How Would Expanding BIA Impact Air Passenger "Leakage" From South West Region to South East Airports?

J Birch, Stop Bristol Airport Expansion Ltd, a coalition of the Parish Councils Airport Association, the Campaign to Protect Rural England and Bristol Friends of the Earth, 25/11/09

Introduction

This paper examines the phenomenon of travellers to or from the South West of England using airports outside the region, and in particular those in the South East which are running near capacity, rather than using airports within the region. This is known as "leakage". The paper examines whether the claims by Bristol International Airport (BIA) that most of its expansion will be through reducing this leakage and hence not increasing the total number of air passengers or flights. It also looks at the environmental impacts of addressing such leakage.

In BIA's reports it is assumed that 4.7m people from the South West drive past BIA's door to access airports in the South East, and that therefore these can largely be captured by BIA to fuel its expansion without a net increase in UK air passengers and with a net reduction in car miles. This is in fact a gross oversimplification and ignores major issues to do with surface access routes, possible air routes, viability and catchment.

Summary

- A total of 4.7m passengers from the South West region use airports in the South East each year, 2.8m using Heathrow
- Even if all of the Heathrow passengers were diverted to using BIA instead, this would fall far short of the 4m extra passengers that BIA is aiming to handle after expansion
- It is implausible that more than 650,000 of these would in fact be diverted to South West airports with only around 200,000 of them to BIA, primarily due to insufficient demand in the South West to make the routes these travellers are accessing outside the region viable
- If all of the leakage was stopped it might save 13,700 tonnes of carbon dioxide from cars per year, but if this caused even one extra daily scheduled flight then this would add over 14,000 tonnes of emissions. Stemming the leakage increases total greenhouse gas emissions
- Any extra routes will primarily be used by new customers rather than diverting any leakage
- It is hard to find any routes used by the "leakage" that could be viable from BIA
- At most 111,000 inbound tourists would be diverted from Heathrow to BIA, and this would not increase the total number of inbound visitors to the region
- Most leakage is for long haul routes yet most of BIA's growth will be in short haul no frills routes and hence will not cut the leakage

Data sources

All of the figures used in this report are from public sources. The major publications are:

Civil Aviation Authority (CAA) annual passenger numbers for BIA (www.caa.co.uk)

CAA Passenger surveys covering BIA for years 2000,2003,2008

Additional data from the 2008 survey used to compile the CAA report

Maps and distances from Cloudmade and Google

Leakage in context

Leakage was previously referred to in the Sustainability Appraisal to the draft RSS and the Ekos report 'Informing sustainable aviation policy for the South West' January 2008 commissioned by the South West Regional Development Agency. This matter has since been ignored and not explored further. North Somerset Council Officer Mike Schneider has referred to leakage in an internal memo dated 20 October 2009:

> 'In the Air Transport White Paper it was estimated that 70% of the flights undertaken by residents of the southwest 'leaked' to other regional / national airports. This finding is important, in that it hides the true demand for flights in the southwest and also means that the expansion of the airport does not mean that all additional flights are 'new' (to some extent they are taking place at other airports). The leakage to other airports adds to private journey miles, the environmental costs of which are also 'hidden'. However, even with the expansion there will still be significant leakage; at best the expansion may draw some of the leakage back to the southwest.'

SBAE request that the Council look at leakage independently of the Air Transport White Paper. From our examination of the data it is clear that not only is it implausible that a significant fraction of the extra passengers at BIA will be drawn from the leakage, but also that cutting the leakage by adding extra flights causes significant environmental damage through increased emissions.

We believe this merits close examination by councillors and officers as it undermines key arguments used by BIA to justify the expansion.

Leakage to the South East

According to the CAA 2008 Passenger Survey report, a total of 4.7m passengers using the South East airports (Heathrow, Gatwick, Stansted, Luton, London City) were journeying from or to the South West region. By far the largest share were to Heathrow (2.8m) followed by Gatwick (1.1m). BIA contest that much of their expansion by 4m extra passengers will come through reducing this "leakage". We examine how plausible this is below.

We examine Heathrow in detail as the majority of the leakage to the South East goes to Heathrow. The map below shows the flows of passengers between the South West and Heathrow, showing the numbers per county area.

Illustration 1: "Leakage" of South West passengers to Heathrow in 2008 (maps.cloudmade.com)

It is normally assumed that someone would choose to fly from a more local airport, for reasons of a shorter travelling time and potentially a lower cost, but this is too simple a model to understand leakage.

There are a variety of reasons that might cause a person to fly from a South East airport rather than a regional one:

1) route is not served by regional airport
2) similar route is served but overall travel time is higher
3) route frequency is too low causing extended trip length
4) airfare or other costs are higher
5) favoured airline (or affiliate network) are not present at regional airport
6) require reliable onward links which are not available from no-frills operators
7) more easily accessed by public transport
8) fits in with other parts of plan eg combining with visit to offices in London
9) travel time to LHR shorter (for travellers near the M4 in eastern part of region)
10) the ease of onward transport links (not having a car in the car park)

It would of course be argued that some of these factors could be solved by expanding BIA. For instance if a given destination is not available then it could be added at BIA. But this is an oversimplification.

For a route to be viable there must be sufficient passengers within the catchment area of the airport to make the route economic. For a once per week service the threshold is around 14,000 passengers per year, and for a daily service the threshold is around 100,000 passengers per year for short-haul and around 90,000 for long haul.

In addition, the routes must fit into the overall schedule of the airline so that the plane can be in use most of the time. It is harder to make weekly long haul services fit than daily short haul ones.

Some direct routes are not possible from BIA due to the length of the runway. The realistic limit of flight operations from BIA with an economically full plane is around 3,600 miles. This reaches the Eastern seaboard of the US, and Dubai, but it cannot reach South Africa, China, Japan or the Western US. This range can of course be extended by refuelling, but this adds considerably to the flight time and its environmental impacts (as much fuel is burned in the take-off and landing phases, as well as diverting from the direct line to the refuelling airport).

For a route to be attractive to business users it needs sufficient frequency to cope with varying work schedules. This means for short haul flights at least a daily frequency is required and preferably twice daily (so you can fly out in the morning and back at night after a meeting). Without this frequency at least one overnight stay is forced which adds to costs and impacts business efficiency. For long haul routes, a daily frequency is required to avoid excessively long stays.

These frequencies in turn imply at least a certain number of passengers need to be available from the catchment to make the route viable.

If this number of passengers was not entirely from the leakage then this means the total number of passengers would rise, and unless the cut in leakage was sufficient to remove a service from Heathrow then the total number of UK flights would also increase.

Leakage to Heathrow

From the data used by the CAA to prepare the 2008 Passenger Survey report, we can see that around 30% of passengers are on business and the rest are on leisure. This split must be taken into

account when judging the attractiveness and viability of a new route from BIA.

This is similar to the picture for each of the counties of the region, although Cornwall and Gloucestershire have smaller amounts of inbound business visitors through Heathrow.

With 6.2m passengers in 2008, BIA had 53 scheduled routes carrying more than 10,000 passengers per year. From this we might assume that at 10m passengers the airport might be aiming to have 85 such routes, an increase of 32.

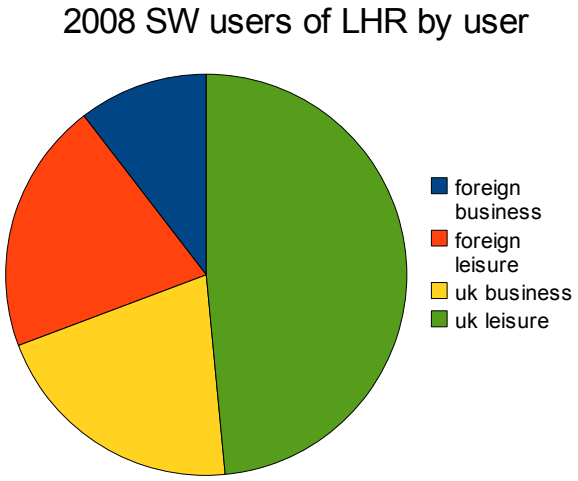

Illustration 2: SW users of Heathrow by user type

Even if BIA managed to create viable routes that captured all of the passengers from the top 50 routes for SW users of Heathrow, this would only amount to 1.7 million passengers, which is far short of the 4m extra passengers BIA plan for, and far more routes than implied by the plans.

We can look more closely at the far end airports accessed through Heathrow to see whether it is plausible that a route from BIA might be possible or viable, and thus if 32 extra routes can be identified.

We can use the following criteria to try to identify these destinations:

1) they must be within 3,600 miles of BIA due to the limited length of the runway, otherwise a refuelling stop is needed
2) they must demonstrate sufficient demand through the existing leakage to make a plausible commercially viable route
3) they must be sufficiently distinct from existing routes at BIA that they might actually attract people who currently do not use the existing routes
4) they may not be to destinations that have recently been tried and shown to be uneconomic from BIA
5) BIA's plans show only one or two new daily scheduled long-haul routes[1] (see later)

In addition we can potentially see whether it is plausible that the actual catchment of BIA, which is dominated by Avon and Somerset, would be sufficient to make the routes viable rather than relying on catching all of the demand from the South West region.

The following shows the top 20 “far ends” by passenger numbers, for flights taken from Heathrow by South West passengers, in 2008:

1 The economic impact report shows 155,000 scheduled long haul passengers in 2008 rising to 249,000 in 2020. However the CAA annual report shows only 90,159 passengers on the only scheduled long haul route to Newark. It appears BIA has made an error in its report.

City	Passengers	Too Far?	Served?
Hong Kong	96375	yes	
New York (JFK)	80426		yes – via Newark
Bangkok	59922	yes	
Dubai	57893		
Tokyo	52389	yes	
Munich	51774		previously and failed
Johannesburg	47304	yes	
San Francisco	46860	yes	
Los Angeles	46281	yes	
Washington	46162		
Toronto	45954		
Auckland	44639	yes	
Copenhagen	44267		
Zurich	43351		previously and failed
Larnaca	41357		yes
Sydney	39346	yes	
Brisbane	38939	yes	
Frankfurt	35560		previously and failed
Dusseldorf	33378		previously and failed
TOTAL	952177		

The routes to Europe (Munich, Zurich, Frankfurt and Dusseldorf) are predominantly business routes and have proven to be uneconomic due to a lack of outbound tourist customers. Both British Airways and Lufthansa have failed to make these routes work.

If we process the rest of the major destinations eliminating those that are too far away, assuming that all of the current users of JFK transfer to using Newark from BIA, and the total long-haul passengers reach 250,000 as shown in the Economic Impact report, which effectively just adds Dubai as a new destination, then the top 134 routes using LHR yield only 24 candidates for Bristol.

These possible new routes give only 890,000 passengers, implying that the leakage to Heathrow could at most be cut by this amount.

But even this is optimistic, because some of the routes carry very few South West passengers. If we assume that only services that have at least 1 return flight per week would be contemplated, then no route with less than 14,000 passengers per year would be considered. This only yields 650,000 passengers from 11 new destinations, where only 272,000 of these are to destinations not already served by BIA.

To attract many of those passengers away from Heathrow, particularly the business customers who make up 31% of the travellers, the services would need to be daily. This implies a minimum of 100,000 passengers per year. None of these routes approaches this level. If we set the bar lower at 50,000 passengers on any route, only two routes conform: JFK and Dubai.

It would be argued that by offering more of these routes from BIA the actual number of passengers

using the services would be higher than currently use Heathrow, but of course this would be extra stimulated demand and would not increase the impact upon the leakage to Heathrow.

The top new destinations that would appear to offer at least a weekly route by capturing the Heathrow leakage are:

City	**Passengers**
Dubai	57893
Copenhagen	44267
Tel Aviv	30804
Athens	29814
Istanbul	27364
Cairo	19939
Oslo	17760
Kefflavik	15645
Stuttgart	14479
Algiers	14269
TOTAL	272234

It is questionable how many of the passengers from Heathrow to existing destinations served by BIA would change to using BIA, as they are already seemingly making a conscious decision to use Heathrow for factors other than the route not being available.

It is clear from this that at most 650,000 of the "leakage" of people from the South West to Heathrow could be diverted to using BIA instead, or less than 14% of the total reported. This is also only 17% of the target for the increase in passengers at BIA. The vast majority of the leakage would therefore continue and **most of the passenger growth envisaged by Bristol Airport is in fact from extra stimulated local demand and not just changing passengers from using other airports.**

BIA serves links to Newark, Paris and Amsterdam, all large hubs. From the large amount of South West people using Heathrow to access long-haul destinations it is clear that they prefer direct routes rather than transferring flights at a hub, and this is unlikely to change in future. Without Bristol Airport being able to directly reach many long-haul destinations it is unlikely that much of the leakage to Heathrow could ever be addressed.

Most of the "leakage" passengers are on long haul routes and if BIA tried to capture these it would mean each plane only doing one return trip per day. Yet BIA makes its money out of the number of planes and passengers it handles, so it makes far more money if a plane makes three or four return trips per day which in turn means the short haul no-frills business model and not the long haul full service one. The planned increase of 4m passengers will be dominated by short haul no-frills business serving outbound tourism and thus will have little impact upon leakage.

Inbound tourists

For inbound passengers, we need to assume a similar set of priorities exist when choosing which airport to use, but based in their home country. For noth inbound and outbound leisure passengers the choice of destination may be generic eg "somewhere sunny" or "somewhere in the south of France" or "somewhere in the English countryside" but they are still quite likely to prefer to travel from their local airport. This means that to capture a significant fraction of the inbound passengers

to the South West region that use Heathrow, potentially a very large fraction of Heathrow's routes would need to be replicated by BIA.

In 2008, the 287,700 foreign tourists[2] using Heathrow to access the South West came from 143 different source airports. To capture even half of these, BIA would have to add at least 19 extra destinations.

The top 19 source airports are:

Airport/City	**Round Trips**	**Distance to BIA**	**Comment**
Toronto	16080	3470	
Johannesburg	11461	6040	too far
San Francisco	10459	5304	too far
Brisbane	9597	10353	too far
Taipei	8410	6169	too far
Tel Aviv	7385	2321	
Melbourne	7093	10598	too far
Hong Kong	6990	6079	too far
Sydney	6953	10660	too far
Larnaca	6744	2130	already served
New York	6375	3360	Newark already served
Auckland	5562	11430	too far
Dusseldorf	5454	411	already served and failed
Zurich	5272	575	already served and failed
Bucharest	5165	1406	
Munich	5016	680	already served and failed
Dubai	4974	3516	
Frankfurt	4538	503	already served and failed
Edmonton	4326	4187	too far
TOTAL	137854		

But, as can be seen, many of these top source airports are too far away to be served from BIA's runway or within the schedule of no-frills operators, several are already served and others have been served and subsequently dropped as they proved to be uneconomic.

Whether an aggressive marketing of the South West in the areas served by these airports could improve the inbound tourist flows is unclear, but up to now it has either not been tried or not succeeded. The costs of such a publicity drive would rise sharply with the number of areas needing to be addressed.

If we eliminate source airports that are substantially above 3,600 miles from BIA, then we need around 47 extra routes to capture inbound demand of 288,000 passengers per year, only 8% of the extra passengers BIA is planning to serve.

2 there were 575,400 such people taking flights, we assume here that equates to half as many round trips

If we eliminate routes that have already been tried and been found to be uneconomic, then we get around 244,000 extra passengers for 26 extra routes. It should be noted that this includes 104,000 passengers to airports already served by BIA – there is no guarantee that they would in fact transfer as there are obviously reasons that they do not currently use BIA in preference to Heathrow.

According to the BIA economic assessment report, the airport plans to move from having 155,000 scheduled long haul passengers in 2008 to 249,000 in 2020. Thus they are at most expecting one more route comparable to the existing Newark route. If we allow for only one new long haul route in our analysis of inbound tourists then we get only 183,000 extra inbound passengers from 14 extra destinations, with the smallest of these delivering less than 800 passengers per year.

Of course the airlines would implement routes for the total number of passengers, not just those inbound. If we revisit the routes examined for the total impact upon leakage we find only 111,000 foreign tourists might be brought in by 11 new destinations. Of course these 111,000 tourists already visit the south west, so diverting them through BIA does not increase the total number of visitors.

Only 15% of the total inbound tourists to the South West region come through BIA, the rest come from Heathrow, Gatwick and by sea. It is clear that the planned expansion is unlikely to significantly increase the number of inbound tourists, and may only marginally do so through diverting traffic from Heathrow.

Travel times

Not all of the South West region is closer to BIA than it is to Heathrow. Using the breakdown of passengers from the CAA survey of 2008 we find 7 districts out of 51 where the travel time to Heathrow is less than that to BIA (Kennet, Purbeck, Salisbury, Poole, East Dorset, Bournemouth and Christchurch). All of these can make use of the M3 rather than the M4 to access Heathrow.

There are 13 districts that are no more than 30 minutes further from Heathrow than they are from BIA, and 22 that are no more than one hour more distant. Given the greater choice available from Heathrow it is easy to see why these passengers are likely to continue to use the larger airport.

If all passengers that travel to points nearer to BIA than to Heathrow swapped to using BIA, then the road passenger miles saved would be around 145m miles per year, for 2.3m passengers. But as we have seen above, in fact only 650,000 of the total passengers are liable to be diverted due to other factors. This would reduce the saving in road passenger miles to 42.3m miles per year. See the emissions section below.

It should be noted that the proportion of passengers reaching Heathrow from the South West by public transport is 41.7% and reaching BIA is 8%[3] . Taking into account this higher use of public transport for Heathrow, and average car occupancy, we can estimate the amount of saved car miles per year might be 11.9m car miles if all of the 650,000 passengers mentioned above were captured by BIA.

Catchment

It has been assumed by BIA that passengers from the South West would naturally prefer to use BIA than to use Heathrow. Another element that makes this an inaccurate view is the catchment of the airport, that is the area that naturally sources customers to the airport. As we have seen, the Dorset area is closer to Heathrow in terms of travel time than it is to BIA, and parts of Wiltshire are at a very similar travel distance.

It is likely that the Dorset areas would naturally prefer to use Heathrow for more distant flights, and

3 in 2008, 15% of BIA's passengers used public transport, according to the CAA survey, which may distorted by low sample sizes. BIA only claims 8% yet relies on other figures from the sdame CAA report

Bournemouth or Southampton for no-frills short-haul flights. Residents of eastern Wiltshire are very likely to prefer Heathrow for longer distance flights or ones that do not fit the no-frills model (eg business destinations with little attraction to the outbound tourist).

The greatest travel times are saved for those travelling from Cornwall and Devon, yet many of these passengers will be travelling along the M5 and as a consequence right past Exeter airport. However, Exeter Airport also has plans to grow considerably, does not have surface access constraints and has a slightly longer runway.

From this we can see that the real catchment area for BIA is dominated by Avon and Somerset. If we reassess the source of passengers with respect to BIA's current catchment patterns, but assuming that the far-end airports chosen are similar across the region, we find that of the 2.8m South West passengers using Heathrow, the share that matches to BIA's profile is only 418,000 or 15%. This would imply that the possible reduction in the leakage if BIA expanded would be insignificant.

Similarly it means that the likely savings in passenger road miles would be around 9m road miles per year, which equates to 3m car miles, taking into account car occupancy and public transport use.

Other airports in the region have plans to expand, notably Bournemouth, Exeter and Newquay. It is likely that some of the current leakage to Heathrow would go to these airports if routes were introduced that attracted some of that demand which currently need to travel to Heathrow or even to Bristol. Likely destinations that might get at least weekly services at these airports might include New York, Munich or Dubai, with a possibility that one of these airports might offer a Far Eastern destination such as Hong Kong. It is highly unlikely that more than one regional airport could sustain a Far East route, due to insufficient demand, but the other airports are less constrained by the runway length.

Airport	**Runway length in metres**
Bristol	2011
Bournemouth	2271
Exeter	2083
Newquay	2744
Heathrow	3660

On this issue, the BIA planning application has a report by Aviation Economics that states:

> AE anticipates that some of the aspirations Bristol has of providing long haul services may be curtailed by their short runway of 2,000m. The length of Bristol's runway is a limiting factor for some widebody aircraft types. … We would expect that if an A330-200 could operate into Bristol, it would have to do so on a severely payload restricted basis in order to make the flight to Dubai without a tech [refuelling] stop. … While the 787 has yet to take first flight, we are confident that the smallest version, the 787-8, will be able to operate from Bristol, it may be payload restricted based on weather conditions and distance of the route. Boeing has confirmed to us that they expect the 787-8 to be able to cover markets of approximately 5,000nm from Bristol under normal operating conditions.

And implies that the only new long-haul route services considered up to 2012 are an increase in the Newark frequency or a four flights per week service to Dubai. Beyond this the only suggested possible routes are Atlanta, Chicago, Boston and Abu Dhabi. The current leakage to all of these destinations is:

City	Leakage Passengers 2008
New York	80426
Dubai	57893
Boston	30604
Chicago	17096
Abu Dhabi	11624
Atlanta	3144
TOTAL	200787

Yet it is unlikely that much of the New York leakage would be captured as it already exists despite the presence of the Newark flight which has spare capacity. The Dubai flight might be possible but the demand shown by the leakage is low and would rely upon either being infrequent or stimulating extra demand. The 787 once introduced might allow flights of up to 5750 miles (but limited by weather conditions and payload) .

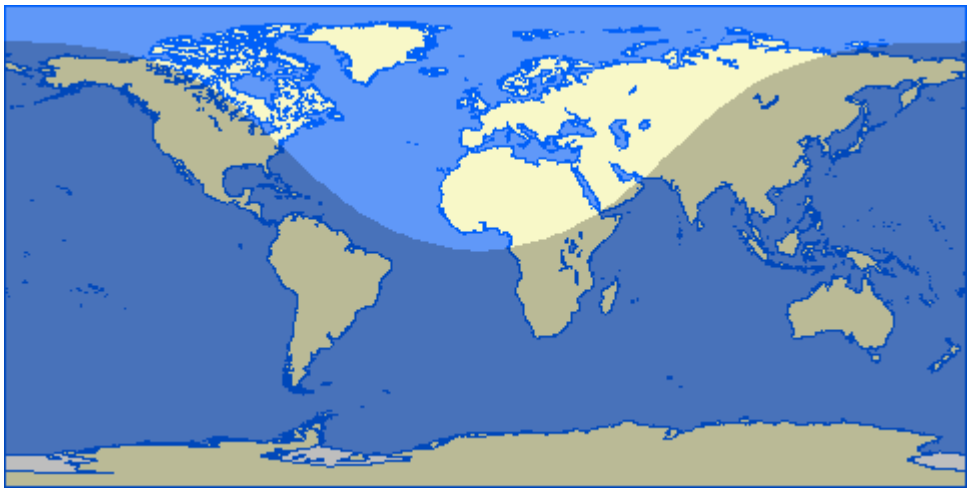

Illustration 3: 3600 mile range from BIA (gc.kls2.com)

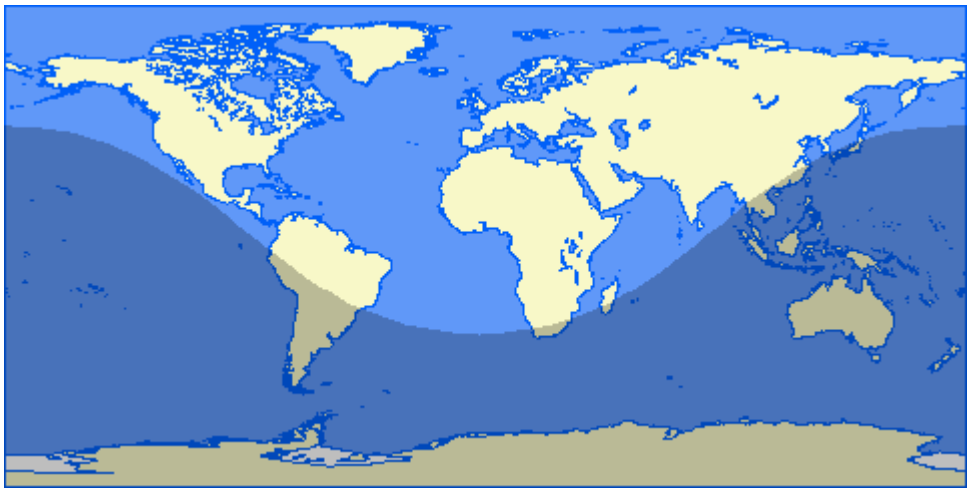

Illustration 4: 5000nm range from BIA

So the use of the 787 might allow more destinations to be reached including India and the west coast of America, but not the top leakage destinations of Hong Kong, Bangkok, Tokyo, Johannesburg, Australia or New Zealand. The likelihood is that one extra long-haul route (to Dubai) would be added before the 787 is available and possibly one more afterwards. As Boston and

Chicago are already within range, if they are not taken up in preference to Dubai it is because of a lack of demand, which is not going to be changed by the new plane being introduced.

So the impact on leakage by adding long-haul routes is likely to be 100,000 passengers or less.

We can imagine that Exeter could capture passengers from Cornwall and Devon and some of Dorset, and possibly Somerset for a desirable route. Bournemouth could capture passengers from Devon, Dorset and possibly some from Wiltshire. A route to New York from Exeter might cut the leakage to Heathrow by a substantial amount for that route, but might also reduce the demand at Bristol for its existing Newark route.

But the key point is that the demonstrated demand for most routes used by SW customers at Heathrow is too low to sustain a frequent scheduled route from **any** of the region's airports, and the majority of the leakage would continue irrespective of any new routes proposed for BIA. Any routes that were added at any of the SW airports would be mostly used by extra stimulated demand rather than by the current leakage to Heathrow, and hence this would increase both outbound tourism spend, flights and net emissions.

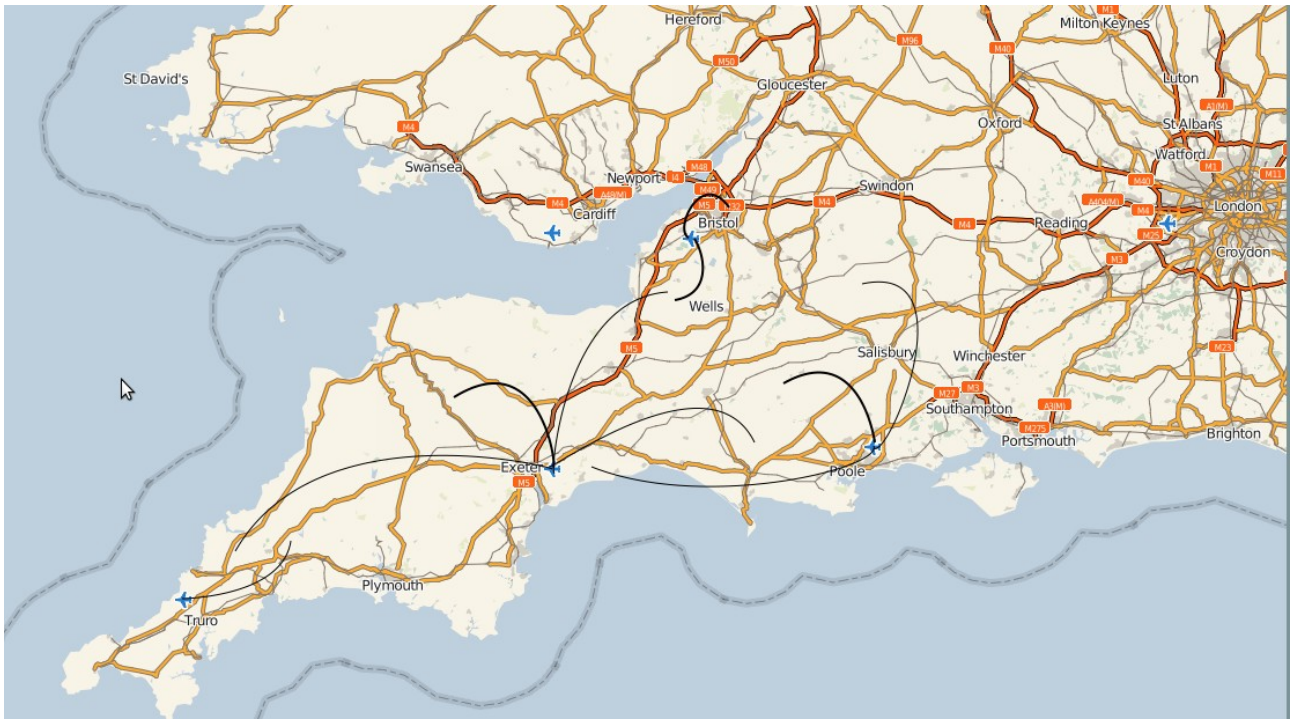

Illustration 5: Likely flows reducing leakage after airport expansion

The above figure shows the likely areas feeding regional airports with passengers that make up the current leakage, should those airports offer routes that compete with the existing Heathrow ones.

It is hard to quantify the size of these flows but if a new route to New York was offered by Exeter, and this captured all of the leakage to Heathrow for JFK, Newark and La Guardia from Somerset, Devon, Cornwall and Dorset (which is unlikely) we find a total of 43,000 passengers of which 8,000 are on business. This equates to around a three times weekly service which might just be enough for a business long haul route, otherwise most of the business custom would be lost, and would imply a twice weekly leisure service. In order for this route to be viable it most likely would rely on taking custom from the Bristol-Newark route and increasing local outbound demand – neither of which reduce leakage. Few other routes look feasible.

Even for BIA's natural catchment area there are many passengers who choose to use Heathrow to access New York. In 2008 there were 45,500 passengers from Avon, Gloucestershire and Somerset that choose Heathrow over BIA to reach New York, and even 6600 who use Heathrow to reach

Newark – the same airport that BIA serves. In the same year, BIA carried 90,159 passengers to Newark. This seems to show that a substantial amount of the leakage would remain even if BIA offered routes to exactly the same destinations, and much more would remain if it was only a nearby one. This may be particularly true when the route is offered by a no-frills airline that chooses to use a cheaper but more remote far-end airport

From the Heathrow leakage data it is very hard to see other plausible routes from airports within the South West that would substantially reduce usage of routes from Heathrow and which could be implemented at BIA. For instance, the airport Ryanair refer to as "Munich" is in fact in Memmingen and is 117km or 80 minutes away from the centre of Munich, whereas the "Munich" served by Heathrow is 38km or 33 minutes from Munich, and accessible by the S-Bahn. It is easy to see that UK travellers are more comfortable with reaching a more distant airport (eg Heathrow) within the UK, often using their own car, than they would be in negotiating long distance travel in a foreign country.

The Local Airport Effect

It is common for people to state that they have policy (or at least a strong preference) to travel from their local airport. This is partly to do with total travel time, and partly a brand loyalty. It is even visible in the fact that people have chosen to pay a substantial premium on package holidays in order to fly from their local airport rather than Manchester, Birmingham or Gatwick.

The total travel time element explains why people are willing to use a less local airport for long haul flights, but are less willing for short haul flights. A substantial fare differential can override this when a more distant airport offers a no-frills flight and the local one only offers a full service carrier. However, Heathrow does not operate no-frills flights so this implies much longer travel times to Luton, Stansted or Gatwick to access these services. As the no-frills operators have spread to more regional airports, the incentive to travel a long way to get a cheaper fare has been lost.

Business travellers typically require to get to a precise place (and hence airport) as swiftly and reliably as possible, with less sensitivity to price. Leisure passengers often make more generic choices of destination, eg "somewhere in the south of France" and are more price sensitive.

This explains why in the past, new routes offered at regional airports have been predominantly used by leisure passengers from the area close to the airport, and that the flows of passengers are mostly new and not diverted from using other airports which they previously would have used. This is often referred to as "suppressed demand" but in fact is more accurately "stimulated demand" ie the presence of the route caused people to consider flying to the destination – there was little or no previous unsatisfied demand in the area to reach that destination. Most sustained routes from BIA are dominated by leisure passengers.

Emissions

If we assumed that all of the 2.8m passengers that travel between Heathrow and the South West were saved through expansion, this would save 145m passenger miles. Taking into account public transport usage and car occupancy this equates to 50m car miles. Using average car emissions figures of 170g CO2/km (272g/mile) we can calculate that this would release 13,617 tonnes of CO2 per year.

However, we have seen that in fact the destinations reached from Heathrow are so diverse, and the demand by South West passengers for any given route so small, that it is very hard to imagine more than 650,000 passengers being diverted, and more likely around between 100,000 and 200,000. This would imply that real emissions saved by reduced car travel would between 500 and 3,200 tonnes per year.

But we have also seen that it is unlikely that any of these routes would be economically viable

without stimulating extra demand beyond that diverted from Heathrow. This not only means that more passengers would be flown in total, and hence the emissions caused by carrying them would increase, but also that more planes would be flying in total because the loss of the SW passengers would be insufficient to make the existing route from Heathrow fold.

So we have to balance the extra emissions due to adding routes from BIA against the possible savings in surface travel. If a route was added from BIA to Munich, a flight of 680 miles, then this would emit roughly 20 tonnes of CO2 per one way flight.[4] Thus for a daily scheduled service this one route would add 14,600 tonnes of CO2 per year – rather more than the total possible savings from car travel.

It is important to note that the impact of aviation emissions is much higher than the amount of carbon dioxide might imply. The key experts on this matter state that the overall impact is around double the impact caused by CO2 alone[5].

From this we can see that the climate impact of even one extra daily scheduled route would be around 29,000 tonnes of CO2 per year and this is more than double the maximum possible surface access savings, and more nearly ten times the likely savings from cars.

To divert all of the Heathrow leakage passengers would require at least 25 extra daily routes[6] and hence increase climate impacts by the equivalent of 725,000 tonnes of carbon dioxide which is 53 times the impact saved by reducing car travel.

Therefore there is no sense in which cutting the leakage to Heathrow by adding flights at regional airports could reduce total climate changing emissions.

SBAE believes that the decision on whether or not expansion can take places lies with North Somerset Council. The Council has a duty under the Department for Communities and Local Government's planning Policy Statements to reduce greenhouse gases and consider them when making a planning decision. The 'Leakage' argument reviewed under this report clearly shows that there will be an increase in carbon emissions if expansion occurs and that therefore the application should be rejected.

4The element of these emissions attributable to the weight of the passengers diverted from Heathrow (and hence saved from another flight) would be relatively small – the empty plane would weigh around 40 tonnes, whereas the passengers and luggage would weigh around 12 tonnes, and the fuel would again add weight only part of which would be determined by the passengers count.

5 The lead author on aviation for the IPCC (Prof David Lee) states that: "the non-CO2 effects of aviation emissions cannot be ignored and that the likely consequence of those effects is to roughly double the impact of the CO2 effects alone".

6 ignoring the destinations those passengers currently go to and assuming they all go to short haul routes. In reality it would take far more flights and many long haul routes to achieve this