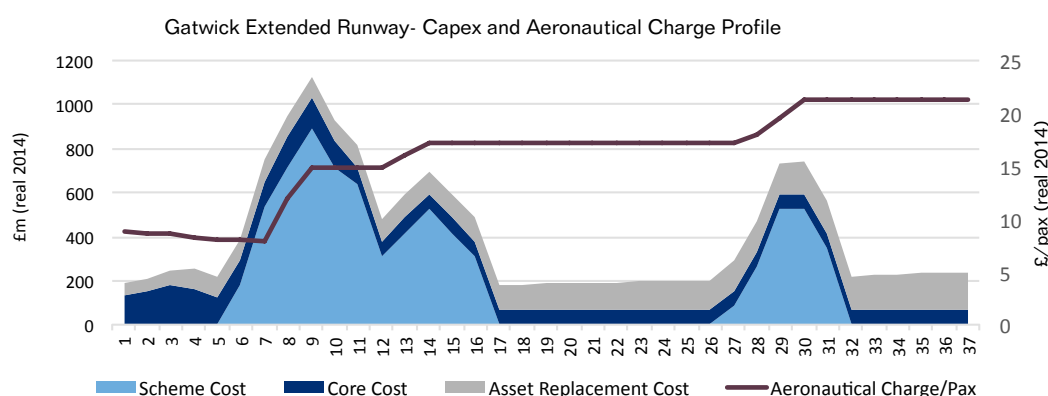
Gatwick

Table 6: Gatwick Airport Second Runway Charges and Investment Profile

Per Passenger Charges in real 2014 prices	
Initial	£9
GAL projected estimate	£12-15
Commission’s Analysis	£15-18, peak charge £23

Source: *Airports Commission: Consultation Document*

Figure 8: Gatwick Capex and Aeronautical Charge Profile



Source: *Airports Commission, Assessment of Need Scenario, Carbon Capped*

- 3.18** Phasing of the Gatwick scheme, particularly the final investment post 2040, potentially reduces some of the risks associated with traffic growth. We assume that if demand does not materialise as forecasted, this stage of development will be deferred meaning the aeronautical charge would remain flat from 2040. In any event, aeronautical charges will almost double from current levels as a best-case. On the basis that the full scheme as proposed is built, the Commission forecasts charges to fall within the range of £15.36 to £23.48 per passenger as shown below. These are well above the £12-£15 range that the airport has suggested, but as all of the

scheme costs have been increased by the AC, we have based our analysis on the AC numbers rather than those of the promoters.

Table 7: Gatwick passenger Aero Charges across the Commission's Four Demand Scenarios

Scenario	Assessment of need – Carbon Capped	Assessment of need – Carbon Traded	Low-cost is king	Global fragmentation
Charge peak	£21.34	£23.48	£16.46	£22.31
Weighted avg (2019-2050) ⁵	£18.76	£19.28	£16.33	£18.29
Weighted avg (2014 - 2050) ⁶	£16.95	£17.55	£15.36	£16.19

Source: Airports Commission: Interim Report (Appendix 3: Technical Appendix)

Heathrow

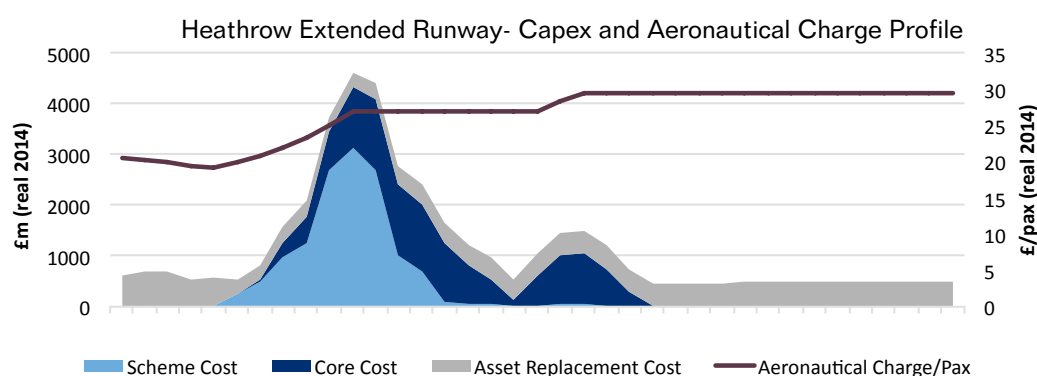
Table 8: Heathrow Airport Extended Northern Runway Charges and Investment Profile

Per Passenger Charges in real 2014 prices	
Initial	£20
Heathrow Hub projected estimate	£24*
Commission's Analysis	£27-28, peak charge £30

Source: Airports Commission: Consultation Document.

* Note: AC Report shows £22 but this reflects 2011-2012 prices. £24 is in 2014 prices

Figure 9: Heathrow extended runway capex and Aeronautical Charge Profile



Source: Airports Commission, Assessment of Need Scenario, Carbon Capped 3.19.

3.19

The profile of investment at Heathrow in the extended runway case leads to a spike in costs and with this development profile there is less scope than Gatwick to defer capex costs. The proportional increase in airport charges resulting from the expansion at Heathrow is lower than Gatwick, but the starting point significantly higher, as

5 Average aero charge weighted by forecast passenger volumes

6 Average aero charge weighted by forecast passenger volumes including the Q6 (2014 – 50) regulatory period

Heathrow is currently twice the price of Gatwick. With the various demand scenarios, the Commission estimates a narrower range of charges at Heathrow, ranging £26.64 to £30.38.

Table 9: Heathrow Passenger Aero Charges across the Commission's Four Demand Scenarios

Scenario	Assessment of need – Carbon Capped	Assessment of need – Carbon Traded	Low-cost is king	Global fragmentation
Charge peak	£29.43	£28.04	£28.05	£30.38
Weighted avg (2019-2050) ⁴	£27.95	£27.49	£27.32	£28.55
Weighted avg (2014 - 2050) ⁵	£27.17	£26.76	£26.64	£27.70

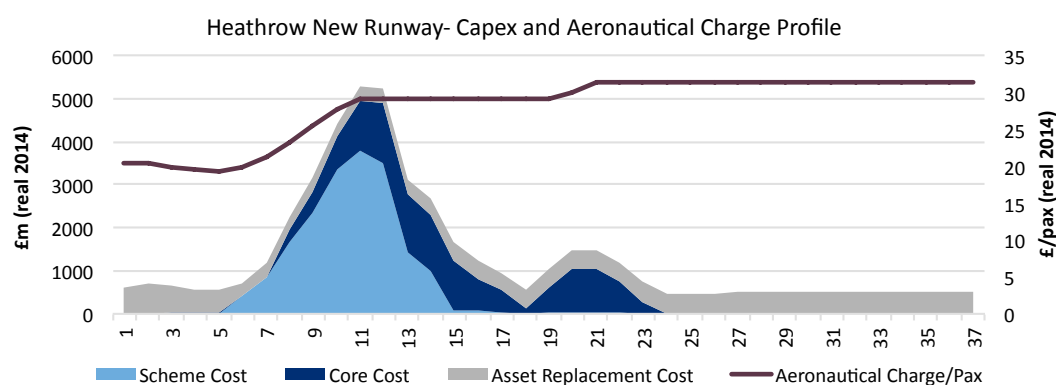
Source: Airports Commission: Interim Report (Appendix 3: Technical Appendix)

Table 10: Heathrow Airport North West Runway

Per Passenger Charges in real 2014 prices	
Initial	£20
HAL projected estimate	Peak at £27 and return to approx. current levels by 2050
Commission's Analysis	£28-29, peak charge £32

Source: Airports Commission: Consultation Document

Figure 10: Heathrow NW Runway, Capex and Aeronautical Charge Profile



Source: Airports Commission, Assessment of Need Scenario, Carbon Capped



3.20

The profile of investment at Heathrow in the North West runway case has a similar profile to the extended runway option with costs incurred in a relatively short window. The proportional increase in airport charges resulting from the expansion at Heathrow is lower than Gatwick, but the starting point significantly higher, as Heathrow is currently twice the price of Gatwick. With the various demand scenarios, the Commission estimates this scheme to have the narrowest variance in charges, ranging £28.35 to £31.88.

Table 11: Heathrow Passenger Aero Charges across the Commission's Four Demand Scenarios

Scenario	Assessment of need – Carbon Capped	Assessment of need – Carbon Traded	Low-cost is king	Global fragmentation
Charge peak	£31.31	£30.29	£30.03	£31.88
Weighted avg (2019-2050) ⁴	£29.87	£29.53	£29.17	£30.33
Weighted avg (2014 - 2050) ⁵	£28.91	£28.64	£28.35	£29.33

Source: Airports Commission: Interim Report (Appendix 3: Technical Appendix)

3.21

Looking at the current charges at Heathrow and Gatwick from their latest full year financial statements, year ending December 2013 and March 2014 respectively, shows aeronautical revenue per passenger at £21.07 for Heathrow and £8.85 for Gatwick. The Airports Commission has calculated the actual allowable yield per passenger in the year ending March 2014 at Gatwick to show initial charges of £9. Heathrow charges of £20 are taken from the recent review of the economic regulatory framework to set regulation for the sixth quinquennium (Q6) covering the period 2014/2015 to 2018/2019 (see below). Gatwick's review by CAA looked at analysis over both 5 and 7 year periods although attaching greater weight to the 5 year period it is expected that Gatwick's license will run for 7 years, given the commitments it has negotiated with its airlines.

Table 12: HAL's Q6 Price Control in CAA's Proposed Licence (Real 2013/2014 Prices)

	2013/14	9 months 2014	2015	2016	2017	2018
Yield per passenger	£20.60	£20.40	£20.13	£19.86	£19.46	£19.10

Source: CAA (Economic regulation at Heathrow from April 2014: final proposals)

3.22

Allowable aeronautical revenue is based on the agreed return on regulatory asset base (RAB) as determined by the CAA. Based on the 'single till' approach, all projected non-aeronautical revenue is subtracted to determine allowable aeronautical revenue which is used to calculate per passenger charges, based on inbound and outbound passengers. The regulation differentiates between GAL and HAL as the CAA judges GAL to have less market power. The calculated revenue per passenger is to be treated as a backstop or fair price for Gatwick so it is

seen as a benchmark instead of a licence cap. GAL is able to set prices with airlines which are similar to the regulated price and is obligated to provide a given level of service. Both service level and prices will be constantly monitored by CAA to ensure GAL doesn't greatly deviate from its service obligation and regulated price. For Heathrow, the RAB regulated price is just the permitted price to charge to airlines per passenger.

Airport Charges Components

3.23 Within the regulatory accounts for the year ending 31st March 2014 aeronautical revenue is stated as consisting of the following:

Table 13: Airport Charging Structure, 2014 - Published Charges

Heathrow Airport Limited	2014	Gatwick Airport Limited	2014
Passenger charges based on no. of departing passengers	£29-£41	Passenger charges levied on passengers on departure	£9-£12
Aircraft landing charges levied according to noise, emissions and weight on landing	£836-£2,934	Aircraft landing charges based weight, noise chapter and season	£0-£1,669
Aircraft parking charges based on a combination of weight and time parked as provided	£21-£51 per ¼ hour	Aircraft parking charges	£2.8-£8.5 per 5mins
Other charges levied for passenger and baggage operations when these services are rendered	various	Other charges levied (e.g. fixed electrical ground power) when these services are rendered	various

Source: *Airport Conditions of Use documents; airportcharges.com*

3.24 The charging structures at airports are generally such that smaller aircraft pay less in runway charges; domestic and EU passengers are charged at lower rates than international; and freight carried in the aircraft hold is included in the runway charges. This means that whilst the figures are often quoted as a set amount per passenger, the reality is that this is merely a convenient measurement unit.

3.25 Dividing total aeronautical revenue by total passengers results in figures of around £21 for Heathrow and £9 for Gatwick today. If calculated as a figure per ton of aircraft, which is a measure used by some airlines to compare airport charges, our estimates are £20 for Heathrow and £14 for Gatwick.

International Benchmarks

International Comparison

3.26 The Airports Commission's terms of reference state that it should report on "its assessment of options for meeting the UK's international connectivity needs". The outcome of the Airports Commission's final recommendation will aim to maintain the UK's aviation global competitiveness. Heathrow is currently the world's third busiest airport as measured by Airport Council International (ACI) in 2014. In order for the UK to maintain competitive with its peer group, it is important to examine where Gatwick and Heathrow rank in terms of airport size and charges.

**Table 14:** List of the world's busiest airports by passenger number, 2013

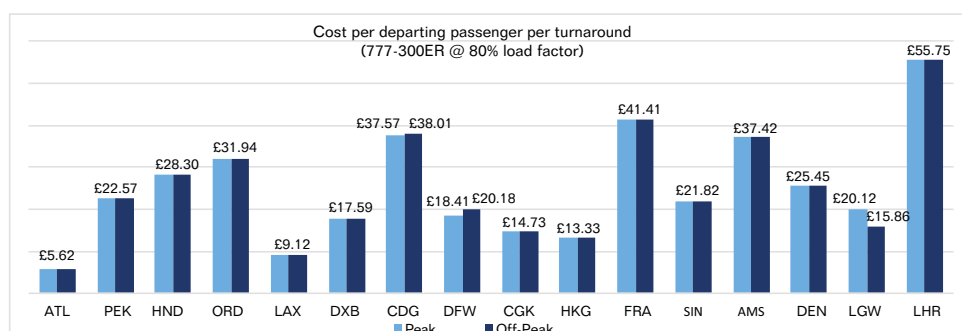
Rank	Airport	Annual passengers (m)
1.	Atlanta (ATL)	94.4
2.	Beijing (PEK)	83.7
3.	London (LHR)	72.3
4.	Tokyo (HND)	68.9
5.	Chicago (ORD)	66.8
6.	Los Angeles (LAX)	66.7
7.	Dubai (DXB)	66.4
8.	Paris (CDG)	62.1
9.	Dallas/Fort Worth (DFW)	60.5
10.	Jakarta (CGK)	60.1
11.	Hong Kong (HKG)	59.6
12.	Frankfurt (FRA)	58.0
13.	Singapore (SIN)	53.7
14.	Amsterdam (AMS)	52.6
15.	Denver (DEN)	52.6
16.	Guangzhou (CAN)	52.4
17.	Bangkok (BKK)	51.4
18.	Istanbul (IST)	51.2
19.	New York (JFK)	50.4
20.	Kuala Lumpur (KUL)	47.5
21.	Shanghai (PVG)	47.1
22.	San Francisco (SFO)	44.9
23.	Charlotte (CLT)	43.6
24.	Incheon (ICN)	41.7
25.	Las Vegas (LAS)	40.9
26.	Miami (MIA)	40.6
27.	Phoenix (PHX)	40.3
28.	Houston (IAH)	39.8
29.	Madrid (MAD)	39.7
30.	Munich (MUC)	38.7
	Gatwick (LGW)	34.2

Source: ACI

3.27

In the section above the current and projected airport charges have been outlined to show the charges levied on a one-way journey. **Figure 11** provides an operating example of airport charges at the top 15 airports plus Gatwick, assuming an international flight turnaround operated by a Boeing 777-300ER at 80% load factor, showing both peak (April – October) and off peak (November – March) charges. The breakdown of charges includes movement charges (runway, noise, infrastructure, air navigation, parking charges etc.) and passenger charges (passenger service charge, security, PRM etc.).

Figure 11: Example of Airport Costs on a Specific International Service, Wide-Body Aircraft

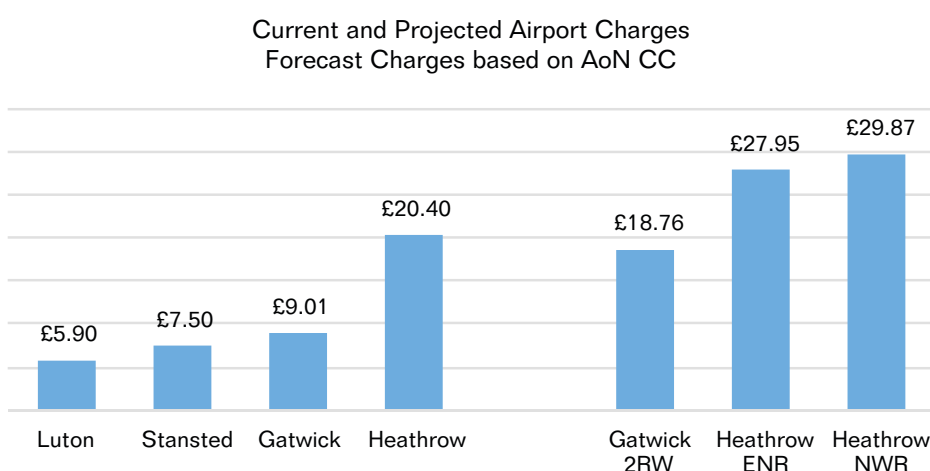


Source: *AirportCharges.com*

3.28 Heathrow achieves the highest charges across the peer-group, with fees almost 10 times higher than the cheapest airport, Hartsfield-Jackson (Atlanta). Despite the charges, Heathrow remains in the top 3 busiest airports, suggesting that the combination of high demand and strong passenger yields makes operators consider the high cost of operating to Heathrow a manageable expense. At the opposite end of the cost spectrum to Heathrow is the busiest airport in the world, Atlanta. As with most of the airports in the US, it is in public ownership and therefore subject to different investment and cost-recovery drivers.

3.29 The majority of these airports have flat rate year-round charges, though Paris CDG, Dallas-Fort Worth and Gatwick offer a winter season discount. The price differential at Gatwick of approximately £5 is the largest, which should provide additional incentive for carriers to operate at Gatwick during the off-peak months.

Figure 12: Comparing London Airport Charges



Source: *Annual Reports, Airports Commission*

3.30 Comparing the current airport charges at Heathrow and Gatwick to alternative airports within London shows that in addition to Gatwick becoming less price competitive on a global scale it also becomes less comparable to its closest competitors in London: Luton and Stansted Airports. With all three airports serving the low-cost airline sector, the relative increase in price if Gatwick's airport charges rise sharply poses a threat to the prospective growth in passengers.



As a result of building a second runway, it may price itself out of some segments of the London low cost carrier (LCC) market.

3.31 Gatwick's charges become more comparable to Heathrow under the scenario where Gatwick is chosen as the preferred option for expansion and Heathrow remains constrained. Without the ability to expand runway capacity there is unlikely to be any major infrastructure upgrade expenditure at Heathrow, leading to the airport having no scope to increase charges in real terms. With less than £2.00 price differential between the two airports it removes the cost incentive for legacy carriers to move their operations to Gatwick as Heathrow will still provide all the non-price advantage, including better connectivity and facilities for network carriers.

3.32 With a second runway, Gatwick may find itself trying to compete at both ends of the airline market – low-cost, price sensitive and network capable long-haul – whilst having to recover its investment costs. This may lead to its proposals being harder to finance than currently it believes. We should also not underestimate the level of debt Heathrow will need if either of the proposals are selected. Although the airport is significantly larger than Gatwick on all financial and air traffic measures, the sizeable increase in borrowing and balance sheet resulting from a third runway development put it on a par with some of the country's largest assets. Nonetheless, the appetite for risk amongst the large-scale commercial investors and banks will almost certainly weigh in favour of Heathrow.

4. Impact of Price Changes on the Forecast Scenarios

4.1

There has been extensive literature published on how changes in price affects demand but when looking at Heathrow and Gatwick Airports as their customer base is so broad there isn't a uniform response to the price change. In order to develop a balanced response a number of perspectives are analysed in this section.

Literature Review, Elasticity of Demand and Air Travel

IATA Economics Briefing No. 9

Air Travel Demand and the Impact of Price

A paper written by IATA examines the impact of the cost of air travel on demand. The main conclusions are:

Passengers are becoming increasingly sensitive to price, led by the boom in low-cost travel, the transparency brought by the Internet and the intense competition on deregulated markets.

All of the studies reviewed found that there was a significant demand response to changes in air travel prices. This indicates that any policy action that results in higher air travel prices (e.g. passenger taxes, increased landing fees) will result in a decline in demand.

The extent of that decline will depend on a number of factors:

- Business vs. Leisure Passengers. In general, all else being equal, business travellers are less sensitive to price changes (less elastic) than leisure travellers. Business travellers generally have less flexibility to postpone or cancel their travel than leisure travellers.
- Short-Haul vs. Long-Haul Travel. Price elasticities on short-haul routes were generally higher than on long-haul routes. In part, this reflects the opportunity for inter-modal substitution on short-haul routes.

Price elasticity is a measure used to capture the sensitivity of consumer demand for a good or service in response to changes in the price of that particular good or service.

The price elasticity is defined as:

$$\text{Price Elasticity} = \frac{\% \text{ Change in Quantity Demanded}}{\% \text{ Change in Price}}$$



The quantity demanded generally decreases when the price increases, so this ratio is usually expected to be negative. For example, if a 10% increase in the price of good 'A' results in a 6% fall in the quantity demanded of that good, its own price elasticity is -0.6. By contrast, if a 10% fall in the price of good 'B' leads to a 12% increase in the quantity demanded of good B, its own price elasticity is -1.2.

The IATA report references a study by Gillen, Morrison and Stewart which found demand elasticities ranging from -0.1 to -1.7, depending on the relevant market. It identified various elasticity estimates for several distinct markets for air travel, such as:

Long-Haul Price Elasticities

International Business -0.3

International Leisure -1.0

Short-Haul Price Elasticities

Business -0.7

Leisure -1.5

PwC study – November 2014 – Impact of Airport Charges

In Report 13 published by the Airports Commission in November 2014 title "Cost and Commercial Viability: Funding and Financing" produced by PwC the impact that higher charges at Heathrow and Gatwick was evaluated.

The report states that:-

"The impact of increased aero charges could be significant when considered in the context of operating margins of the airlines which use the airports. The schemes (LGW 2R, LHR NWR and LHR ENR, respectively) are likely to require aero charge funding in their first full year of operation that is equivalent to £270m, £1,180m and £970m (in 2014 prices) greater than is generated in 2014. The way in which this will be funded is likely to depend on a number of factors such as: the price elasticity of demand of passengers; the underlying efficiency of airlines; the commercial flexibility of the airports; government policy; and the operating models of different airlines. The analysis also suggests that aero charges as a proportion of fare revenue is larger for airlines which operate shorter average sector lengths."

"Evidence from the case studies that we considered (in the Netherlands and Spain), as well as historic difficulties that Manchester and Stansted had in the past in pricing up to their then regulated price caps, suggest that the impact on demand of changes in aero charges can be significant. The position on demand risk is finely balanced. On the one hand, current pricing is a relatively small component of overall fares, and the current demand levels might be expected to prompt a very limited demand response. On the other hand (e.g. based on the size of these charges compared to low margins

and evidence from case studies), demand risk may be more significant. This could be particularly important at Gatwick which currently caters for more low-cost traffic (which might be assumed to be relatively price sensitive) and is currently in less of a state of excess demand than is Heathrow.”

“For example, current aero charges at each airport are £9.01 for Gatwick and £20.40 for Heathrow. Based on ticketing data from Milanamos Planet Optim Future, the current estimated average one-way fare in 2013/14 (including Air Passenger Duty) for passengers at Gatwick and Heathrow are £132 and £401, respectively. This implies that aero charges are currently up to 6.8% and 5.1% of the average fare at Gatwick and Heathrow, respectively.”

“Ultimately it seems likely that the increase would need to be funded through a combination of sources:

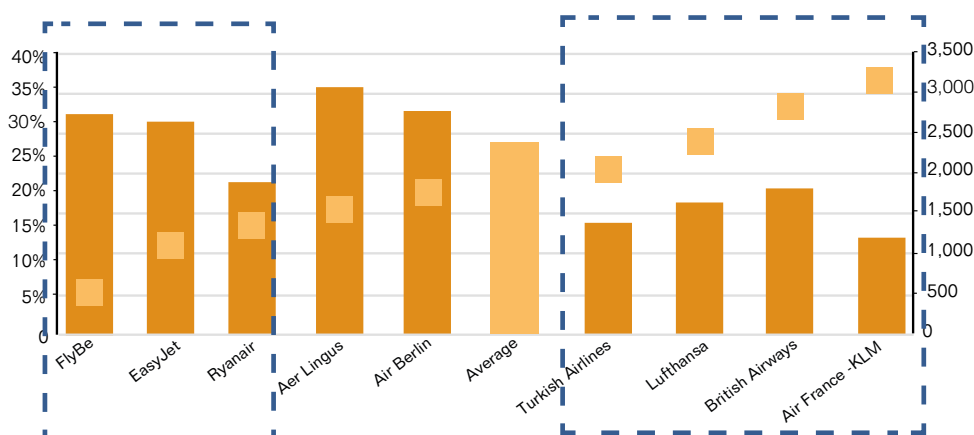
- Passengers (e.g. through increased fares);
- Airlines (e.g. through reduced costs or margins);
- Airports (e.g. by generating higher commercial or non-aeronautical revenues, or by greater cost efficiency); or
- Government policy – it would be a matter for the Government of the day to consider whether any public sector involvement was appropriate and, if so, what form it might take.”

“The precise manner in which the increase in aeronautical charges will ultimately be funded will therefore likely depend on factors such as:

- The price elasticity of demand of passengers;
- The underlying efficiency of airlines;
- The commercial flexibility of the airports;
- Government policy; and
- The operating models of different airlines.”

The report shows the proportion of average seat revenue which is accounted for by aeronautical related charges. This shows that the aeronautical related charges are proportionally almost twice the cost impact for the low-cost carriers operating with shorter average sector lengths and would imply “that these carriers could be more sensitive to changes in aero charges.”

Figure 13: Aeronautical related charges as a proportion of total seat revenue and average sector length



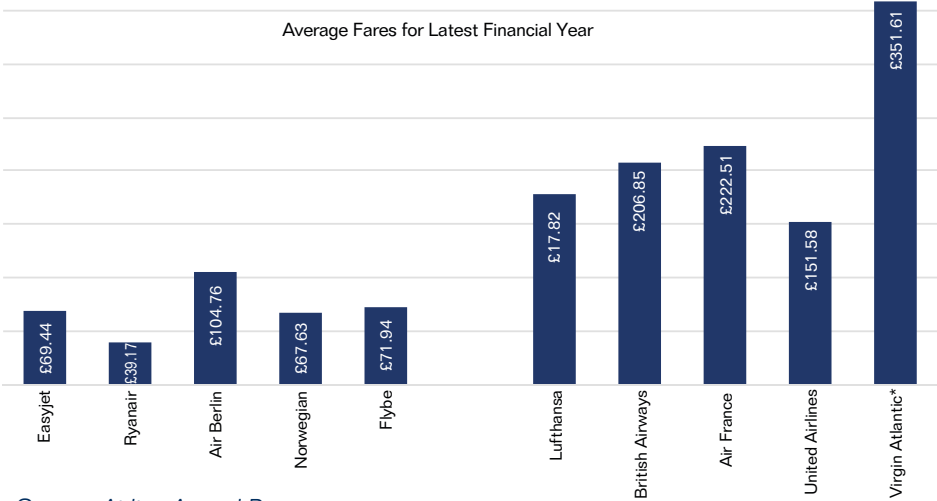
Source: Report 13 published by the Airports Commission in November 2014 title "Cost and Commercial Viability: Funding and Financing" produced by PWC. Data taken from airline annual reports and airline schedules.

Airline Revenues Today

4.2

There is little reliable data showing airport-specific average fares for individual airlines and so our analysis is based on system-wide average fares for a group of airlines that operate a major proportion of capacity at each airport, supplemented by some illustrative data for easyJet. For Gatwick we have used a selection of low-cost carriers whose operations account for 53% of total seats. At Heathrow, British Airways and Virgin Atlantic also operate around 53% of available seats and we have included a selection of other network carriers. The chart shows network average fares rather than Gatwick v Heathrow, although it is clear that there is a very strong yield premium for airlines that operate long-haul services. Within this group, only Virgin Atlantic is a pure long-haul carrier – all others operate a short-haul network that will dilute the system-wide average fare. British Airways, for example, only operates from London and so its network average fare of £206 will be a blend of Heathrow and Gatwick, long and short-haul routes. easyJet on the other hand operates a pan-European network that generates an average of £69 one way. From our group of representative airlines, those using Gatwick give an average fare of £77.03, which is approximately £100 less than the network airlines.

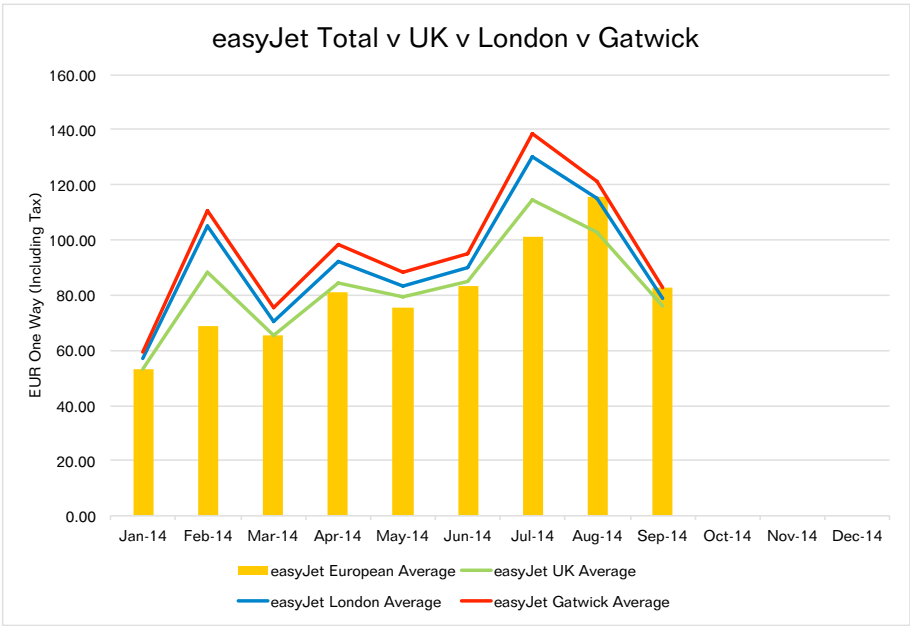
Figure 14: Average Fare for Representative Group of Airlines Operating from Gatwick and Heathrow



Source: Airline Annual Reports
*Virgin Atlantic average fare is for Financial Year Ending Feb 2013

4.3 Given the fare differential between the two business models, the airport charges have a smaller impact on network carriers where it accounts for a lower proportion of total fare. Heathrow’s most important operator is BA, with approximately 50% of seat capacity. For Gatwick, it is easyJet, operating about 40% of the traffic. The airlines’ reliance on the respective airports is very different - easyJet has only 12% of its system capacity at Gatwick compared to British Airways which has 87% of its seats originating from Heathrow. This suggests that British Airways would be more reluctant to reallocate its operations, whereas easyJet is a more agile carrier that might consider alternative options.

Figure 15: The Importance of Gatwick to easyJet



Source: rdcapex.com



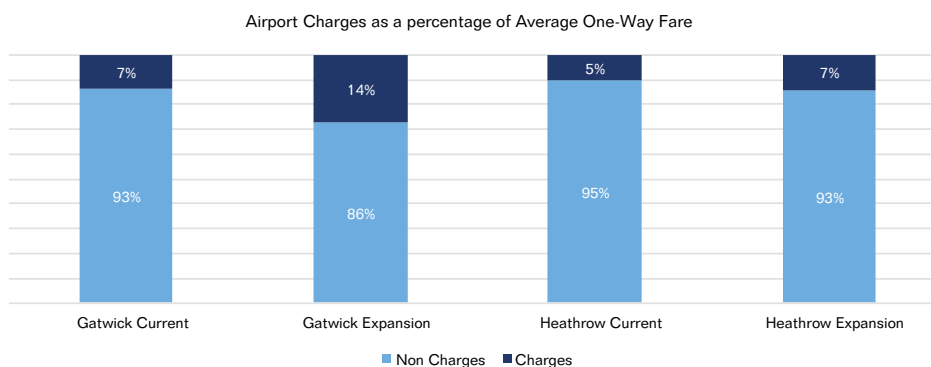
4.4

Using sampled fare data for 2014 as shown in **Figure 15**, we have looked into the importance of Gatwick to easyJet by comparing the monthly average fares across all routes; all UK routes; all London routes and then all Gatwick routes. The analysis suggests that the average fare from the UK is above its network average by about 5%, while the London airports⁷ average fare is above that of the UK. Finally, the average fare achieved at Gatwick sits above London in importance to the airline. The Jan-Sep average for Gatwick is around ~~£~~€9 higher than the UK-wide average fare and €16 above its system average – although these prices include government tax, which for the UK is significantly higher than any other country. Nonetheless, in the summer months we see a price-premium of up to 39% over network averages whilst in the off-peak months, with the exception of February, Gatwick premium is less obvious, particularly once the effects of UK APD (€17 on a one-way ticket) are stripped out.

4.5

Figure 16 below shows the effect of projected increases in airport charges to the levels proposed by the Commission, as a proportion of current average fares at Gatwick and Heathrow. Based on our current estimates for average fares, and assuming that these remain constant in real terms, the doubling of charges at Gatwick sees charges accounting for around 14% of the average one way fare versus 7% at Heathrow, reflecting the higher yield and proportionately lower increase in charges. These figures differ from those presented in the Moody's report for both Gatwick and Heathrow expansion scenarios reflecting different source data.

Figure 16: Airport charges as a percentage of average one way fare



Source: Ticketing data from Milanamos Planet Optim Future, Charges data from Airports Commission: Consultation

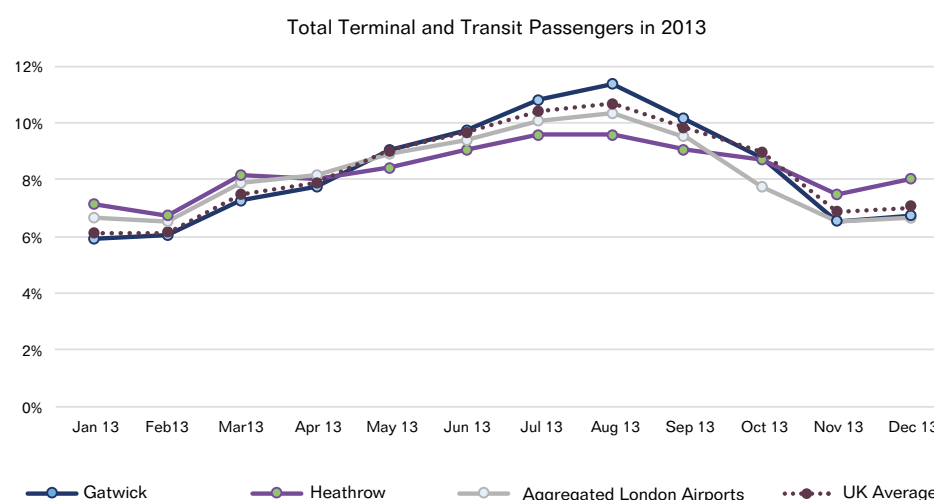
4.6

In the summer months, both airports are essentially full, with very few slots available. However, when comparing the seasonality of passenger throughput between the two airports, Gatwick has greater variability in monthly passenger traffic, due to the seasonality of its demand. This reflects the traffic mix at the airport, where there are many more flights to 'holiday' destinations for which traffic is, by nature, peaky.

4.7

Figure 17 overleaf shows the proportion of annual passengers carried in each month for Heathrow, Gatwick, the London system (aggregated) and the UK average. By comparison, the range at Heathrow is far less pronounced. Indeed, Gatwick is a more seasonal airport than the UK average, with a lower proportion of passengers carried in the winter and higher in the summer months.

Figure 17: Passenger traffic at London Airports 2013



Source: Civil Aviation Authority

4.8 The seasonal mix in traffic at Gatwick highlights the difference in route structure between the two airports. A comparison between the slot allocation charts for Heathrow, Gatwick and Stansted shows that whilst Heathrow is full throughout the year, Gatwick has some available capacity in the winter⁸ and Stansted has year-round slot availability. This reinforces the evidence shown by the variability in passenger traffic as a proportion of total annual passengers for London, Heathrow and Gatwick. If this trend remains consistent in future years then an expansion at Gatwick may risk unused capacity during the winter season whilst relieving excess demand in the summer season. This differentiation of capacity use is not reflected in the annual forecasts presented by the Commission but we think it is an important factor to be considered if new capacity is to be utilised efficiently.

4.9 Over the last ten years, Gatwick has increased the number of destinations with daily or more frequent flights from 74 to 96, whereas in the same period at Heathrow, there are four fewer destinations flown. Almost all of this growth has occurred to European points, which account for 92% of departures at Gatwick, up from 87% a decade ago. The network overlap between the two airports shows a stark variance in the type of destination served, as shown below. Destinations unique to Gatwick tend to be leisure-orientated in Europe and the Caribbean, whereas Heathrow has major global cities as its unique points. Analysing the overlap between the two networks⁹ leads us to conclude that filling additional capacity at Gatwick and/or the rise of a long-haul low-cost model would be very likely to begin by replicating destinations already served from Heathrow, rather than bring additional connectivity to the UK.

4.10 Our analysis of published airline schedules data shows that, in the last decade, Gatwick has added 47 new destination cities, of which 29 are not served at Heathrow. Over the same period, Heathrow has lost four.

⁸ See appendices for slot allocation tables from ACL (Airports Coordination Limited)

⁹ See Appendix 1 for full list of network overlap and unique destinations

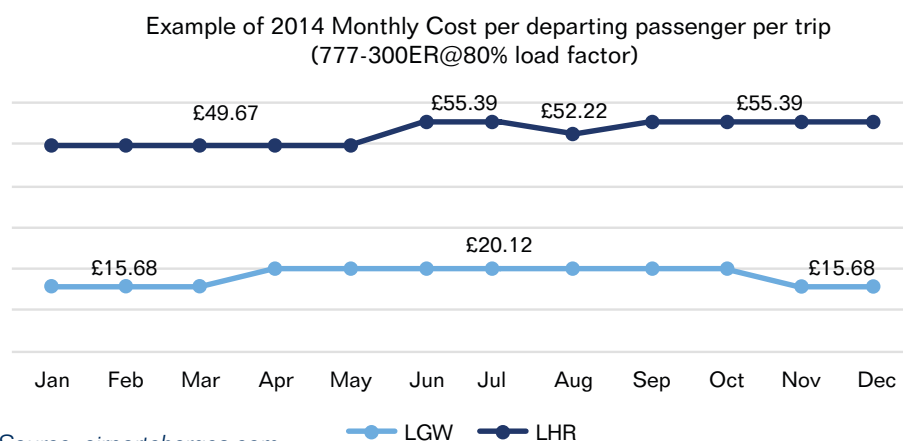
Table 15: New Routes at Gatwick, 2014 v 2004 – Annual Flight Frequency >355

	Gatwick	Of these, which were flown at Heathrow:		
	New v 2004	in 2004	in 2014	Not served
Primarily Leisure	26	1	2	24
Primarily Business	10	10	10	0
Mix	11	5	6	5
Total	47	16	18	29

Source: *Innovata, RDC Analysis*

4.11 Of the new routes from Gatwick, over half (26) are to 'leisure' destinations. Of the 10 new 'primarily business' points, all were already flown from Heathrow in 2014 – and 2004, meaning that the last decade has seen no net gain in business destinations served from Gatwick that weren't already flown from Heathrow.

4.12 Gatwick is being proactive in finding solutions to the seasonality issue and has reduced airport charges during the winter season (November to March), in which it offers a reduction from summer pricing equivalent to around 25%. It is also one of the fastest growing airports in the country, having transformed its traffic base under private ownership, and we would expect growth to accrue to the peak summer months at any growing airport so it is perhaps unsurprising that the current traffic mix is more seasonal in nature.

Figure 18: Seasonality example - Gatwick's airport charges

4.13 However, seasonality is a function of demand and the summer spike in traffic coupled with the passenger mix and route profile of today shows that there will need to be an evolution in the route network to achieve year-round utilisation. The current published winter discounts do not appear to provide the incentive for airlines to pick up some of the available slots, although these are notoriously harder to fill once the balance of airline operations moves away from being consistent year-round. If airport charges were to increase during the winter season due to the building of the second runway, there may be a detrimental effect on winter slot utilisation similar to that which was observed at Stansted between 2008 and 2011, when Ryanair simply parked aircraft in the off-peak months, claiming it was cheaper than flying from the 'most expensive airports'¹⁰.

4.14 It is also implementing Gatwick Connect, an airport-hosted product enabling passengers to transfer between low-cost airline flights using an airport-backed scheme. This initiative may help divert traffic over Gatwick in the off-peak months and promote greater confidence in price-sensitive travellers to try self-connecting. It is a unique concept and one that will certainly bring additional passenger benefit to the airport while reducing the risk for passengers of missed flight connections.

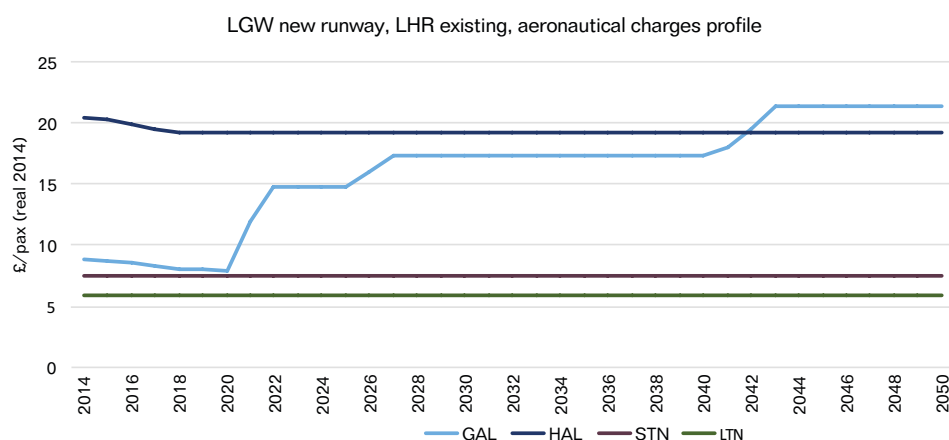
4.15 We see this as a great example of competition-led innovation on the part of Gatwick though note that the decision to offer an interline product is fundamentally an airline strategy, backed by complex sales and revenue management systems. Whether an airport connecting product is a concept that is strong enough to force change across the industry remains open to question but, if it gains traction, may be widely adopted in the future.

How Might Increases in Airport User Charges Impact Demand?

4.16 Airport charges at Heathrow are currently the highest of its peer group of comparable airports, while Gatwick is more in line with the peer group and at the lower end of the spectrum. In the case of Gatwick, the charges are passed through to passengers as part of their air-fare, whereas at Heathrow many of the carriers will also have a freight component to their traffic to which part of the airport charges will accrue. However, for the purposes of our modelling we have assumed that the full value of charges is passed on to passengers at both airports.

4.17 The rise in airport charges as estimated by the Airports Commission suggests that Heathrow will retain its position as one of the world's most expensive airports in terms of passenger charges if the expansion takes place here. If Gatwick is selected it would become less price competitive as its charges would be more comparable to Heathrow's.

4.18 Based on the AC assessment, a new runway at Gatwick would increase per passenger aeronautical charges from £8/passenger in the short term to £17/passenger in the medium term and £21/passenger in the long term (at 2014 prices), although the airport has consistently maintained that it can deliver the runway and retain charges within a £12-£15 range. Assuming Heathrow is unable to expand, and charges remain the same in real terms as projected by the end of Q6 level, the relative attractiveness of Gatwick's charges would diminish over time. Currently, its charges are 57% lower compared to Heathrow. However, with the new runway in place, this differential could reduce to just 10% and in the long term could actually be 11% higher than at Heathrow.

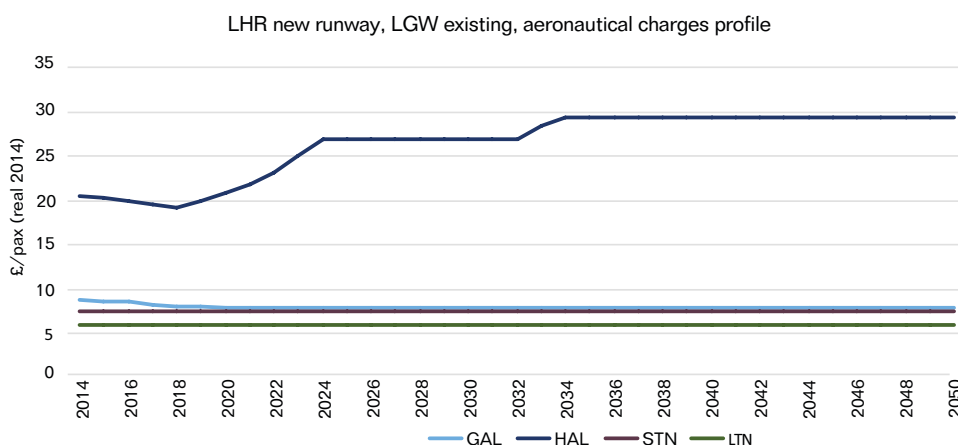
Figure 19: Charges Profile - Gatwick New Runway, Heathrow Existing Charges

Source: Airports Commission: Cost and Commercial Viability: Funding and Financing

Note: LGW new runway charges based on Airports Commission scenario AoN CC. LHR (do nothing) charges assume to remain flat in real terms.

4.19

Conversely, an expanded Heathrow could see its differential set against Gatwick airport widen to 73%. This would put Heathrow into a completely different price bracket compared to other UK airports, and probably at the top of the global chart for user access charges.

Figure 20: Charges Profile - Heathrow New Runway, Gatwick Existing Charges

Source: Airports Commission: Cost and Commercial Viability: Funding and Financing

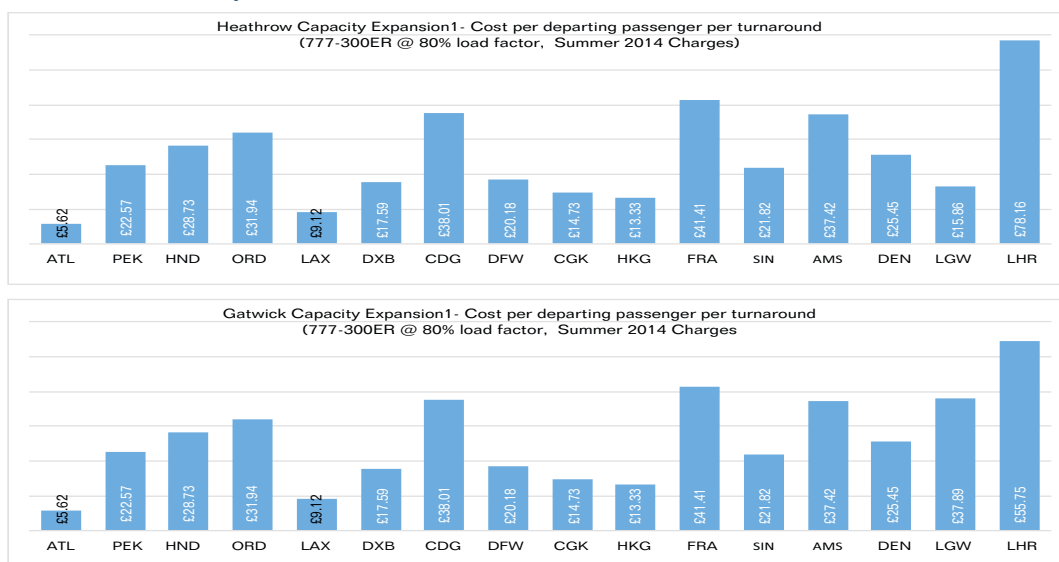
Note: LHR new runway charges based on HHL scheme (extended runway) Airports Commission scenario AoN CC. LGW (do nothing) charges assume to remain flat in real terms.

4.20

The charts below show the impact of an identical percentage change in airport charges as shown in the Airports Commission's report, on airport charge per departing passenger on a long-haul return trip. Under an expansion at Heathrow taking an average of the two proposals would result in charges per-passenger per-trip increasing from £55.75 to £78.16. For Gatwick the cost per-passenger per-trip would rise from £15.86 to £29.86.



Figure 21: Example of Change in Airport Charges applied to an International Service, Wide-body Aircraft at Heathrow and Gatwick



Source: *Airportcharges.com, Airports Commission*

Percentage change in airport charges is calculated based on the scenario: *Assessment of Need-Carbon Capped*.

- 4.21** Although among European airports Heathrow has the highest airport charges, this hasn't acted as a deterrent to airlines operating at the airport as free slots are a rare commodity and it was the busiest airport by passenger throughput in Europe in 2014. Looking at five of the relevant factors that will determine the responsiveness of demand to price changes as proposed by economic theory will assist in determining the impact of these potential changes.

Nature of Goods

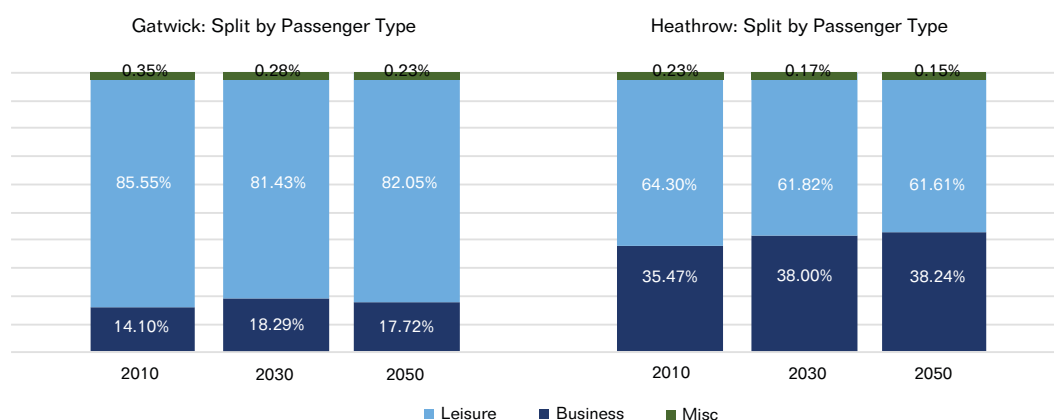
- 4.22** This identifies whether the good is a necessity for human life or is simply a luxury or comfort good. Where it is a necessity elasticity of demand tends towards being inelastic, for luxury and comfort goods, consumers are more responsive to price changes making it elastic.
- 4.23** Although approximately 60% of Heathrow passengers are leisure travellers, a key driver behind operating at Heathrow for airlines is to capture business passenger traffic. For business travellers, air travel can be seen as an integral part of their job. Hub transfer passengers could also see their flight routing through Heathrow as a necessity as it is a compulsory part of their journey instead of a choice for some routes.
- 4.24** As Gatwick is characterised by short-haul leisure passengers, overseas holidays would be seen as a luxury item, which could be forfeited if prices were to rise.

Availability of Substitutes

4.25 If there are close substitutes, demand is more elastic, as a rise in the price of one good/service encourages change in consumption to the substitute.

4.26 Heathrow, operating as the UK's only hub airport, has a higher presence of alliance-member carriers offering extensive options for passenger transfers. Its long-haul route network surpasses that of any other UK airport, making it difficult for there to be a viable close alternative within the UK. Outside the UK, substitutes within Europe exist including Paris CDG, Amsterdam Schiphol and Frankfurt. Although these European airports act as potential substitutes for transfer passengers, around 70% of Heathrow's throughput has London as its final destination/origin. Within the UK the closest substitute would be Gatwick, although it doesn't offer the same range of frequency and range of long-haul flights.

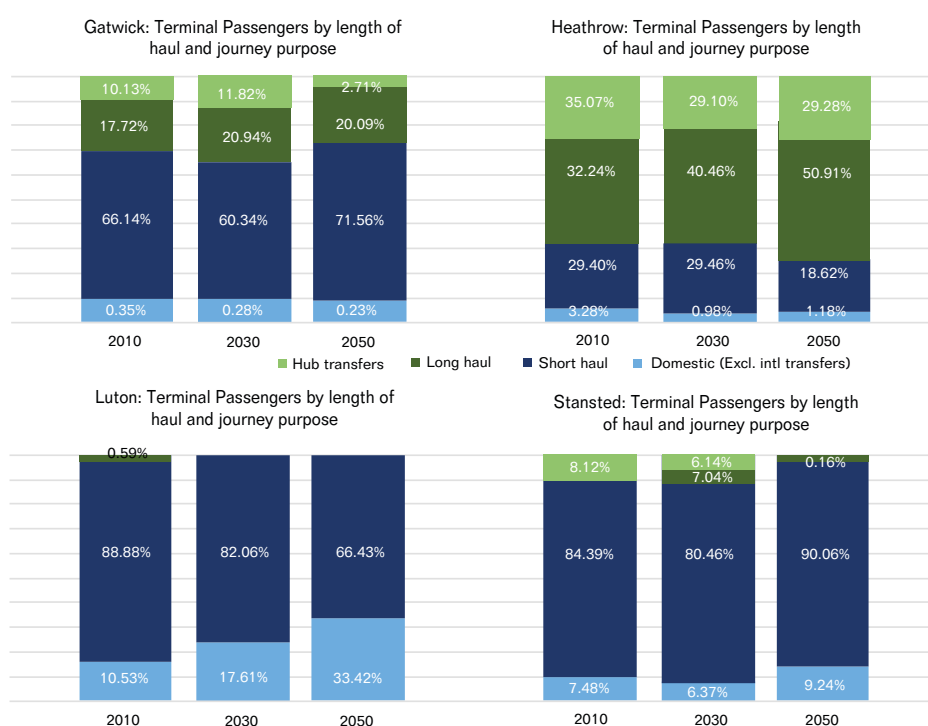
Figure 22: Passenger Profile, Gatwick and Heathrow



Source: Airports Commission forecasts: data annexes

4.27 Gatwick has some closer substitutes, including two alternatives within the London system – Stansted and Luton which also offer leisure short-haul flights operated by low-cost carriers. These airports aren't exact substitutes as Gatwick offers a greater variety of long-haul destinations and has some transfer traffic, whereas Stansted and Luton have very little in the way of long-haul and transfer traffic.

Figure 23: Terminating Passenger Profiles, Gatwick and Heathrow



Source: Airports Commission forecasts: data annexes

Possibility of Postponing

- 4.28** The demand for goods or services when consumption isn't immediate and can be postponed for a significant period of time is said to be "elastic". If the choice to postpone isn't a viable option the demand for that good/service is "inelastic".
- 4.29** If business passengers are determined to be a main driver of growth:
- At Heathrow, it wouldn't be possible to postpone their trip for a significant period of time as the timing of their trip would have longer term implications.
 - At Gatwick if passengers' purpose is categorised as being leisure, then if prices rise, postponing the trip would be more realistic as they have less restrictions to the timing of their trip.

Proportion of Income Spent

- 4.30** The demand for the goods which account for a negligible amount of a consumer's total income is deemed inelastic. The greater the proportion of income spent on a good the more responsive the consumer is to a change in price, as the price change will account for a greater outflow from their disposable income.
- 4.31** If we assume that the proportion of business travellers from Heathrow do not include air travel as an outflow from their individual income, perfectly inelastic demand could be assigned to these travellers. However for the leisure proportion, a flight from



Heathrow which is on average more expensive than flights from other London airports would be a significant percentage of a holiday maker's income, especially if they are travelling as a family. This would make them very responsive to price changes.

- 4.32** 30% of traffic from Gatwick is accounted for by LCCs causing average fares at Gatwick to be a smaller proportion of total income when compared to flights departing from Heathrow, based on the average UK income.

Force of Habit

- 4.33** As a habit cannot be avoided in the case of a price rise, the consumer continues to purchase the good/service and is unresponsive to incremental changes in price, therefore making its demand fairly inelastic.
- 4.34** Both business passengers and leisure passengers can consider their flying as habitual, elasticities are more dependent on the nature of the individual flyer. Long-haul leisure flights tend to be more infrequent and would therefore be more responsive to price changes. Business travel could be seen as a habit as it cannot be avoided and is done frequently as seen by the numerous incentive schemes and frequent flyer packages offered to business travellers.

Summary

- 4.35** Airport user charges are one element of airline operating costs and, as we have seen, usually represent between 10% and 30% of total revenue. They are seen by network carriers as an inevitable consequence of their operations into major airports, whereas low-cost carriers generally see them as a negotiating opportunity for cost reduction.
- 4.36** It remains the case for network carriers that they are involved in many more passenger itineraries than their low-cost counterparts – our experience suggests a factor of at least ten times more. This gives a much wider scope for network carriers to fill their aircraft in periods of low demand by selling a few cheap seats in many markets, rather than many cheap seats in a few markets. They also have the benefit of freight revenues to offset some of the landing charge costs, meaning the theoretical charge-per-passenger arising from changes in charges may not be the actual charge passed on to passengers.
- 4.37** As already stated, we have insufficient resources to undertake price-point elasticity modelling bearing these considerations in mind and have relied on a simpler approach as outlined below. We have made no assumption about the possibility that increased competition may break or change habits.

Elasticity of demand modelling

Frontier Economics Report

- 4.38** Frontier Economics published a report in April 2014 that proposed expanding Heathrow would provide greater benefits to passengers than expanding Gatwick

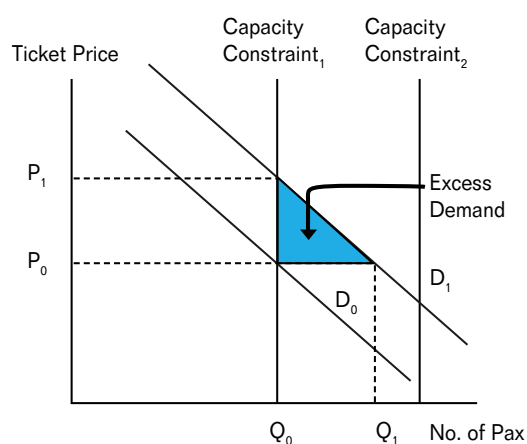
Airport. This conclusion was derived using basic demand and supply theory which found that the monetary benefit in 2030 due to expansion at Heathrow could benefit society by £300 per person in ticket prices, compared to £4 if expansion took place at Gatwick.

4.39 In the report it is assumed that airport capacity is fixed and changes in price do not influence passenger numbers as they are ultimately constrained by the airports' capacity limits. The findings suggest that the constraints at Heathrow are leading to consumers being charged higher prices because the supply of airline capacity (seats) is lower than demand.

4.40 On further analysis we believe the impact of Gatwick's benefit is understated as the Frontier report bases its analysis on aggregate passenger data. The capacity assumption for Gatwick doesn't take into consideration the variability in the airport's seasonal capacity, constraining the airport in the summer. As Gatwick is full during the summer and carriers don't seek to occupy slots during the winter season, the airport is, effectively, operationally capacity constrained. Due to the fact that both Heathrow and Gatwick are operationally constrained, the 'supply and demand' modelling should look similar, so that any additional capacity would remove excess demand that artificially pushed up the price which should, in turn, lead Gatwick to showing a greater monetary benefit that Frontier Economics has suggested.

4.41 That said, we do not dispute that Heathrow is absolutely full, whereas Gatwick has slot availability during the winter season. It probably holds true that with both airports full in the summer, consumers – particularly those travelling in the school holidays – are facing higher fares than they would if the system was less constrained. Implicit within this, therefore, is the possibility that the release of new airport capacity would feed through to additional airline seat availability to the destinations with greatest demand, leading to a fall in absolute fares – even with increased charges.

Figure 24: Modelling of impact of capacity expansion on constrained airport



Source: Frontier Economics, RDC

4.42

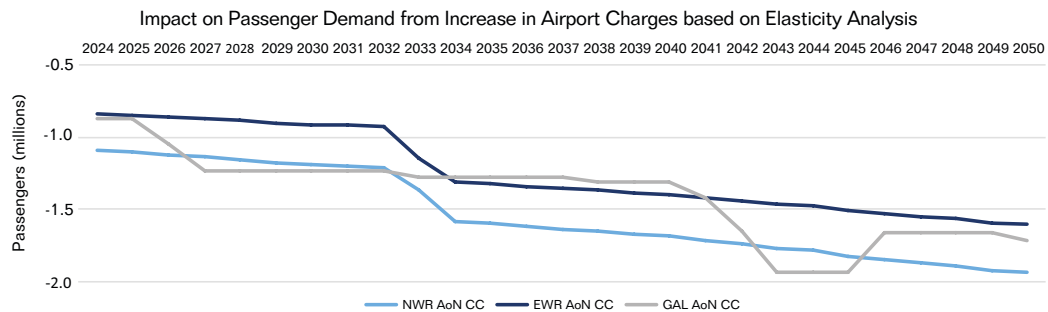
Figure 24 shows that when an airport is capacity constrained, as in the case of Heathrow (year round) and Gatwick (summer), if there is an increase in demand (D_0 to D_1) then because the airlines are unable to increase the number of passengers in order for there to be an equilibrium between supply and demand, the ticket price charged to passengers is pushed up (P_0 to P_1) to regulate demand. By increasing airport capacity (capacity constraint₁ to capacity constraint₂) an increase in demand doesn't automatically lead to price increase and passenger numbers increase (Q_0 to Q_1).

RDC Modelling

4.43

In order to quantify the potential impact of increasing airport charges on traffic growth, we have applied different elasticities to leisure and business travel and worked on the assumption that the increase in charges is passed through to consumers. The analysis is based on the 'ceteris paribus' assumption so that the percentage change in the price that is viewed by a consumer is only caused by a rise in airport charges. The change in airport charges has been modelled to commence in 2025, the first full year when new charges in relation to the expansion would probably be introduced. The elasticities have been applied to the Airports Commission's baseline forecast (carbon capped capacity unconstrained). The graph below shows the fall in demand based on percentage change in fares, on the assumption that 100% of airport charge increases are passed through to the customer and all other fare components remain constant.

Figure 25: Changes in passenger demand through increased charges



Source: RDC analysis

4.44

The smallest impact is from the Heathrow Extended Runway proposal. The fluctuation in the proposal that gives rise to the greatest change in passenger demand, between Heathrow's new runway and a new runway at Gatwick is due to the airport charges profile. From 2042-2043 airport charges are forecast to increase by approximately 9% at Gatwick while Heathrow remains constant, explaining the greater jump in reaction by passengers at Gatwick during this period. Cumulatively, the extended runway proposal results in the loss of approximately 33.6 million passengers compared to 41.5 million and 61.1 million for the Heathrow North West Runway and Gatwick's Second Runway respectively.

5 Closing Observations

5.1 By shortlisting three schemes and with only one to be chosen, we are left with a binary choice between Heathrow and Gatwick where, given long-term uncertainties, it would seem more sensible to allow either or both to expand as and when it felt justified by the commercial case. Our views are that Heathrow offers both the lowest-risk and highest-benefits outcome given its position within the global aviation industry; with its mix of carriers, proven ability to deliver sustainable, intercontinental services and lower risk of securing financing.

5.2 At the heart of the debate remains the nature of the additional connectivity needed by the UK over the next 30 years plus and how this relates to the fundamental business models which drive the aviation industry. If the aim is simply to develop connectivity with Europe (still Britain's main trading partner) and with a few long-haul "thick" routes where demand is particularly strong, the point-to-point model, operating from a range of local and regional airports, has worked well. However, for global connectivity the fundamental need to aggregate people and freight has remained extremely powerful, as evidenced by the growth of hubs not just in Europe but in the Middle East. The key issue is whether, in the decades ahead, the UK wishes to maintain and expand its direct connectivity with a broad range of global destinations, and not depend on people and goods having to transit through other hubs, whether in Europe or the Middle East. If so, it would need to ensure that London continues to host one of the world's major hubs itself.

A Short Summary of the Airline Industry

5.3 Airlines provide a supply of capacity to accommodate the underlying demand, within the bounds of their commercial objectives. How to account for shifts in strategy over the long term is difficult, and supply failure is a key risk for any airport seeking to expand. The debate is often expressed as a choice between low-cost and hub-and-spoke, but what is striking about the last ten years is the strength of both models. In the same way as twenty-years ago it would have been hard to foresee the impact low-cost airlines were to have on short-haul travel, a decade ago it would have been difficult to model the rapid rise of hub airports in Middle East. Yet today, there are four new hubs¹¹ that are changing the very nature of European air travel – and the level of competition between airlines. There is no convincing evidence that either model will displace the other; it is much more plausible that each will play to their strengths.

5.4 Within Europe, it is unsurprising that airlines support lower airport charges, and a competitive environment that enables them a choice between airports. This is particularly noticeable with short-haul and low-cost carriers, for whom as we have seen, airport charges account for a far higher proportion of total ticket price than they do for long-haul. Looking to the UK, and London specifically, the low-cost segment appears to favour expansion across the London system, not just at one airport, because this avails competition and choice.



5.5 Anecdotal and actual evidence shows there is a cautious interest from some low-cost airlines in long-haul, although they are presently seeking the right business model. The limited number of services operated by Norwegian to the US and Asia include connections between their own flights at their 'hub' airports; and Michael O'Leary has recently observed that network carriers may start using low-cost airlines to feed their long-haul flights – at the same time, claiming Ryanair will eventually fly long-haul itself¹².

5.6 There is an implicit acceptance within these examples of the need for some level of passenger aggregation to make long-haul viable, i.e. the hub model. How to re-invent this, in a multilateral system that already binds together network and regional airlines from across the world, is the heart of the challenge – one that has yet to be conquered. Whether facilitated by solutions like Gatwick Connect or low-cost carriers working with the incumbent airlines, nothing has yet taken a foothold to replace what is a highly complex system.

5.7 The success of the low-cost airlines to date has been in offering a product for the price-sensitive traveller, stimulating demand and growing markets. They don't yet offer solutions for the high-yield long-haul business traveller, or carry freight which makes an important revenue contribution. As of today, the few long-haul routes opened by low-cost carriers have been to destination cities that are already served by the network model. It is following the same trend as we initially observed when the low-cost short-haul services began. The next evolution, if the model works, will be to new leisure destinations – pushing out charter airlines in the process; and finally, new business connectivity could be realised although again, turning to the evidence from today, the balance of new connectivity in the last decade has not been to business destinations.

5.8 In our earlier work, we stressed the underlying strengths of the network, or hub-and-spoke, model in supporting additional long-haul connectivity, recognising that for short-haul, point-to-point is preferable. The fundamentals of long-haul commercial viability remain strong: aggregation of passengers; differential markets; the ability to maximise price through different classes of service (first, business, premium economy, economy); the power of global alliances and loyalty programmes; and belly-hold freight. These we see as being at the core of most long-haul routes for the foreseeable future. Maximising long-haul networks is achieved by maximising hubs. We therefore agree with the Commission's findings that, in most cases expansion at Heathrow brings the greater number of additional destinations.

Customers of Heathrow, Gatwick and UK Plc¹³

5.9 British Airways and easyJet both caution whether runway expansion plans at Gatwick are viable and favour expansion at Heathrow instead. They both have a vested interest in this argument, British Airways would likely benefit from additional capacity at Heathrow, whilst easyJet enjoys a powerful position as Gatwick's largest customer and, our analysis suggests, enjoys a price-premium through operating in a constrained environment.

12 <http://www.reuters.com/article/2015/01/21/ryanair-european-short-haul-idUSL6N0V04CB20150121>
13 See appendices for further detail

- 5.10** Norwegian favours expansion at Gatwick and Heathrow, Ryanair suggests expansion at Heathrow, Gatwick and Stansted. Both easyJet and Ryanair also discuss the potential to operate from Heathrow in the future. We view the withdrawal of Flybe as being an over-reaction to the price increases at Gatwick. If the long-term forecasts are robust, the airline was sitting on slots that have significantly more value than it sold them for; however, it is notable that these slots were purchased by easyJet, enabling it to increase its footprint at the airport.
- 5.11** Moody's expects that Gatwick will be more vulnerable to competition if Heathrow were to build a new runway as it would be at risk of losing scheduled airline traffic to Heathrow, where carriers can typically earn more per passenger mile. Conversely, the construction of a Gatwick runway would almost double aeronautical charges at the airport, putting it at a huge competitive disadvantage to Stansted, which is its main competitor in the low-cost airlines segment. We understand the sentiment in this report although note that Moody's does not rate Gatwick's debt and the other two rating agencies have not published similar papers.
- 5.12** As outlined in our previous work, we do not see London supporting two high-yield hub airports and therefore find it unlikely that Gatwick can sustain charges that are close to, or exceed Heathrow, particularly if it loses short-haul traffic to an alternative London airport. We should not underestimate the risk posed by significant increases in user charges. It is foreseeable that within a dual airport, high-cost operating environment, there is market failure on the airline side, in not providing growth in flights at Gatwick.
- 5.13** The same argument applies at Heathrow, though here we feel the risk is that the UK will lose traffic to overseas hub airports if it is either priced-out of Heathrow or unable to obtain slots. However on balance, we suggest that Heathrow, as the preferred airport for high-yield traffic, would be in a position to incentivise airlines to switch key routes from the other London airports, mitigating some its financial risk.
- 5.14** Although we are neutral on the merits of the two Heathrow schemes, linking back to our previous findings which suggested that an additional (fourth) runway may be required by the late 2040s, the extended runway proposal can be more easily converted into a four-runway airport than the north west runway option.

Noise and Environment

- 5.15** We are, again, limited in our ability to produce meaningful analysis on these issues and acknowledge their importance to those effected. As would be expected, there are substantial differences in the noise and environmental impacts of expansion at Heathrow and Gatwick, from the number of 'new' people under flight paths to local air quality.
- 5.16** One area in which we can be certain is that aircraft technology will improve markedly over the duration of any forecast period. The table below shows the change in noise between new generation of long-haul aircraft (A380, B787) and aircraft types that

flew regularly in the 1980s and 1990s (DC10, B747-200). Similar changes would be observed if looking at short-haul types.

Table 16: Examples of aircraft noise improvements

Aircraft	Engine	Lateral	Lateral Max	Lateral Margin	Flyover	Flyover Max	Flyover Margin	Approach	Approach Max	Approach Margin	Noise chapter
A380-800	Trent 972-84	94.8	103	8.2	93.2	106	12.8	98	105	7	4
B747-200	JT9D-7R4G2	101.3	102.8	1.5	102.4	105.9	3.5	106.8	105	-1.6	3
B787-8	Trent 1000-G	91.7	100.9	9.2	89.1	98	8.9	96.8	104.3	7.5	4
DC-10-10/15	CF6-6D	98	101.5	3.5	98.6	101.8	3.2	106	104.8	-1.2	3

Source: CAA (except Approach Margin)

5.17 The Chapter 4 standard required all new aircraft type designs to have a cumulative margin of 10 EPNdB or more as of 1 January 2006. In other words, the Chapter 4 limit represents an increase in stringency of 10 EPNdB (cumulative) relative to the Chapter 3 limit. Chapter 2 aircraft were banned from European airspace in 2002 and it is not unforeseeable that Chapter 3 will face a similar fate at some stage in the future. With airlines having to renew their aircraft in order to meet with the certification requirements, it can be assumed that the noise footprint at either Gatwick or Heathrow will not increase at the same rate as passenger demand.

5.18 Noise is normally the biggest concern with airport expansion, and particularly so at Heathrow since it affects so many people. On the other hand, aircraft noise is not a new issue and has been falling since the days of the early jumbo jets and Concorde. The ultimate judgement – which will be difficult and controversial - is whether the future of UK global connectivity should be decided on this issue, or whether a combination of further reductions in engine noise, better flight patterns, improved mitigation and compensation for those most immediately affected can be found which enables a fair balance with the wider needs of London and the country.

Appendix I: Route Additionality at Gatwick

2014 v 2004

The analysis below shows new destination cities (as defined by IATA) flown from Gatwick with flight frequency greater than 355/year categorised by primarily business (B), primarily leisure (L) and mix (M), showing the overlap with Heathrow. For example, Enfidha, Hurghada, Marrakech and Sharm el-Sheikh are new to Gatwick, not flown from Heathrow and primarily leisure destinations; Moscow is new to Gatwick, was already flown from Heathrow and is primarily a business route.

Yr	From	Continent	To	Additional in 2014 over 2004		
				LGW Unique	LHR Overlap	Route Type
2014	LGW	AF	Enfidha	Y		L
2014	LGW	AF	Hurghada	Y		L
2014	LGW	AF	Marrakech	Y		L
2014	LGW	AF	Sharm el-Sheikh	Y		L
2014	LGW	AS	Moscow		Y	B
2014	LGW	CB	Saint Lucia	Y		L
2014	LGW	EU	Antalya	Y		L
2014	LGW	EU	Basel/Mulhouse		Y	B
2014	LGW	EU	Berlin		Y	B
2014	LGW	EU	Bodrum	Y		L
2014	LGW	EU	Budapest		Y	B
2014	LGW	EU	Catania	Y		L
2014	LGW	EU	Cork		Y	M
2014	LGW	EU	Dalaman	Y		L
2014	LGW	EU	Dubrovnik	Y		L
2014	LGW	EU	Düsseldorf		Y	B
2014	LGW	EU	Fuerteventura	Y		L
2014	LGW	EU	Gran Canaria	Y		L
2014	LGW	EU	Hamburg		Y	B
2014	LGW	EU	Helsinki		Y	B
2014	LGW	EU	Ibiza	Y		L
2014	LGW	EU	Innsbruck	Y		L
2014	LGW	EU	Irakleion	Y		L
2014	LGW	EU	Istanbul		Y	M
2014	LGW	EU	Kerkyra	Y		L
2014	LGW	EU	Kiev		Y	M
2014	LGW	EU	Knock	Y		L
2014	LGW	EU	Lanzarote	Y		L



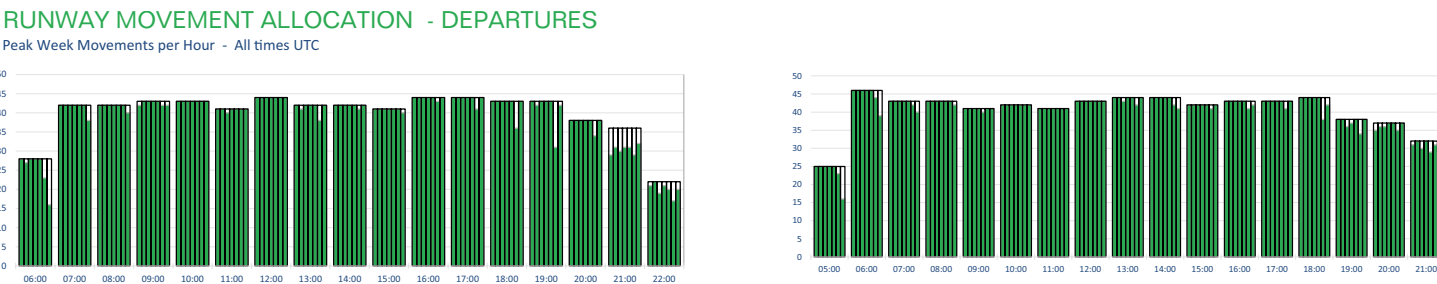
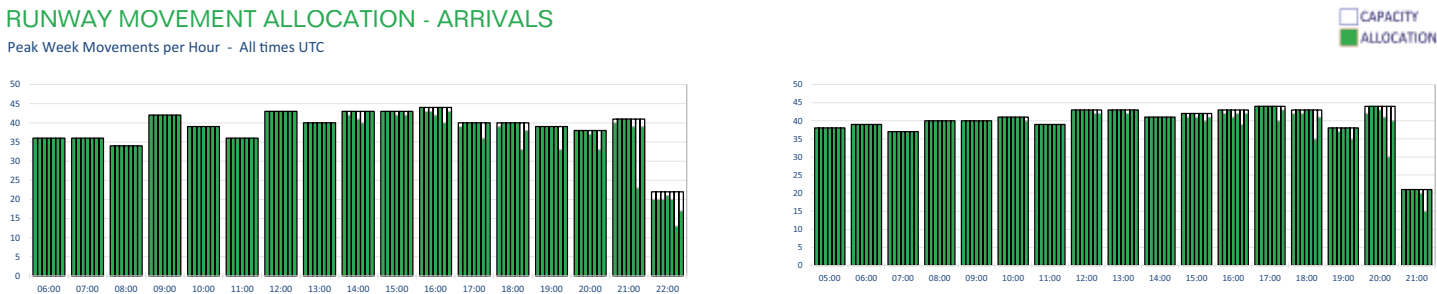
				Additional in 2014 over 2004		
Yr	From	Continent	To	LGW Unique	LHR Overlap	Route Type
2014	LGW	EU	Larnaca		Y	L
2014	LGW	EU	Lyon		Y	M
2014	LGW	EU	Menorca	Y		L
2014	LGW	EU	Montpellier	Y		M
2014	LGW	EU	Murcia	Y		L
2014	LGW	EU	Oslo		Y	B
2014	LGW	EU	Reykjavik		Y	M
2014	LGW	EU	Riga	Y		M
2014	LGW	EU	Salzburg	Y		M
2014	LGW	EU	Sevilla	Y		M
2014	LGW	EU	Sofia		Y	B
2014	LGW	EU	Split	Y		M
2014	LGW	EU	Stockholm		Y	B
2014	LGW	EU	Tenerife	Y		L
2014	LGW	EU	Thessaloniki	Y		L
2014	LGW	EU	Valencia	Y		L
2014	LGW	EU	Vienna		Y	M
2014	LGW	NA	Cancun	Y		L
2014	LGW	NA	Las Vegas		Y	L

Appendix 2: Slot Availability at Heathrow, Gatwick, Stansted and Luton

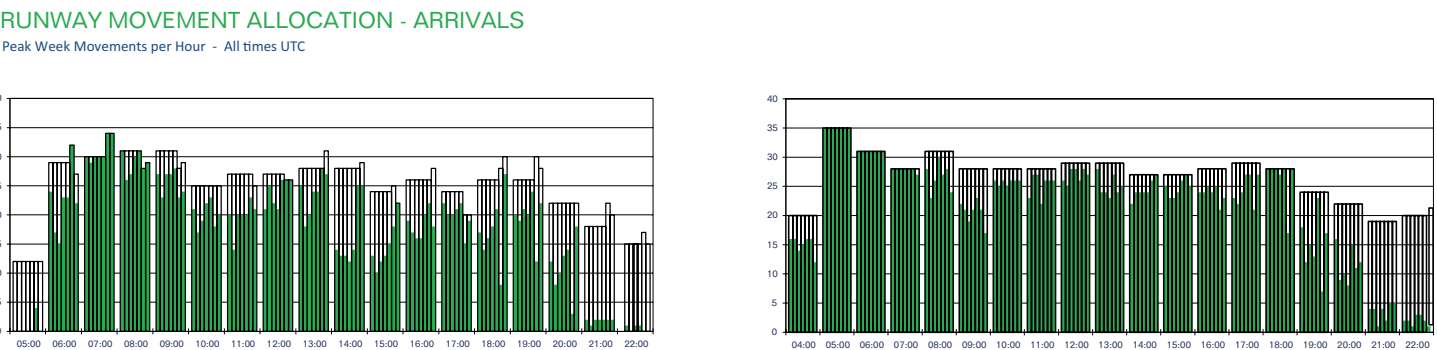
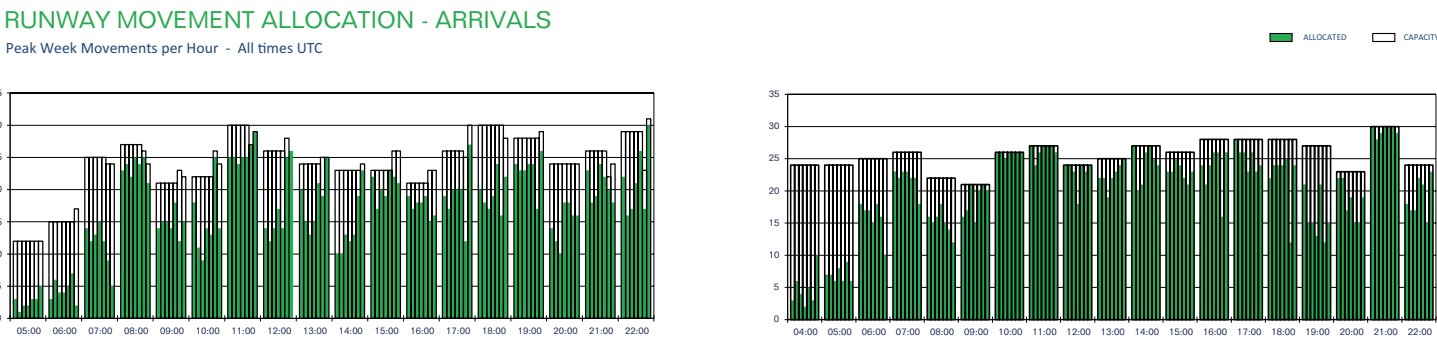
WINTER SCHEDULE

SUMMER SCHEDULE

HEATHROW



GATWICK



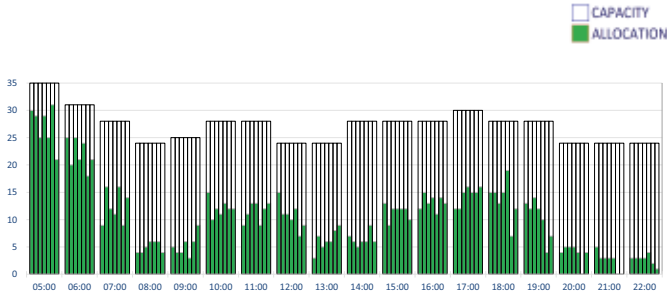
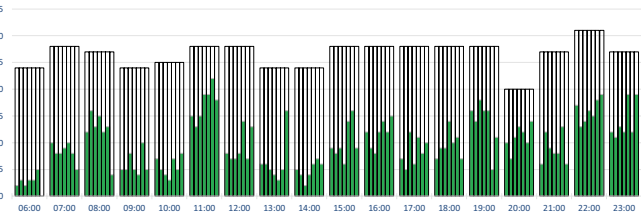
WINTER SCHEDULE

SUMMER SCHEDULE

STANSTED

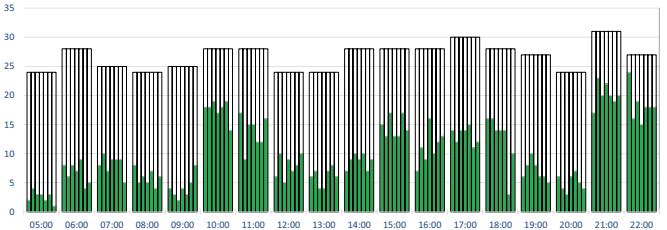
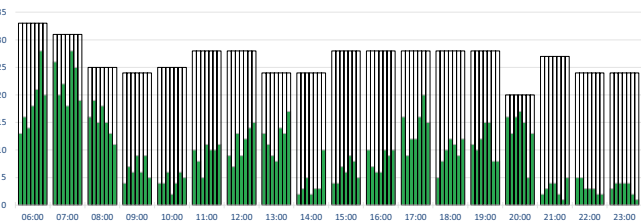
RUNWAY MOVEMENT ALLOCATION - ARRIVALS

Peak Week Movements per Hour - All times UTC



RUNWAY MOVEMENT ALLOCATION - ARRIVALS

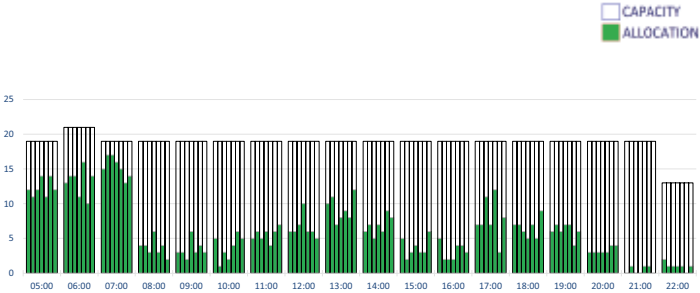
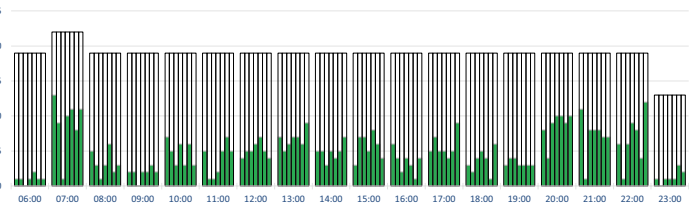
Peak Week Movements per Hour - All times UTC



LUTON

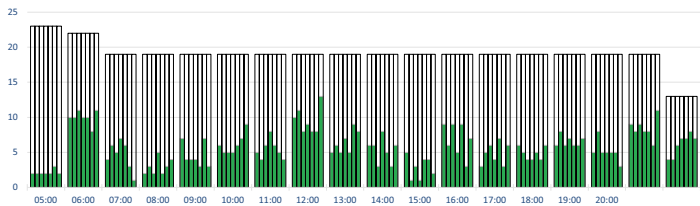
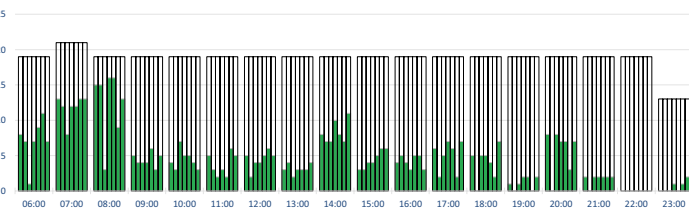
RUNWAY MOVEMENT ALLOCATION - ARRIVALS

Peak Week Movements per Hour - All times UTC



RUNWAY MOVEMENT ALLOCATION - ARRIVALS

Peak Week Movements per Hour - All times UTC



Appendix 3: Literature Review and Case Studies

There have been a number of publications and press releases in the lifetime of the Airports Commission from some of the key players in the airport expansion discussion. Our review of these concentrates on the following:

- Airline views on runway expansion at Heathrow and Gatwick (British Airways, EasyJet, Ryanair and Norwegian)
- Credit rating agency standpoint (Moody's)
- Case studies of the impact of higher charges on traffic at various airports (AENA, Belgrade, Gatwick and Stansted)

Ryanair stance on Heathrow, Gatwick and Stansted

Briefings and interviews given by Michael O'Leary, CEO of Ryanair – January 2015

Interviewed about Ryanair's future business strategy, Michael O'Leary set out radical plans to fly British Airways and Virgin Atlantic passengers to European and domestic destinations on Ryanair aircraft. His 'pitch' to British Airways and Virgin is to fly their long-haul transfer passengers into Heathrow, Stansted and Gatwick using his own Ryanair planes for short-haul connecting flights.

He stated that the plan could apply to other major international airlines in transatlantic flights and those to the Middle East and Asia – and predicted that budget airlines acting as feeder flights would in future become the norm.

O'Leary pointed out that a constraint to the proposal could be the passenger liability if flights were delayed and connections missed. O'Leary said major carriers would have to pick up the tab. He said: 'We don't have a lot of funding available for compensation. We would expect that the long-haul planes would accept the passenger liability issue.' The plan would also be an interim measure as Ryanair itself one day plans to enter the long-haul market but has found it hard to acquire the right planes. Ryanair wants 30-50 aircraft over five years to enter the long-haul market.

O'Leary predicted that within five years other low-cost airlines will follow this model and added: 'Low-cost carriers can do a lot more of the feeding of long-haul flights.' Ryanair is undergoing a makeover to become a 'nicer' airline with a focus on customer service. O'Leary said: 'We were maybe a little bit cheap and nasty. We have spent a lot of time and effort trying to be cheap and a little bit better.'

On London's expansion, O'Leary claimed the best solution to expansion issues for London's airspace would be to build new runways at all three London airports and residents 'shouldn't be able to block expansion... it is ridiculous' he said.

Another point of potential entry for Ryanair to operate from Heathrow could come as a result of the bid by International Consolidated Airlines Group (IAG) to acquire Aer Lingus. O'Leary has signalled his company could buy any Heathrow landing rights



that are put up for sale as remedy slots if IAG makes a successful bid.

O'Leary believes that if such a deal were to go ahead EU competition regulators could demand that IAG offload some of its routes between Ireland and Heathrow airport, as both its subsidiary British Airways and Aer Lingus operate these services. "We would be willing to participate in that," he said, adding that BA was prepared to take similar steps when Ryanair made its third bid to buy Aer Lingus in 2012. At that time BA agreed to buy 20 of Aer Lingus's 24 landing slots at Heathrow to allay the European Commission's concerns that a Ryanair takeover would reduce competition on flights between Ireland and Britain.

It is worth noting Ryanair appears to be actively ruling-in the prospect of entering the long-haul market with enough aircraft to offer a range of European origins. At present, they are the only other low-cost airline to state this ambition, although it is not new. O'Leary has made similar claims several times in recent years. The airline suggests it would not rule out operating from Heathrow, while supporting expansion at all airports. The idea that long-haul carriers would pick up compensation for missed connections could be replaced by an airport-funded connecting guarantee like the Gatwick Connect service.

There seems to be some contradiction between the claim that low-cost carriers will feed long-haul airlines in the future and the aspiration to fly long-haul themselves.

Norwegian views on Gatwick and Heathrow¹⁴

Norwegian has said it would consider opening long-haul routes from Asia to London Gatwick to feed traffic onto its planned transatlantic operations if the UK airport can secure approval to build a second runway. Bjorn Kjos, chief executive of Norwegian, said Gatwick could be used as a mini hub for long-haul Asian routes connecting to its services to New York, Fort Lauderdale and Los Angeles which begin this summer.

"Gatwick is ideal for long-haul, low-cost operations because there are so many low-cost carriers in Gatwick; Ryanair, EasyJet and Norwegian, people can self-connect so it is ideal for a low-cost operation.

Kjos warned that this could only happen if Gatwick was allowed to build a new runway as the current one is at almost full capacity and much of the demand from emerging economies in Asia will come from those wishing to fly long-haul, low-cost.

"I think it [preventing Gatwick's expansion] will really have an impact on everybody. What we fear will be the big impact on London is especially impact on passengers coming from the Far East, actually you are talking about such a high number of passengers you need more than one airport to take care of those passengers," he said.

Kjos noted that both Gatwick and Heathrow have been shortlisted as candidates for a new runway to deal with the lack of capacity around London, but it is expected that only one will be given permission to grow.

Kjos concluded that both airports should be allowed to expand. "Six times as many people living in the Far East as they do in the West, China and India are growing and as the global economy starts to even out we will reach a point where they will have

the chance to fly, you already have 100 million people today flying out of China on vacation for instance.”

In common with Ryanair, Norwegian sees competition between airports as a key driver of reducing airport charges. The airline already operates some low-cost long-haul from Gatwick and is a clear supporter of the Gatwick Connect concept whereby the airport facilitates connections between carriers.

Wizzair at Belgrade Airport

In April 2014, Wizz Air, the largest low-cost airline in Central and Eastern Europe said that it would halve its capacity in Belgrade by closing routes to Oslo (Torp airport) and Brussels (Charleroi airport) and reducing the number of flights to other destinations. Wizz Air said the decision was made after airport costs were increased by 40%, which made the Belgrade airport the most expensive in the Wizz Air’s network of flights. The aircraft from the Belgrade base were transferred to the Latvian capital of Riga. The airline stated that “if Belgrade airport reduces costs and becomes competitive with other less expensive airports in the region, it will be possible to compensate for the loss resulting from halving Belgrade capacity”.

IAG Viewpoint Daily Telegraph - Financial Times – October 31st 2014

Willie Walsh: ‘No business case’ to support a second runway at Gatwick

Willie Walsh, the head of British Airways’ parent company IAG, ruled out supporting a second runway at Gatwick, even if it is given the go-ahead by policymakers, arguing that he doesn’t believe there is a business case to support expansion at Gatwick, suggesting there is insufficient demand from airlines for extra capacity at Gatwick. Walsh said, “I would not support a runway at Gatwick because I don’t think there is a business case to support it,” the airlines boss said.

Mr Walsh said his objections are “principally based on the demand environment” but he warned that BA would also strongly resist any increase in charges to fund expansion, either at Gatwick or at Heathrow. “I don’t think it [demand] is as strong as Gatwick would argue,” he said. He warned both airports that they would have to demonstrate “how charges [for airlines] will reduce rather than increase”.

British Airways has stayed largely ‘under the radar’ since the Airports Commission was established. Having fully backed Heathrow expansion before the 2010 general election and seen Government reject the expansion approval, it is perhaps unsurprising. Recent moves to acquire Irish carrier Aer Lingus¹⁵ could be seen as a contingency move to safeguard its transatlantic business in the long term. In the event that it is unable to grow from its London Heathrow hub, we would see the Heathrow network being primarily point-to-point into London, and connecting traffic being pushed over an enlarged Dublin network.

easyJet questions case for new runway at Gatwick airport¹⁶

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15 <http://www.bbc.co.uk/news/business-30978683>

16 Financial Times – November 18th 2014



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Moody's Global Credit Research¹⁷

A new runway will have mixed credit implications for London's airports

Moody's issued a credit research report which argued that adding a new runway at either Heathrow or Gatwick would have conflicting credit implications for London's three largest airports.

The Moody's report said that "A new runway will have mixed credit implications for London airports. A runway at Heathrow would allow the airport to benefit from growth in future traffic volumes, and a new runway at Gatwick would not take significant traffic from Heathrow. Gatwick, on the other hand, would be vulnerable to airlines switching to an expanded Heathrow, whilst a new runway at Gatwick would increase its airport charges and could alienate its price-sensitive airlines."

A runway at Heathrow would allow the airport to accommodate expected growth in London passenger traffic. By 2050, Heathrow would be able to accommodate between 133 and 149 million passengers, which is almost double current traffic levels. While Heathrow's hub airport status could come under pressure from a new runway at Gatwick, it would remain London's largest airport as it would still be expected to handle around 20 million more passengers per annum than Gatwick by 2050.

Moody's expects that Gatwick will be more vulnerable to competition if Heathrow were to build a new runway as it would be at risk of losing scheduled airline traffic to Heathrow, where carriers can typically earn more per passenger mile. Conversely, the construction of a Gatwick runway would almost double aeronautical charges at the airport, putting it at a huge competitive disadvantage to Stansted, which is its main competitor in the low-cost airlines segment.

Moody's notes that a Heathrow runway would not affect Stansted, as it is unlikely to experience significant competition from Heathrow, given its specialisation in servicing low-cost carriers, which are entirely absent from Heathrow.

It is worth noting that Moody's doesn't rate Gatwick Airport's debt and the other two rating agencies, Fitch and Standard & Poors, have not published on Gatwick. However, we tend to agree with the themes identified within their report.

AENA: high airport charges deter traffic at Spain's airports¹⁸

CAPA examined traffic trends at AENA and considered whether they have been affected by higher airport charges. The analysis suggests that there is a clear link and so action to reverse falling traffic numbers through lower charges seems a logical step.

Data from CAPA's Airport Charges Database (supplied by Air Transport Research Society) show that combined landing and terminal charges across a range of aircraft types at Madrid, Spain's largest airport, increased by around 60% or more in 2013 versus 2012. Airlines at Barcelona, Spain's second largest airport, saw increases of 50% or more in these charges in 2013.

The 5.0% drop in passenger numbers at AENA airports in 2012 compared with an increase of 4.4% at the world's airports (source: Airports Council International). Although Europe's growth was slower than the global average, reflecting the EU's economic weakness, Europe's airports still handled 1.8% more passengers in 2012 than in 2011.

Spain's airport passenger decline made it by far the worst performer among Western Europe's five biggest countries. The 5.0% drop in Spanish airports compares with a 1.2% fall in Italy and positive growth in the UK, Germany and France.

The CAPA report concludes "In this context, it becomes apparent that AENA's airport charge increases have hit passenger numbers hard".

Ryanair closed 11 routes to Madrid and four to Barcelona El Prat following the Spanish Government's decision to double taxes at the two airports. "Ryanair objects to the Spanish government's decision to double airport taxes at both Madrid and Barcelona airports," said Michael O'Leary, Ryanair chief executive. "Sadly, this will lead to severe traffic, tourism and job cuts at both airports this winter."

easyJet decided to close its Madrid base from the winter 2012/13 season following the increase in charges and moved the eight aircraft stationed at Madrid to other locations in Europe which "will deliver higher returns for the airline". easyJet said returns from the Madrid operation were "below" those of all its other bases, blaming over-capacity in the Spanish market and high airport charges levied by operator AENA. easyJet cut capacity to Madrid by 20% though continued to serve the airport from other bases.

www.flybe.com – May 2013

Flybe announces withdrawal from Gatwick following increase in charges

Following an increase in charges at Gatwick, Flybe announced in May 2013 that it has sold its arrival and departure slots at the airport, to easyJet for a cash sum of £20 million. The seven axed Flybe routes – Newcastle, Jersey, the Isle of Man, Inverness, Guernsey, Belfast and Newquay – flew 550,000 passengers to and from Gatwick in the last financial year of operation.

Flybe said the decision was as a result of the pricing regime applied by the airport's owners to the operators of smaller, regional aircraft which, in Flybe's case, has resulted in a 102% rise over the last five years. Despite Flybe using the Airports Act 1986 to argue to the Civil Aviation Authority (CAA) in 2010 that Gatwick was acting in an anti-competitive and discriminatory manner, the CAA ruled in September 2012 that Gatwick was within its rights to raise their landing fees for smaller aircraft, thus paving the way for Flybe's withdrawal.

Commenting on the departure from Gatwick, Jim French, Flybe's Chairman and Chief Executive said: "No business can swallow such a massive increase in such a short period of time and it is with real regret and some anger that we have made this decision". He added "No business can swallow-cost increases of more than 100% over five years and Flybe simply cannot bear such punitive rises. We have therefore taken the very difficult decision to withdraw our services from London Gatwick from 29 March 2014, because of the airport's policy of year-on-year above inflation rises in landing fees for operators of smaller regional aircraft."

This decision was particularly significant for Flybe, as at the time it signalled an end to its operations from the London system.

Ryanair case study – Stansted Airport - Response to increase in airport charges

Stansted passenger traffic fell for four successive years after reaching a peak of 23.8m passengers in 2007. The decreases were driven to a large extent by Ryanair downscaling its operation at the airport. In 2007, Ryanair's 10 year agreement with Stansted, under which they were receiving substantially discounted rates, expired. Stansted moved Ryanair onto rack rates signed in 2007, which effectively doubled the airline's charges.

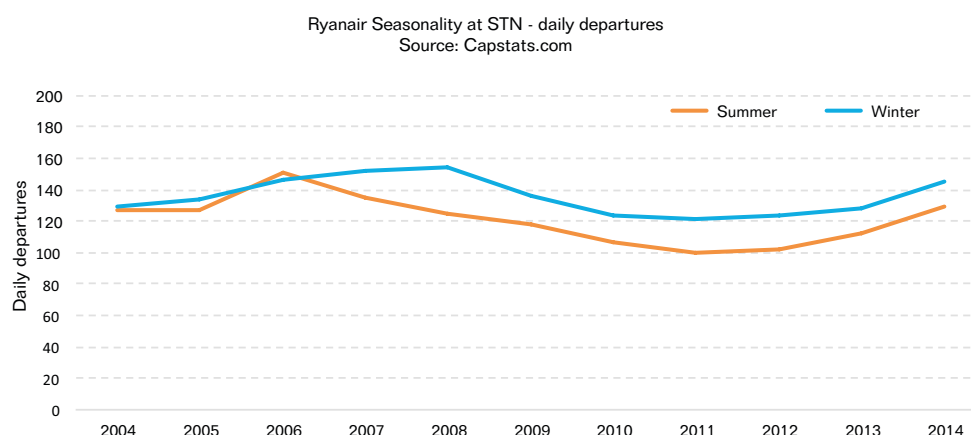
Table 17: Ryanair Passengers at Stansted 2007-2013

Year	Annual passenger (m)	Annual change
2007	23.78	0.4%
2008	22.36	(6.0%)
2009	19.96	(10.7%)
2010	18.57	(6.9%)
2011	18.05	(2.8%)
2012	17.47	(3.2%)
2013	17.85	2.2%

Source: CAA

In response Ryanair reduced its offer by, effectively, 25%. Based aircraft fell from 40 in 2008 to 28 in 2011 and the airline also parked more aircraft over the winter period arguing the increased charges meant routes were no longer profitable over the winter months.

Figure 26: Seasonal profile of Ryanair at Stansted



Source: CAA

In September 2013, following the sale of Stansted to Manchester Airports Group (MAG), the new owners agreed a deal with Ryanair to boost its passenger numbers at the airport by 50% over the next 10 years in exchange for lower airport charges and better facilities. Under the terms of the agreement, which began in April 2014, Ryanair has targets to grow its passenger numbers from 13.2m in 2013 to more than 20m a year by 2023.

This increase represents a quarter of Ryanair's planned growth over the next five years. Ryanair said it would increase the number of aircraft based at Stansted from 37 to 43.

The notable point from the Ryanair case at Stansted is that where the balance of power lies with airlines, they can and will use their strength to secure improved terms with airport operators. This is particularly prevalent where one airline is operating the majority of capacity at an airport, and that airport is within a competitive system. Arguably, easyJet is currently in a similar position at Gatwick whereas British Airways, although operating at a highly constrained site, has less scope to move from Heathrow, where it has a much greater physical footprint.



Author Profile

Peter Hind is Managing Director of RDC Aviation and has over 20 years' experience in the aviation sector, including senior roles in the strategy and network planning team at bmi. He authored the ITC's 2014 report on 'The Optimum Size of a UK Airport Hub'.

Disclaimer

Data for this report has been obtained from a number of sources including the UK CAA, Innovata and Airports Commission documentation and submissions to the Commission. We may have adjusted data in order to maintain integrity and consistency. We have checked external information for obvious discrepancies or errors, however we are not responsible for the accuracy of any data provided by or obtained from third parties.

The company will be pleased to explain the basis of any supporting grounds pertaining to the statements herein, in the event that these are not clearly shown.

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